

TIERS
IN FULL

CHILDREN'S SURGICAL SERVICES

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Children’s Surgical Services: Tiers in Full to Support Operational Planning

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HOW TO CITE THE CHILDREN’S SURGICAL SERVICES:

We encourage you to share these documents with others and we welcome their use as a reference. Please cite each document in the module in keeping with the citation on the table of contents of each of the three documents. If referencing the full module, please cite as:

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Children's Surgical Services: Tiers in Full to Support Operational Planning

1.0 Surgical Tiers of Service

1.1 Module Development

The Children's Surgical Tiers of Service module is made up of three components:

1. Documents that provide context and were developed to inform the Surgical Tiers module
 - a. *Children's Surgical Services: Setting the Stage for Tiers Development*
 - b. Summary of the Evidence Volume-Outcome Relationship in Pediatric Surgery¹
2. Children's Surgical Services: Tiers in Brief to Support System Planning (Provides a high-level overview of key aspects of the module.
3. Children's Surgical Services: Tiers in Full to Support Operational Planning (Provides significant detail of key aspects of the module: (1) clinical service. (2) knowledge sharing/training; and (3) quality improvement/ research) (**this document**).

This document, the **Children's Surgical Services: Tiers in Full to Support Operational Planning**, builds on and is intended to be used in conjunction with the *Children's Surgical Services: Tiers in Brief to Support System Planning*.

The module was developed by an interdisciplinary working group comprised of a representative(s) from each of BC's HAs (various combinations of surgeons, anesthesiologists, nurses, directors/managers and planners), Child Health BC and a meeting facilitator. In addition to the working group, representatives from all BC HAs and other constituent and topic-specific groups provided feedback on the draft document. The final version was submitted to the Provincial Surgical Executive Committee and Child Health BC Steering Committee for acceptance.

The document was informed by work done in other jurisdictions, mostly notably Queensland,² New South Wales,³⁻⁶ Australia,⁷ the United Kingdom⁸⁻¹³ and the United States.¹⁴ B.C. data was used where it was available, as were relevant BC and Canadian standards (e.g., Provincial Privileging documents¹⁵⁻¹⁸ and the Royal College of Physicians and Surgeons Objectives of Training^{19,20}).

1.2 Module Scope

Surgical services discussed in this document are hospital-based and are provided in surgical day care, operating rooms, and inpatient and outpatient settings. Procedures usually require some form of anesthetic and/or procedural sedation.

Services are accessible follows:ⁱ

- a. New patients: Up to a child's 17th birthday (16 years + 364 days); and

ⁱ BC Children's Hospital. Administration manual: Admission age, BCCH and Sunny Hill Hospital for Children. 2010.

- b. Children receiving ongoing care: Up to a child’s 19th birthday (18 years + 364 days).

2.0 Children’s Surgical Services Tiers in Full

2.1 Differentiation of the Tiers

2.1.1 Definitions

“Medical complexity,” “procedural complexity” and “age” are used to differentiate the tiers from each other. Refer to tables 1, 2 and 3 for definitions.

Table 1: Medical Complexity

The American Society of Anesthesiologists (ASA) score is used as a proxy for “medical complexity.”

Medical Complexity	ASA Score	Description
Low	ASA 1	<ul style="list-style-type: none"> • Healthy child.
	ASA 2	<ul style="list-style-type: none"> • Child with mild systemic disease – no functional limitation (e.g., child with well controlled asthma or diabetes).
Modest	ASA 3	<ul style="list-style-type: none"> • Child with severe systemic disease – definite functional limitation (e.g., child with congenital heart disease or early muscular dystrophy).
Severe	ASA 4	<ul style="list-style-type: none"> • Child with severe systemic disease – a constant threat to life (e.g., child with late muscular dystrophy, pulmonary hypertension or cardiac myopathy).
	ASA 5	<ul style="list-style-type: none"> • Moribund child not expected to survive 24 hrs with or without surgery (e.g., perforated abdomen with end stage sepsis and multi-organ failure).

Note re use of ASA score as a proxy for medical complexity:

ASA is a simple classification system used to identify a child’s health status before surgery. The intent of using the ASA classification as a proxy for medical complexity is to convey the concept that a child without a significant concurrent medical condition(s) or with a condition which is medically controlled and not expected to significantly impact the complexity or risk of periop/post-operative care can be safely cared for in a T2, T3 or T4 centre. Conversely, a child with a significant concurrent medical condition(s) which is not medically controlled and/or is evolving and/or is expected to significantly impact the complexity or risk of providing periop/post-operative care is most safely cared for in a T6 or, depending upon the type and severity of the condition(s), a T5 centre. Final determination of the appropriate tier needs to be decided on a case-by-case basis.

Examples of children with medium or high medical complexities (i.e., ASA 3 or greater):

- Chronic lung disease with oxygen dependency, home ventilation or CPAP.
- Airway pathology. e.g., laryngo and tracheomalacia, tracheal stenosis, significant sleep apnea.
- Complex syndromes particularly those involving the airway, breathing or circulation.
- Serious neuromuscular disorders. e.g., duchenne muscular dystrophy.
- Severe cerebral palsy with complex needs.

- Major respiratory disease. e.g., cystic fibrosis with major derangement of respiratory function.
- Metabolic and complex endocrine disease (excluding stable diabetes and hypothyroidism).
- Pulmonary hypertension.
- Significant congenital heart disease. e.g., complex shunts/circulations.
- Significant hematological disorders. e.g., sickle cell disease and hemophilia.
- Significant renal and/or hepatic impairment.
- Unstable epilepsy.

Table 2: Procedural Complexity

Procedural Complexity	Description
Low	<ul style="list-style-type: none"> • Procedure is commonly performed on children (most low complexity procedures are also commonly performed on adults); AND • Typical time in the operating room is less than 2 hours; AND • Routine OR equipment requirements; AND • Post-operative care requires RNs with general pediatric knowledge and skills, with access to an interdisciplinary team on a case-by-case basis; AND • Post-operative admission to an NICU or PICU is not expected; AND • Transfusion of blood products intraoperatively is unlikely; AND • Risk of a significant intra or post-operative complication is low.
Medium	<ul style="list-style-type: none"> • Procedure or technique is unique to children but is performed relatively frequently; OR • Requires equipment or devices not routinely stocked by operating rooms; OR • Risk of intraoperative blood product transfusion(s) is <u>not</u> negligible; OR • Risk of intra or post-operative complication(s) is <u>not</u> negligible; OR • Post-operative care requires RNs and an interdisciplinary team with med/surg knowledge and skills that works exclusively or primarily with children; <p>AND</p> <ul style="list-style-type: none"> • Post-operative admission to PICU is not expected (post-operative admission to an NICU may be expected); AND • Involves a single perioperative surgical specialty; AND • Does not require pre and post-operative multi-specialty coordination (e.g., oncology, GI medicine and interventional radiology).
High	<ul style="list-style-type: none"> • Procedure or technique is unique to children and is performed infrequently; OR • Post-operative care requires RNs and an interdisciplinary team with subspecialty surgical knowledge and skills that works exclusively or primarily with children; OR • Post-operative admission to a PICU is expected; OR • Involves multi-specialty perioperative participation (e.g., general and ENT surgeon); OR • Requires pre and post-operative multi-specialty coordination (e.g., oncology, GI medicine and interventional radiology).
Life & limb <i>Applicable to all tiers</i>	<ul style="list-style-type: none"> • Procedure done on an unplanned/emergency basis that would not normally be within the capacity of a given site but which, if resources are available (trained personnel, equipment, etc), is performed because the risk of transport is > risk of performing the procedure locally. • Most likely to occur in rural & remote settings.

Table 3: Age

Description	Pediatric Expertise & Requirements	Anesthesia Provider
14 – 16.9 years	Limited pediatric expertise and equipment required	Adult anesthesia specialist
2 – 13.9 years	Pediatric expertise and equipment required	Adult anesthesia specialist with some pediatric practice
6 mos – 1.9 years	Pediatric expertise and equipment for very young children required	Adult anesthesiologist with high volume pediatric practice or pediatric anesthesiologist
0 – 6 months	Pediatric expertise and equipment for neonates & very young children required	Pediatric anesthesiologist

2.1.2 Relationships: Medical & Procedural Complexity, Age & Tiers

Table 4 provides an overview of the relationship between medical complexity, procedural complexity, age and the appropriate types of children served at each tier.

Table 4: Children Appropriate to Receive Services at Each Tier (based on Medical Complexity, Age & Procedural Complexity)

		T1			T2			T3			T4			T5			T6		
		Procedural Complexity																	
Medical Complexity	Age	Low	Med	High	Low	Med	High	Low	Med	High	Low	Med	High	Low	Med	High	Low	Med	High
Low (ASA 1-2)	0 - 6 mos													*	*	*			
	6 mos - 2 yrs															*			
	2 yrs & up															*			
Med (ASA 3)	0 - 6 mos													*	*	*			
	6 mos - 2 yrs															*			
	2 yrs & up															*			
High (ASA 4&5)	0 - 6 mos																		
	6 mos - 2 yrs																		
	2 yrs & up																		
Life & Limb																			

*= Applicable only if relevant pediatric surgical specialty team and pediatric anesthesiologist is available.

T1	Prevention, Primary & Emergent Health Service
T2	General Surgical Service
T3	Child-Focused Surgical Service

T4	Children's Comprehensive Surgical Service
T5	Children's Regional Enhanced & Subspecialty Surgical Service
T6	Children's Provincial Subspecialty Surgical Service

2.2 *Responsibilities and Requirements at each Tier*

The next section describes the responsibilities and requirements at each tier to provide a **safe**, **sustainable** and **appropriate** level of service.

Refer to Table 5 for the types of surgical procedures appropriate to be performed at each tier, on whom and by whom (Table 5 is similar to Table 4 but provides additional detail about the types of providers appropriate to involve, by tier).

Note:

This document and other documents in the module are intended to guide discussions within HAs and provincially about the appropriate provision of surgical services for children. These discussions are guided not only by the responsibilities and requirements outlined in this document but also by the risks inherent in the service being discussed and by similar activities that contribute to the maintenance of the required service and skills. This module creates an opportunity for HAs to reflect on the appropriate types of surgical services provided to children and to deliberately plan an approach to service and skill maintenance, especially in situations where limited practical experience is available.

Table 5: Types of Surgical Procedures Performed at Each Tier, on Whom & by Whom

		T2			T3			T4			T5			T6			
		General Surgical Services			Child-Focused Surgical Services			Children's Comprehensive Surgical Services			Children's Regional Enhanced & Subspecialty Surgical Services			Children's Provincial Surgical Subspecialty Services			
		Procedural Complexity			Procedural Complexity			Procedural Complexity			Procedural Complexity			Procedural Complexity			
ASA	Age	Low	Med	High	Low	Med	High	Low	Med	High	Low	Med	High	Low	Med	High	
Medical Complexity	1	0 - 6 mos									PA & S	PA & PS	PA & PS ²			PA & PS ³	
	&	6 mos - 2 yrs						A2 & S				A2 & S	PA & PS ²			PA & PS ³	
	2	2 yrs & up	A1 & S			A1 & S						A1 & S	PA & PS ²			PA & PS ²	
	3	0 - 6 mos										PA & PS	PA & PS	PA & PS ²	PA & PS	PA & PS	PA & PS ³
		&	6 mos - 2 yrs									A2 & S	A2 & S	PA & PS ²			PA & PS ³
		2 yrs & up										A1 & S	A1 & S	PA & PS ²			PA & PS ³
	4	0 - 6 mos													PA & PS	PA & PS	PA & PS
		&	6 mos - 2 yrs												PA & PS	PA & PS	PA & PS
		2 yrs & up													PA & PS	PA & PS	PA & PS
Life & limb procedures ¹		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	

Abbreviations

A1	Anaesthesiologist who meets the currency requirements in the Provincial Privileging document (400 hrs/yr, adults & children + 80 CPD credits/yr). At T2 & T3, may be a family practice anesthesia provider who meets the currency requirements in the Provincial Privileging document (recommended current clinical activity to meet licensure requirements of the College of Physicians and Surgeons of BC, of which 150 hrs are self-reported anesthesia related activity plus 30 hours of anesthesia-related CME over a 3 year cycle).
A2	Anaesthesiologist who meets the currency requirements in the Provincial Privileging document for providing anesthesia to children ages 6 mos - 2yrs. This includes recent experience providing anesthesia to children in this age group + 10 CPD credits/year in pediatric anesthesiology.
PA	Anaesthesiologist who has completed a 12-month fellowship in pediatric anesthesia & meets the currency requirements in the Provincial Privileging document. This includes recent experience providing anesthesia to children in the 0 - 6 mos age group + 80 CPD credits/yr with at least 20 CPD credits in pediatric anesthesiology. For cardiac anesthesia an additional 6-month fellowship in pediatric cardiac anesthesiology is required + 50 pediatric cardiac cases/yr + 80 CPD credits/yr with at least 20 CPD credits/yr in pediatric cardiac anesthesiology.
S	Surgeon who meets the currency requirements in the Provincial Privileging document for the relevant specialty (most specialties specify a minimum # procedures &/or # operative hrs required as the primary surgeon. Some also specify CME credit hrs/yr). At T2, may be a family physician with enhanced surgical skills who meets the currency requirements in the Provincial Privileging document (current demonstrated skill & an adequate volume of experience - 20 hrs/yr non-endoscopic surgical time or 50 hrs/yr surgical-related activity including consults, call backs to the ED & maternity wards, CPD).
PS	Surgeon who has completed a pediatric fellowship & meets the currency requirements in the Provincial Privileging document for the relevant surgical specialty (including pediatric-specific requirements, if specified).

HAs to identify specific procedures appropriate to perform at each facility. Decisions will reflect the tier designation & consider factors identified in Appendix 1 (Table 1.1.a).

Note 1: Risk of transporting the child is greater than the risk of performing the procedure locally. Assumes availability of resources (trained personnel, equipment, etc).

Note 2: Specific high complexity procedures available at T5 is determined by the HA and considers factors identified in Appendix 1 (Table 1.1.a). The range of procedures available at T5 is narrower than the range at T6.

Note 3: Full range of high complexity procedures is available.

2.2.1 Clinical Service

2.2.1.1 Responsibilities

		T2	T3	T4	T5	T6
		General Surgical Services	Child-Focused Surgical Services	Children's Comprehensive Surgical Services	Children's Regional Enhanced & Subspecialty Surgical Services	Children's Provincial Surgical Subspecialty Services
1	Service reach	Local community/local health area.	Multiple local health areas/health service delivery area.	Health service delivery area/health authority.	Health authority.	Province.
2	Surgical settings	<ul style="list-style-type: none"> Day care (mostly) Planned 	<ul style="list-style-type: none"> Day care & inpatient Planned & unplanned 	<ul style="list-style-type: none"> Day care & inpatient Planned & unplanned 	<ul style="list-style-type: none"> Day care & inpatient Planned & unplanned 	<ul style="list-style-type: none"> Day care & inpatient Planned & unplanned
3	Surgeons & anesthesia providers	<p>Variable, depending on surgeon availability (locally & via outreach).</p> <p>General surgeon or family practice physician with enhanced surgical skills available in rural & remote sites (not 24/7). Transfer algorithm in place when surgical or anesthesia provider is not available.</p> <p>See Appendix 2 for a list of procedures that & rural & remote sites should be prepared (but not limited) to perform.</p>	<p>General surgeon available on-call 24/7 & available on-site as needed.</p> <p>Strive to have dental surgery, ophthalmology, orthopedics, ENT, plastics and urology on-call 24/7 & available on-site as needed. Transfer algorithm in place at times an appropriate surgical specialty is not available (e.g., vacations).</p> <p>Anesthesia provider on-call 24/7.</p> <p>See Appendix 2 for a list of procedures that T3 services should be prepared (but not limited) to perform.</p>	<p>Specialists available on-call 24/7 & available on-site as needed to assess & manage children with all types of surgical conditions except cardiac or neurosurgery-related. Managing a surgical condition may include performing a surgical procedure, developing an alternative management plan or transferring the child to a T5/T6 service.</p> <p>Anesthesiologist who meets the credentialing requirements available to provide anesthesia to children ages 6 mos - 2 yrs 24/7.</p>	<p>Same as T4 plus:</p> <p>Pediatric surgical specialists available for some specialties (<u>not</u> 24/7).</p> <p>Pediatric anesthesiologist(s) available 24/7.</p>	<p>Pediatric surgical specialists available 24/7 to assess & definitively manage children with all types of surgical conditions, including multi-system trauma.</p> <p>Pediatric anesthesiologist(s) available 24/7.</p>
4	Procedures performed	Refer to Table 5 (previous page)	Refer to Table 5 (previous page)	Refer to Table 5 (previous page)	Refer to Table 5 (previous page)	Refer to Table 5 (previous page)

		T2	T3	T4	T5	T6
		General Surgical Services	Child-Focused Surgical Services	Children's Comprehensive Surgical Services	Children's Regional Enhanced & Subspecialty Surgical Services	Children's Provincial Surgical Subspecialty Services
5	Pre-admission care	<p>Implements algorithm to screen & follow-up anesthetic, medical & behavioural risk in healthy children ages 2 & over (e.g., blood work, anesthesia consult, etc).</p> <p>Provides pre-operative teaching for children undergoing common, low complexity procedures & their families.</p>	Same as T2.	<p>Same as T3 plus:</p> <ul style="list-style-type: none"> Children may be ages 6 mos & over. Provides pre-operative teaching for children undergoing a broad range of low complexity procedures. 	<p>Same as T4 plus:</p> <ul style="list-style-type: none"> Children may be any age and have modest medical complexities. Provides pre-operative teaching for children undergoing medium & a limited range of specific high complexity procedures. 	<p>Same as T5 plus:</p> <ul style="list-style-type: none"> Children may have severe medical complexities. Provides pre-operative teaching for children undergoing a broad range of high complexity procedures.
6	Preoperative care	<p>Prepares children ages 2 & over pre-operatively undergoing common, low complexity procedures. Assesses condition & takes action if issues identified.</p>	Same as T2.	<p>Same as T3 plus:</p> <ul style="list-style-type: none"> Children may be ages 6 mos & over. Provides pre-op care for children undergoing a broad range of low complexity procedures. 	<p>Same as T4 plus:</p> <ul style="list-style-type: none"> Children may be any age and have modest medical complexities. Provides pre-op care for children undergoing medium & a limited range of specific high complexity procedures. 	<p>Same as T5 plus:</p> <ul style="list-style-type: none"> Children may have severe medical complexities. Provides pre-op care for children undergoing a broad range of high complexity procedures.
7	Intraoperative care	Refer to Table 5. (profile of children & types of procedures).	Refer to Table 5. (profile of children & types of procedures).	Refer to Table 5. (profile of children & types of procedures).	Refer to Table 5. (profile of children & types of procedures).	Refer to Table 5. (profile of children & types of procedures).

		T2	T3	T4	T5	T6	
		General Surgical Services	Child-Focused Surgical Services	Children's Comprehensive Surgical Services	Children's Regional Enhanced & Subspecialty Surgical Services	Children's Provincial Surgical Subspecialty Services	
8	Post-anesthetic care unit (PACU)	<p>Provides q 5-15 min post-op monitoring (pulse, respiration, BP, O₂ saturation) until child is stable. Temperature & input/output on arrival to PACU & as necessary thereafter.</p> <p>Nursing staffing is based on the guidelines provided in the National Association of PeriAnesthesia Nurses of Canada (NAPAN) Standards for Practice.^{ii,21}</p>	Same as T2.	Same as T3.	<p>Same as T4.</p> <p>Refer to Children's Critical Care Module for availability of critical care services.</p>	<p>Same as T5 plus:</p> <p>Refer to Children's Critical Care Module for availability of critical care services.</p>	
9	Post-op care: Day care	Care & Monitoring	Provides post-op care & monitoring for children ages 2 & over who have undergone common, low complexity procedures . Assesses condition & takes action if issues identified.	Same as T2.	<p>Same as T3 plus:</p> <ul style="list-style-type: none"> • Children may be ages 6 mos & over. • Provides post-op care for children who have undergone a broad range of low complexity procedures. 	<p>Same as T4 plus:</p> <ul style="list-style-type: none"> • Children may be any age & have modest medical complexities. • Provides post-op care for children who have undergone medium & limited range of specific high complexity procedures. 	<p>Same as T5 plus:</p> <ul style="list-style-type: none"> • Children may have severe medical complexities. • Provides post-op care for children who have undergone a broad range of high complexity procedures.

ⁱⁱ 1:1 nurse/child ratio: Initial admission to PACU, artificial airway in place, unresponsive child or child 8 yrs or younger without family or competent support staff present.
1:2 nurse/child ratio: Child is conscious, stable, free of complications. If child is 8 yrs or younger, must also have a family or competent support staff present.

			T2	T3	T4	T5	T6
			General Surgical Services	Child-Focused Surgical Services	Children's Comprehensive Surgical Services	Children's Regional Enhanced & Subspecialty Surgical Services	Children's Provincial Surgical Subspecialty Services
	Post-op care: Day care cont'd	Discharge	Prepares children ages 2 & over who have undergone common, low complexity procedures & their families for discharge.	Same as T2.	Same as T3 plus: <ul style="list-style-type: none"> Children may be ages 6 mos & over. Prepares children who have undergone a broad range of low complexity procedures for discharge. 	Same as T4 plus: <ul style="list-style-type: none"> Children may be any age and have modest medical complexities. Prepares children who have undergone medium & limited range of specific high complexity procedures for discharge. 	Same as T5 plus: <ul style="list-style-type: none"> Children may have severe medical complexities. Prepares children who have undergone a broad range of high complexity procedures for discharge.
10	Post-op care: ⁱⁱⁱ Inpatients	Care & monitoring	Provides post-op care & up to q4h monitoring (TPR, BP, O2 saturations, input & output & blood sugars) for children ages 2 & over who have undergone common, low complexity procedures. Q4h refers to monitoring beyond the initial post-operative period.	Same as T2 plus: <ul style="list-style-type: none"> Monitoring frequency may be up to q2h. 	Provides post-op care & up to q1h monitoring (TPR, BP, O2 saturations, input & output & blood sugars) for children ages 6 mos & over who have undergone a broad range of low complexity procedures. Q1h refers to monitoring beyond the initial post-operative period. Refer to Children's Critical Care Module for availability of critical care services.	Same as T4 plus: <ul style="list-style-type: none"> Monitoring frequency may be more frequent than q1h & for prolonged periods. <p>Refer to Children's Critical Care Module for availability of critical care services.</p>	Same as T5.

ⁱⁱⁱ T2 column in section 10 (Post-op Care: Inpatients) is only applicable to sites where children are admitted as inpatients (i.e., rural & remote sites).

			T2	T3	T4	T5	T6
			General Surgical Services	Child-Focused Surgical Services	Children's Comprehensive Surgical Services	Children's Regional Enhanced & Subspecialty Surgical Services	Children's Provincial Surgical Subspecialty Services
10 cont'd	Post-op care: Inpatients cont'd	Pain management	<p>Assesses pain using age & developmentally appropriate pain assessment tool(s).</p> <p>Provides age & developmental stage appropriate pain relieving interventions.</p> <p>Administers weight-based doses of analgesics via topical, oral, enteral, intranasal & rectal routes.</p> <p>Manages complications of analgesia (e.g., manage airway, administer antidotes).</p>	<p>Same as T2 plus:</p> <ul style="list-style-type: none"> Administers weight-based doses of analgesics via SQ & IM injection & intermittent IV routes. 	<p>Same as T3 plus:</p> <ul style="list-style-type: none"> Administers analgesics via patient controlled IV route. Administers analgesics via continuous IV to children ages 2 years & over. 	<p>Same as T4 plus:</p> <ul style="list-style-type: none"> Administers analgesics via continuous IV to children ages 6 mos & over. <p>Optional (not required): May offer epidural anesthesia/analgesia if:</p> <p>(a) pediatric anesthesiologist is on-call 24/7, available on-site as needed & is comfortable with the plan; & (b) nurses have received specific education & are comfortable with the plan.</p>	<p>Same as 5 plus:</p> <ul style="list-style-type: none"> Manages pain for children of any age that require an extended & innovative range of options & routes. May include regional analgesia/anesthesia (e.g., epidurals).
		Post-op complications	<p>Manages common post-op complications (e.g., urinary retention, fever, surgical site infection requiring IV antibiotics). Refers to T3-T6 as necessary.</p>	<p>Same as T2.</p>	<p>Same as T3 plus:</p> <ul style="list-style-type: none"> Manages complex post-op complications, including children referred/transfer red from T2 & T3 services within the HA. 	<p>Same as T4 plus:</p> <ul style="list-style-type: none"> Manages complex post-op complications, including children referred/transfer red from T2, T3 & T4 services within the HA. 	<p>Same as T5 plus:</p> <ul style="list-style-type: none"> Manages complex post-op complications, including children referred/transfer red from T2 - T5 services throughout the province. Management often involves multiple pediatric subspecialists.

			T2	T3	T4	T5	T6
			General Surgical Services	Child-Focused Surgical Services	Children's Comprehensive Surgical Services	Children's Regional Enhanced & Subspecialty Surgical Services	Children's Provincial Surgical Subspecialty Services
10 cont'd	Post-op care: Inpatients cont'd	Parenteral fluid & medication management	<p>Initiates & maintains continuous peripheral IV infusions with pre-mixed electrolytes.</p> <p>Administers common intermittent IV medications via syringe & mini-bag (e.g., antibiotics). Excludes analgesics.</p> <p>Smart IV pumps^{iv} used for all children on IVs.</p>	<p>Same as T2 plus:</p> <p>Administers a range of intermittent IV medications via syringe & mini-bag (e.g., antibiotics, opiates).</p> <p>Maintains PICC lines.</p>	<p>Same as T3 plus:</p> <p>Initiates PICC lines.</p> <p>Initiates & maintains short & long-term CVCs.</p> <p>Accesses, maintains & deaccesses venous access devices.</p> <p>Initiates & maintains high risk medication peripheral IV infusions (e.g., insulin).</p>	<p>Same as T4 plus:</p> <p>Inserts venous access devices (in the OR).</p>	Same as T5.
		Blood & blood component administration		Initiates & maintains infusions of blood & blood components.	Same as T3.	Same as T4.	Same as T5.

^{iv} A "smart pump" has customizable software with a library of medications that can be programmed for different patient groups and provide alerts such as clinical advisories, soft stops and hard stops.

			T2	T3	T4	T5	T6
			General Surgical Services	Child-Focused Surgical Services	Children's Comprehensive Surgical Services	Children's Regional Enhanced & Subspecialty Surgical Services	Children's Provincial Surgical Subspecialty Services
10 cont'd	Post-op care: Inpatients cont'd	Nutrition management	<p>Provides health promoting nutrition advice & proactive surveillance for children with stable nutrition needs & low complexity medical conditions. e.g., normal nutritional requirements, management of food sensitivities, healthy eating and healthy weights, accurate weights & measures.</p> <p>Inserts, replaces & maintains NG tubes for short-term hydration. Verifies placement using x-ray.</p> <p>Replaces & maintains established G-tubes.</p> <p>Continues established for nutritional intake while in hospital (oral or via tube). Does not initiate new mechanism.</p> <p>Supports breastfeeding mothers & assists with breastfeeding-related challenges.</p>	<p>Same as T2 plus:</p> <p>Provides nutrition advice & growth & monitoring for children with stable nutrition needs & common medium complexity medical conditions. e.g., uncomplicated failure to thrive, fluid management, dehydration.</p> <p>Determines selection & amounts of standard oral & enteral formulas for oral intake.</p>	<p>Same as T3 plus:</p> <p>Provides nutrition advice & growth monitoring for children with stable nutrition needs & a broad range of medium complexity medical conditions.</p> <p>Determines selection & amounts of & specialized oral & enteral formulas for oral or enteral intake.</p> <p>Inserts, replaces & maintains NG tubes required for nutritional management.</p> <p>Replaces established surgically-placed J-tubes (in OR).</p> <p>Establishes & replaces NJ tubes (in radiology).^v</p> <p>Establishes & maintains central venous access for delivery of parenteral nutrition for hospital & outpatient use.</p> <p>Initiates, administers & monitors TPN.</p> <p>Teaches children/families about home enteral nutrition.</p>	<p>Same as T4 plus:</p> <p>Provides nutrition advice & growth monitoring for children with significant (but stable) nutrition vulnerabilities & medical complexities.</p> <p>Makes decision & establishes G & J-tubes.</p> <p>Makes decision & establishes GJ tubes. Replaces established GJ tubes (in radiology)</p> <p>Available as a resource <i>within the HA</i> on days, M-F.</p>	<p>Same as T5 plus:</p> <p>Provides nutrition advice & growth monitoring for children with changing & complex nutrition needs & all levels of medical complexity.</p> <p>Available as a resource <i>throughout the province</i> on days, M-F.</p>

^v Assumes availability of adult or pediatric interventional radiologist that is comfortable caring for children. If not available, this would not be done at T4.

			T2	T3	T4	T5	T6
			General Surgical Services	Child-Focused Surgical Services	Children's Comprehensive Surgical Services	Children's Regional Enhanced & Subspecialty Surgical Services	Children's Provincial Surgical Subspecialty Services
10 cont'd	Post-op care: Inpatients cont'd	Wound management	Manages simple surgical wounds using standard protocols .	Same as T2.	Manages complex surgical wounds, including the use of negative pressure wound therapy.	Same as T4.	Same as T4 plus: • Provides specialty nursing consultation for complex wounds on an inpatient & outpatient basis.
		Ostomy care	Manages pre-existing (at least one week post-op), uncomplicated ostomies.	Same as T2.	Manages the care of new & pre-existing ostomies.	Same as T4.	Same as T5.
		Psycho-social & spiritual support	Supports children/families with relatively common, low complexity/acuity medical/surgical conditions & routine psychosocial/emotional needs (e.g., provides information about what to expect during hospital stay; tip sheets/picture books on helping children get through blood work/procedures). Consults with T3-T6 providers &/or refers to psychiatrist in situations requiring specialized support, as required (e.g., unexpected death, complicated grieving, end of life).	Provides limited counselling for children/families with relatively common, medium acuity/complexity medical/surgical conditions & routine psychosocial/emotional needs . Consults with T3/T6 providers &/or refers to psychiatrist in situations requiring specialized support, if required.	Provides specialized counselling for children/families with a broad range of medium acuity/complexity medical/surgical conditions & complicating psychosocial/emotional needs . Undertakes targeted interventions to reduce fear, pain &/or anxiety related to a child's diagnosis, hospitalization, treatment or procedure. May be group or 1:1. Upon request, provides consultation to T1-T3 providers within the HA on ways to support the psychosocial/emotional care of children/families with acute/complex medical/surgical conditions.	Provides specialized counselling for children/families with high acuity/medium medical/surgical conditions & complicating psychosocial/emotional needs . Undertakes targeted interventions to reduce fear, pain &/or anxiety related to a child's diagnosis, hospitalization, treatment or procedure. May be group or 1:1.	Provides specialized counselling for children/families with the most acute/complex medical/surgical conditions & complicating psychosocial/emotional needs . Undertakes 1:1 targeted interventions to reduce fear, pain &/or anxiety related to a child's diagnosis, hospitalization, treatment or procedure. May be group or 1:1.

			T2	T3	T4	T5	T6
			General Surgical Services	Child-Focused Surgical Services	Children's Comprehensive Surgical Services	Children's Regional Enhanced & Subspecialty Surgical Services	Children's Provincial Surgical Subspecialty Services
10 cont'd	Post-op care: In-patients cont'd	Psycho-social & spiritual support cont'd				Assesses, formulates diagnoses & provides 1:1 psychological interventions for referred children/families with acute &/or complex med/surg conditions. Upon request, provides consultation to T5 team & to T1-T3 providers within the HA on ways to support the psychosocial/emotional & psychological care of children/families with acute/complex med/surg conditions.	Assesses, formulates diagnoses & provides 1:1 psychological interventions for referred children/families with acute &/or complex med/surg conditions. Upon request, provides consultation to T6 teams & to T1-T3 providers throughout the province on ways to support the psychosocial/emotional & psychological care of children/families with acute &/or complex med/surg conditions.
		Rehabilitation	Provides general rehabilitation for healthy children ages 2 & over who have had low complexity procedures (adult focused rehabilitation therapists).	Same as T2.	Same as T3.	In keeping with the rehabilitation needs of children of all ages who have modest medical complexities &/or have had medium/selected high complexity procedures, provides rehabilitation activities which include: <ul style="list-style-type: none"> Supporting activities of daily living Encouraging mobilization Providing splinting, casting & equipment 	In keeping with the rehabilitation needs of children of all ages who have severe medical complexities &/or have had high complexity procedures, provides rehabilitation activities which include: <ul style="list-style-type: none"> Supporting activities of daily living Encouraging mobility Providing splinting, casting & equipment Assessing the environment for safety & accessibility

			T2	T3	T4	T5	T6
			General Surgical Services	Child-Focused Surgical Services	Children's Comprehensive Surgical Services	Children's Regional Enhanced & Subspecialty Surgical Services	Children's Provincial Surgical Subspecialty Services
						<ul style="list-style-type: none"> Assessing the environment for safety & accessibility <p>Documented plan in place to manage children requiring timely & time-bound rehabilitation post-discharge.</p>	<p>Documented plan in place to manage children requiring timely & time-bound rehabilitation post-discharge.</p> <p>Works collaboratively with local community-based rehabilitation providers to lead the development & support the implementation of care plans for children post-discharge. May include virtual care consultation &/or outreach.</p>
	Dis-charge	<p>Prepares children ages 2 & over who have undergone common, low complexity procedures & their families for discharge.</p> <p>Discharge plans may involve referrals to local community-based services. (e.g., IDP, PT, OT, SLP, audiologist, PHN).</p>	Same as T2.	<p>Same as T2 plus:</p> <ul style="list-style-type: none"> Children may be ages 6 mos & over. Prepares children who have undergone a broad range of low complexity procedures for discharge. <p>Discharge plans may require collaboration with providers in the child's home community and referral(s) to pediatric specialists/specialty teams (e.g., nursing support services, at-home program, specialty clinics).</p>	<p>Same as T4 plus:</p> <ul style="list-style-type: none"> Children may be any age and have modest medical complexities. Prepares children who have undergone medium & a limited range of specific high complexity procedures for discharge. 	<p>Same as T5 plus:</p> <ul style="list-style-type: none"> Children may have severe medical complexities. Prepares children who have undergone a broad range of high complexity procedures for discharge. <p>Discharge plans may be complex & involve multiple pediatric specialists/ programs, resources & equipment needs (e.g., NG or CVC care at home, home vent, home TPN, etc).</p>	

		T2	T3	T4	T5	T6
		General Surgical Services	Child-Focused Surgical Services	Children's Comprehensive Surgical Services	Children's Regional Enhanced & Subspecialty Surgical Services	Children's Provincial Surgical Subspecialty Services
11	Deteriorating situations	<p>Uses BC Pediatric Early Warning System (PEWS) to identify, communicate, mitigate & escalate signs of clinical deterioration. Implemented in all areas as defined by CHBC.</p> <p>Assesses & stabilizes critically ill children while arranging & awaiting transfer.</p>	Same as T2.	<p>Same as T3 plus:</p> <p>Capacity to perform endotracheal intubation 24/7 (on-site MD or RT).</p> <p>Refer to Children's Critical Care Module for availability of critical care services.</p>	<p>Same as T4 plus:</p> <p>Refer to Children's Critical Care Module for availability of critical care services.</p>	Same as T5. Refer to Children's Critical Care Module for availability of critical care services.
12	Outpatient pre- & post-op follow-up care	Pre and post-op care provided by surgeon in surgeon's office.	Same as T2.	<p>Specific aspects of pre & post-op care may be provided in general pediatric outpatient clinic (e.g., dressing changes, IV antibiotics or assessment &/or treatment by PT, OT or dietitian).</p>	<p>Same as T4 plus:</p> <p>Some subspecialty-specific interdisciplinary outpatient clinics available for children with complex needs.</p> <p>Some clinics involve more than one type of physician specialist (e.g., Cleft Lip Clinic, Club Foot Clinic, Feeding & Swallowing Clinic, Respiratory Clinic, Torticollis Clinic).</p>	<p>Broad range of subspecialty-specific interdisciplinary outpatient clinics available for children with complex needs. Many clinics involve more than one type of physician specialist.</p> <p>Examples: Cardiac Surgery Clinic, Cleft Palate/Craniofacial/Jaw Clinic, Scoliosis Clinic, Burns Clinic, Vascular Anomalies Clinic, Complex Feeding Clinic, Congenital Malformation Clinic.</p>

2.3.1.2 Requirements

		T2	T3	T4	T5	T6
		General Surgical Services	Child-Focused Surgical Services	Children's Comprehensive Surgical Services	Children's Regional Enhanced & Subspecialty Surgical Services	Children's Provincial Surgical Subspecialty Services
1.0	Providers					
1.1	Physicians					
	Surgeon(s)	<p>Surgical specialties: Variable, depending on surgeon availability (locally & via outreach).</p> <p>General surgeon or family practice physician with enhanced surgical skills available in rural & remote sites (not 24/7).</p> <p>Surgeons and family practice physicians meet the currency requirements in the Provincial Privileging document for the relevant specialty (most specify a minimum # procedures &/or # operative hrs required as the primary surgeon. Some also specify CME credit hrs/yr).</p> <p>Transfer algorithm in place when surgical provider is not available.</p>	<p>Surgical specialties: General surgeon on-call 24/7 & available on-site as needed.</p> <p>Strive to have dental surgery, ophthalmology, orthopedics, ENT, plastics and urology on-call 24/7 & available on-site as needed to perform procedures commonly required on children (see Appendix 2).</p> <p>Surgeons meet the currency requirements in the Provincial Privileging document for the relevant specialty.</p> <p>Transfer algorithm in place at times appropriate surgical specialty is not available (e.g., vacations)</p>	<p>Surgery specialists from all specialties on-call 24/7 & available on-site as needed to assess & manage children with all types of surgical conditions except cardiac or neurosurgery-related. Managing a surgical condition may include performing a surgical procedure, developing an alternative management plan or transferring the child to a T5/T6 service.</p> <p>Surgeons meet the meet currency requirements in the Provincial Privileging document for the relevant specialty.</p>	<p>Same as T4 plus:</p> <p>Pediatric surgery specialists available for some specialties (<u>not</u> 24/7). Surgeons have completed a pediatric fellowship & meet the currency requirements in the Provincial Privileging document for the relevant specialty (including pediatric specific requirements, if specified).</p>	<p>Pediatric surgery specialists on-call 24/7 & available on-site as needed. Surgeons have completed a pediatric fellowship in the relevant specialty and meet the minimum currency volumes + CME requirements in the Provincial Privileging document for the relevant specialty (including pediatric specific requirements, if specified).</p> <p>Pediatric trauma team available on-call 24/7 & available on-site as needed.</p> <p>Pediatric surgery specialists available on-call 24/7 to provide advice to health care providers throughout the province on pediatric surgery-related topics.</p>

		T2	T3	T4	T5	T6
		General Surgical Services	Child-Focused Surgical Services	Children's Comprehensive Surgical Services	Children's Regional Enhanced & Subspecialty Surgical Services	Children's Provincial Surgical Subspecialty Services
Anesthesia provider(s)	<p>Anesthesia provider (specialist or family practice physician) available on-site during times surgical procedures are performed.</p> <p>Anesthesia providers meet the currency requirements in the Provincial Privileging document:</p> <ul style="list-style-type: none"> Anesthesiologists: 400 hrs/yr, adults & children + 80 CPD credits/yr. Family practice anesthesia provider: 400 hrs/yr clinical activity plus 150 self-reported hrs/yr anesthesia-related activity (operative time, procedural sedation, emergency airway management & consultation). 	<p>Anesthesia provider (specialist or family practice physician) on-call 24/7 & available on-site as needed (by phone within 15 min & on-site within 2 hours max).</p> <p>Anesthesia providers meet the currency requirements in the Provincial Privileging document:</p> <ul style="list-style-type: none"> Anesthesiologists: 400 hrs/yr, adults & children + 80 CPD credits/yr. Family practice anesthesia provider: 400 hrs/yr clinical activity plus 150 self-reported hrs/yr anesthesia-related activity (operative time, procedural sedation, emergency airway management & consultation). 	<p>Anesthesiologist on-call 24/7 & available on-site as needed to provide anesthesia to children including children ages 6 mos - 2 yrs. Meets credentialing requirements to provide anesthesia to children ages 6 mos - 2 yrs.</p> <p>Provincial Privileging requirements: Recent experience working with children ages 6 mos to 2 yrs + 10 CPD credits/yr in pediatric anesthesiology.</p>	<p>Pediatric anesthesiologist on-call 24/7 & available on-site as needed.</p> <p>Provincial Privileging requirements: Pediatric anesthesiologist (12-month pediatric anesthesiology fellowship) with recent experience working with children ages 0 -6 mos + 80 CPD credits/yr with at least 20 CPD credits/yr in pediatric anesthesiology.</p>	<p>Pediatric anesthesiologist on-call 24/7 & available on-site as needed (by phone within 10 min & on-site within 45 min).</p> <p>All T6 anaesthesiologists meet the currency requirements to provide anesthesia to children of all ages as per the</p> <p>Provincial Privileging requirements.</p> <ul style="list-style-type: none"> 0 - 6 mos: See T5. Cardiac anesthesia: Additional 6-month fellowship in pediatric cardiac anesthesiology + 50 pediatric cardiac cases/yr + 80 CPD credits/yr with at least 20 CPD credits/yr in pediatric cardiac anesthesiology. <p>Pediatric anesthesiologists available 24/7 as a resource to health care providers throughout the province.</p>	

		T2	T3	T4	T5	T6
		General Surgical Services	Child-Focused Surgical Services	Children's Comprehensive Surgical Services	Children's Regional Enhanced & Subspecialty Surgical Services	Children's Provincial Surgical Subspecialty Services
	Other specialist physicians	Pediatrician from <i>within HA</i> available by phone or via virtual care to discuss cases 24/7.	Pediatrician on-call 24/7 & available on-site as needed (by phone within 10 min & on site within 45 min max). ⁶	Same as T3.	Pediatrician or pediatrician designate (e.g., resident) on-site 24/7 . This does not include the ED physician. Pediatric subspecialists available for on-site consultation in higher volume services (e.g., cardiology, neurology, GI) - not 24/7.	Pediatrician or pediatrician designate (e.g., resident) on-site 24/7 . This does not include the ED physician. Pediatric subspecialty physicians available on-call 24/7 & available on-site as needed.
	After-hours arrangements	On-call MD or ED MD available on-call or on-site 24/7 to manage surgical complications.	Same as T2.	Same as T3.	Same as T4.	Same as T5.
1.2	Nurses					
	Pre-admission	RN with pediatric assessment skills & knowledgeable about range of surgeries performed on-site available for pre-operative assessments on days, M-F.	Same as T2.	Same as T3.	Same as T4.	Pediatric RN with extensive pediatric surgery knowledge available for pre-operative assessments days, M-F.

⁶ Refer to the medical On-Call Availability Program (MOCAP) at www.health.gov.bc.ca/pcb/mocap.html. Actual response times depend on patient need & are determined on a case by case basis.

		T2	T3	T4	T5	T6
		General Surgical Services	Child-Focused Surgical Services	Children's Comprehensive Surgical Services	Children's Regional Enhanced & Subspecialty Surgical Services	Children's Provincial Surgical Subspecialty Services
Nurses: Operating room	<p>OR RNs assigned to pediatric cases regularly scrub/circulate for children ages 2 yrs old & over.</p> <p>Orientation includes review of relevant pediatric surgical procedures, pediatric specific OR protocols, pediatric specific OR equipment & management of pediatric emergencies in the OR.</p> <p>RNs have completed Pediatric Foundational Competency E-learning course,⁷ ENPC &/or PALS.</p>	Same as T2.	Same as T3 plus: OR RNs assigned to pediatric cases scrub/circulate for children of ages 6 mos & older undergoing a broad range of surgical procedures on a daily basis.	Same as T4 plus OR RNs assigned to pediatric cases scrub/circulate for children of all ages.	Pediatric OR RNs. RNs receive pediatric specific orientation/ education & practice exclusively or primarily with children.	

⁷ <https://learninghub.phsa.ca/Courses/5869/child-health-foundational-competencies>. Course is 3 modules and for an experienced RNs, takes ~ 15 – 20 min/module (total ~60 – 90 minutes to complete all modules),

		T2	T3	T4	T5	T6
		General Surgical Services	Child-Focused Surgical Services	Children's Comprehensive Surgical Services	Children's Regional Enhanced & Subspecialty Surgical Services	Children's Provincial Surgical Subspecialty Services
Nurses: Post-anesthetic care unit (PACU)	<p>PACU RNs assigned to pediatric cases regularly recover children ages 2 & over that have undergone general anesthetics. Orientation includes review of relevant pediatric surgical procedures, pediatric specific PACU protocols, pediatric specific PACU equipment & the management of pediatric emergencies in the PACU.</p> <p>RNs have completed Pediatric Foundational Competency E-learning course, ENPC &/or PALS (ENPC &/or PALS recommended).</p>	Same as T2.	Same as T3 plus: PACU RNs assigned to pediatric cases recover children ages 6 mos & older undergoing a broad range of surgical procedures on a daily basis.	Same as T4 plus: PACU RNs assigned to pediatric cases scrub/circulate for children of all ages .	<p>Pediatric PACU RNs. RNs receive pediatric specific PACU orientation/education & practice exclusively or primarily with children.</p> <p>Current ENPC &/or PALS recommended.</p>	

		T2	T3	T4	T5	T6
		General Surgical Services	Child-Focused Surgical Services	Children's Comprehensive Surgical Services	Children's Regional Enhanced & Subspecialty Surgical Services	Children's Provincial Surgical Subspecialty Services
Nurses: Surgical Day Care	<p>SDC RNs assigned to pediatric cases regularly admit, receive from PACU & provide post-operative monitoring for children ages 2 & over undergoing surgery.</p> <p>RN orientation includes review of relevant pediatric surgical procedures, pediatric specific SDC protocols, pediatric specific SDC equipment & the management of pediatric emergencies in the SDC/inpatient unit.</p> <p>RNs have completed Pediatric Foundational Competency E-learning course, ENPC &/or PALS.</p>	Same as T2.	<p>Same as T3 plus:</p> <p>SDC RNs assigned to pediatric cases regularly admit, receive from PACU & provide post-operative monitoring for children ages 6 mos & older undergoing a broad range of surgical procedures on a daily basis.</p>	<p>Same as T4 plus:</p> <p>SDC RNs assigned to pediatric cases admit, receive from PACU & provide post-operative monitoring for children of all ages.</p>	<p>Pediatric SDC RNs available days, M-F. Practice is exclusively or primarily pediatrics.</p> <p>Current ENPC &/or PALS recommended.</p>	

		T2	T3	T4	T5	T6
		General Surgical Services	Child-Focused Surgical Services	Children's Comprehensive Surgical Services	Children's Regional Enhanced & Subspecialty Surgical Services	Children's Provincial Surgical Subspecialty Services
Nurses: Inpt unit	RNs assigned to children have " pediatric skills " (see glossary). Practice predominantly involves adults.	RNs assigned to children have "pediatric skills" (see glossary) & are regularly exposed to hospitalized children. Practice is predominantly with adults but includes some children. RNs have completed Pediatric Foundational Competency E-learning course, ENPC &/or PALS. Formalized pediatric orientation & ongoing education available.	RNs have " pediatric skills " (see glossary) & are continuously exposed to hospitalized children. RN practice is exclusively or primarily with children. RNs have completed Pediatric Foundational Competency E-learning course, ENPC &/or PALS. Formalized pediatric orientation & ongoing education available. Pediatric educator assigned to pediatric unit.	Same as T4.	Pediatric RNs that are continually exposed to hospitalized children. RN practice is exclusively or primarily children . Most have " enhanced skills " in relevant med/surg specialty area(s). RNs have completed Pediatric Foundational Competency e-learning course, ENPC, PALS &/or other appropriate pediatric specialty education. Formalized pediatric orientation & ongoing education available. Pediatric educator(s) assigned to pediatric unit(s).	
Nurses: Outpatient clinic			Refer to Pediatric Outpatient Clinic requirements in <i>Medical Tiers in Full</i> document.	Same as T4 plus: Pediatric RN(s) assigned to specialty clinics have " enhanced skills " (see glossary) in the relevant specialty area(s). Limited number of specialty-specific outpatient clinics.	Pediatric RN(s) assigned to specialty clinics have " enhanced skills " (see glossary) in the relevant subspecialty area(s). Broad range of subspecialty clinics.	

		T2	T3	T4	T5	T6
		General Surgical Services	Child-Focused Surgical Services	Children's Comprehensive Surgical Services	Children's Regional Enhanced & Subspecialty Surgical Services	Children's Provincial Surgical Subspecialty Services
	Nurses: Community-based	RN available to provide episodic assessments & care on days, M-F (e.g., simple dressing change).	Same as T2.	Same as T3 plus: Home IV services can be arranged as required.	Same as T4.	Accesses teams in childrens' home communities to arrange community-based RN services for episodic assessments & care & home IV services.
1.3	Psychosocial professionals	Generalist social worker & spiritual care practitioner available on request on days, M-F, for individual cases. Practice is predominantly with adults.	Social worker with general pediatric knowledge & skills available on request on days, M-F, for individual cases. Practice may be predominantly with adults but includes some children. Spiritual care practitioner available on request for individual cases.	Social worker(s) with general pediatric knowledge & skills available days, M-F. Practice includes both adults & children. Child life specialist available days, M-F. Spiritual care practitioner available on-call 24/7 & available on-site as needed. Volunteer program available that provides services to children/families (and adults) available days, M-F & after-hours by pre-arrangement.	Same as T4 except practice is exclusively or primarily pediatric or, if not, team members have significant exposure to develop pediatric-specific expertise . Plus: Psychologist with pediatric expertise. ⁸ Practice may include both adults & children. Psychosocial professionals assigned to subspecialty clinics have " enhanced skills " (see glossary) in the relevant subspecialty area(s). Limited number of subspecialty clinics.	Pediatric social worker(s), psychologist(s), child life specialist & music therapist available days, M-F. Practice is exclusively or primarily with children. Child life specialist(s) available extended hours, 7 days/wk. Spiritual care practitioner(s) on-call 24/7 & available on-site as needed. Volunteer program available that provides services to children/families. Psychosocial professionals assigned to subspecialty clinics have " enhanced skills " (see glossary) in relevant subspecialty area(s). Broad range of subspecialty clinics.

⁸ Psychologist with pediatric expertise: Psychologist that has completed a Psychology Residency Program and has a demonstrated special interest, knowledge and skills in pediatric psychology. Pediatric knowledge and skills are acquired & maintained through clinical experience and special pediatric-focused continuing psychology education.

		T2	T3	T4	T5	T6
		General Surgical Services	Child-Focused Surgical Services	Children's Comprehensive Surgical Services	Children's Regional Enhanced & Subspecialty Surgical Services	Children's Provincial Surgical Subspecialty Services
1.4	Allied health	<p>Generalist PT, OT & dietician available on request on days, M-F, for individual cases. Practice is predominantly with adults.</p> <p>Pediatric dietician available via HealthLink days, M-F.</p> <p>Generalist pharmacist available as per Accreditation Canada standards, including on-call service (standards not specific to pediatrics).</p>	<p>Staff with general pediatric knowledge & skills available on request for individual cases. Practice is predominantly with adults but includes some children.</p> <ul style="list-style-type: none"> • RT available on-site days, M-F. On-call (& available to come to the site if required) outside these hours. • PT & OT available days, M-F (may be on-site PT/OT or PT/OT arrangement via service agreement). • Dietician available days, M-F. <p>Pharmacist as per T2.</p>	<p>Staff has general pediatric knowledge & skills. Practice includes both adults & children.</p> <ul style="list-style-type: none"> • RT available on-site 24/7. • PT & OT available days, M-F. • Dietician available days, M-F. • OT or SLP available to perform swallowing assessment days, M-F. <p>Pharmacist with pediatric expertise⁹ available on-site days, M-F. Outside these hours, general pharmacist is available on-call for telephone consultation.</p> <p>Note: Physicians, nurses, psychosocial & allied health professionals work consistently together as a pediatric interdisciplinary team.</p>	<p>Same as T4 except practice on days, M-F, is exclusively or primarily pediatrics or, if not, team members have significant exposure to develop pediatric-specific expertise. After-hours coverage (if available) is usually provided by generalists.</p> <p>Clinical pharmacy specialist(s) in pediatrics¹⁰ available on-site days, M-F. Outside these hours, general pharmacist is available on-call for telephone consultation.</p> <p>Allied health professionals assigned to subspecialty clinics have "enhanced skills" (see glossary) in the relevant subspecialty area(s). Limited number of subspecialty clinics.</p>	<p>Pediatric specialists:</p> <ul style="list-style-type: none"> • RT available on-site 24/7. • PT, OT & SLP available days, M-F. • Dietician available days, M-F. • OT or SLP available to perform swallowing assessment days, M-F. <p>Clinical pharmacy specialist(s) in pediatrics available on-site days, M-F. Outside these hours, general pharmacist with pediatric expertise available on-call for telephone consultation.</p> <p>Team practices exclusively or primarily with children.</p> <p>Psychosocial professionals assigned to subspecialty clinics have "enhanced skills" (see glossary) in relevant subspecialty area(s). Broad range of subspecialty clinics.</p>

⁹ **Pharmacist with pediatric expertise:** Pharmacist that has completed a Pharmacy Practice Residency Program and has a demonstrated special interest, knowledge and skills in pediatric pharmacy. Pediatric knowledge and skills are acquired & maintained through clinical experience and special pediatric-focused continuing pharmacy education.

¹⁰ **Clinical pharmacy specialist:** Pharmacist that has completed a Pharmacy Practice Residency Program and has a demonstrated special interest, knowledge and skills in pediatric pharmacy. Practice is exclusively or almost exclusively with children. Pediatric knowledge and skills are acquired & maintained through clinical experience and special pediatric-focused continuing pharmacy education.

		T2	T3	T4	T5	T6
		General Surgical Services	Child-Focused Surgical Services	Children's Comprehensive Surgical Services	Children's Regional Enhanced & Subspecialty Surgical Services	Children's Provincial Surgical Subspecialty Services
1.5	<p>Other:</p> <ul style="list-style-type: none"> • IV starts • Wound/ostomy • Pain management • Lactation consultant • Feeding & swallowing team • Complex feeding & nutrition service 	<p>Algorithm in place to manage difficult pediatric IV starts.</p> <p>Algorithm in place to manage breastfeeding related challenges.</p>	<p>Same as T2 plus:</p> <p>Referral pathway in place to access wound/ostomy RN.</p> <p>Referral pathway in place to access lactation consultant.</p>	<p>Same as T3 plus:</p> <p>Wound/ostomy RN on-site days, M-F (for adults & children).</p> <p>Pain management team on-site days, M-F (for adults & children).</p>	<p>Same as T4 plus:</p> <p>Pediatric feeding & swallowing team available locally to provide oral motor & dietary assessment/consultation days, M-F.</p> <p>Capacity available locally to perform videofluoroscopy feeding studies.</p>	<p>Algorithm in place to manage difficult pediatric IV starts.</p> <p>Pediatric wound/ostomy RN on-site days, M-F.</p> <p>Pediatric pain mgt team available on-site days, M-F.</p> <p>Lactation consultant on-site days, M-F.</p> <p>Pediatric feeding & swallowing team available on-site to provide oral motor & dietary assessment/consultation days, M-F.</p> <p>Capacity available on-site to perform videofluoroscopy feeding studies.</p> <p>Pediatric complex feeding & nutrition service available on-site.</p>

		T2	T3	T4	T5	T6
		General Surgical Services	Child-Focused Surgical Services	Children's Comprehensive Surgical Services	Children's Regional Enhanced & Subspecialty Surgical Services	Children's Provincial Surgical Subspecialty Services
2.0	Facilities					
2.1	Pre-admission assessment	Child-friendly space to see children prior to surgery to assess risk, provide teaching, etc.	Same as T2.	Same as T3.	Same as T4.	Pediatric pre-admission clinic.
2.2	Pre-operative assessment & care on day of surgery	Child-friendly space to complete pre-op assessment & prepare children on day of surgery. Space accommodates parents . May occur in a "traditional" surgical day care (mixed adults & children) or on the inpatient pediatric unit. Space meets requirements for "safe pediatric bed" (see glossary).	Same as T2.	Same as T3.	Space to complete pre-op assessment & prepare children on day of surgery. Space accommodates parents & meets requirements for "safe pediatric bed" (see glossary). Space is set-up for the exclusive use of children (e.g., pediatric med/surg day care or pediatric inpatient unit).	Same as T5.
2.3	Pre-operative waiting area & operating room(s)	Pre-operative waiting area: Child-friendly space that accommodates parents . Child visible to nursing staff during waiting period. Operating room(s): Room is appropriate for children. Space can accommodate parents during induction of anesthesia.	Same as T2.	Same as T3.	Same as T4.	Pre-op waiting area & ORs are set-up for the exclusive use of children . All areas can accommodate parents .

		T2	T3	T4	T5	T6
		General Surgical Services	Child-Focused Surgical Services	Children's Comprehensive Surgical Services	Children's Regional Enhanced & Subspecialty Surgical Services	Children's Provincial Surgical Subspecialty Services
2.4	Post-anesthetic care unit (PACU)	Child-friendly space in PACU. Able to create a "visual barrier" between a child & other intubated patients. Can accommodate parents.	Same as T2.	Same as T3 plus: Separate child-friendly area available in the PACU for children. Can accommodate parents.	Same as T4.	PACU set-up for the exclusive use of children (equipment, pictures on the wall, etc). Can accommodate parents.
2.5	Post-surgery recovery unit	Child-friendly space to complete post-op assessment & provide care on day of surgery. Space accommodates parents . May occur in a "traditional" surgical day care (mixed adults & children) or on the inpatient pediatric unit. Space meets requirements for "safe pediatric bed" (see glossary).	Same as T2.	Same as T3.	Space to complete post-op assessment & provide care on day of surgery. Space accommodates parents & meets requirements for "safe pediatric bed" (see glossary). Space is set-up for the exclusive use of children (e.g., pediatric med/surg day care or pediatric inpatient unit).	Same as T5.
2.6	Inpatient beds	If admit children, have a "safe pediatric bed(s)" (see glossary).	Designated pediatric inpatient resources/beds . Beds meet criteria for "safe pediatric beds" (see glossary). Physical separation of children & adults recommended.	Dedicated pediatric inpatient resources/unit . Unit meets criteria for "safe pediatric unit" (see glossary).	Dedicated pediatric inpatient resources/teaching unit . Unit meets criteria for "safe pediatric unit" (see glossary).	Dedicated pediatric inpatient resources/teaching units, grouped by medical/surgical specialties/subspecialties . Units meet criteria for "safe pediatric unit" (see glossary).

		T2	T3	T4	T5	T6
		General Surgical Services	Child-Focused Surgical Services	Children's Comprehensive Surgical Services	Children's Regional Enhanced & Subspecialty Surgical Services	Children's Provincial Surgical Subspecialty Services
2.7	Outpatient clinic (consultations)	Virtual care enabled outpatient space (ED, hospital outpatient or community-based clinic).	Same as T2.	Child-friendly virtual care enabled space & infrastructure to see outpatients (may share or co-locate with pediatric inpatient or adult outpatient services).	Child-friendly virtual care enabled outpatient space & infrastructure . Space is exclusively used by children.	Child-friendly virtual care enabled outpatient space & infrastructure . Space is exclusively used by children. Pediatric subspecialty teams co-located or in close proximity.
2.8	Outpatient treatments & procedures e.g., Dressing changes, feeding tube changes, remove tunnelled catheter (sedation may be required).	Child-friendly space & infrastructure to perform procedures & treatments. May be shared (in ED, procedure room in inpatient or outpatient area, medical day unit, etc). Capacity to provide oral sedation.	Same as T2.	Same as T3.	Pediatric-specific space(s) & infrastructure to perform procedures & treatments. Used exclusively used by children.	Same as T5.
2.9	ICU beds				On-site T3 NICU. Refer to Children's Critical Care Module for availability of critical care services.	On-site T4 NICU. Refer to Children's Critical Care Module for availability of critical care services.
3.0	Clinical diagnostic & support services	Refer to relevant modules (under development).				

		T2	T3	T4	T5	T6
		General Surgical Services	Child-Focused Surgical Services	Children's Comprehensive Surgical Services	Children's Regional Enhanced & Subspecialty Surgical Services	Children's Provincial Surgical Subspecialty Services
4.0	Volumes per year					
4.1	Minimum surgical procedures/yr ¹¹		<p>Based on a 3 year average:</p> <p>Surgical procedures, (day care & inpatient), ages 0 - 16.9 yrs: 200 cases/yr (incl NICU)</p> <p>AND one of the following:</p> <p>Med/surg visits, ages 0 - 16.9 yrs: >500/yr. Includes inpatient visits & day care visits which involve a general anesthetic or anesthetic standby (excl NICU).</p> <p>OR</p> <p>Med/surg inpatient days, 0 - 16.9 yrs: >500/yr (excl NICU)</p>	<p>Based on a 3 year average:</p> <p>Surgical procedures, (day care & inpatient), ages 0 - 16.9 yrs: 500 cases/yr (incl NICU)</p> <p>AND one of the following:</p> <p>Med/surg visits, ages 0 - 16.9 yrs: >1,000/yr. Includes inpatient visits & day care visits which involve a general anesthetic or anesthetic standby (excl NICU).</p> <p>OR</p> <p>Med/surg inpatient days, 0 - 16.9 yrs: >1,500/yr (excl NICU)</p>	<p>Based on a 3 year average:</p> <p>Surgical procedures, (day care & inpatient), ages 0 - 16.9 yrs: 1,000 cases/yr (incl NICU)</p> <p>AND one of the following:</p> <p>Med/surg visits, ages 0 - 16.9 yrs: >2,000/yr. Includes inpatient visits & day care visits which involve a general anesthetic or anesthetic standby (excl NICU).</p> <p>OR</p> <p>Med/surg inpatient days, 0 - 16.9 yrs: >4,500/yr (excl NICU)</p>	<p>Based on a 3 year average:</p> <p>Surgical procedures, (day care & inpatient), ages 0 - 16.9 yrs: 4,000 cases/yr (incl NICU)</p> <p>AND one of the following:</p> <p>Med/surg visits, ages 0 - 16.9 yrs: >8,000/yr. (excl NICU);</p> <p>OR</p> <p>Med/surg inpatient days, 0 - 16.9 yrs: >20,000/yr (excl NICU)</p>

¹¹ If a facility meets the responsibilities and requirements for a given tier EXCEPT the minimum volumes, suggestions to mitigate the insufficient volume include: (1) creating opportunities for the surgical team to gain pediatric experience through "in reach", "outreach" and "pairing up" of anesthesiology/surgical team providers to increase pediatric surgery exposure; (2) consolidating the number of sites within the HA providing surgical services; (3) reviewing the procedures performed on local children at BCCH to determine whether there is capacity to perform these locally; and/or (4) creating simulation experiences. Systems are in place to review regularly review surgical outcomes (refer to section 5.3.3).

		T2	T3	T4	T5	T6
		General Surgical Services	Child-Focused Surgical Services	Children's Comprehensive Surgical Services	Children's Regional Enhanced & Subspecialty Surgical Services	Children's Provincial Surgical Subspecialty Services
5.0	Specialty/subspecialty physician interdependencies					
5.1	Interdependencies	See section 1.1 Physicians.	See section 1.1 Physicians.	See section 1.1 Physicians.	See section 1.1 Physicians.	Full range of pediatric surgical & medical specialists.
6.0	Other					
6.1	Equipment & supplies	<p>Pediatric anesthesia cart - see Appendix 3 for a reference list.</p> <p>Inpatients: Refer to <i>Children's General Medicine: Tiers in Full</i> (Appendix 1) for guidelines on equipment & supplies for sites that admit children.</p>	Same as T2.	Same as T3.	Same as T4.	Same as T5.

		T2	T3	T4	T5	T6
		General Surgical Services	Child-Focused Surgical Services	Children's Comprehensive Surgical Services	Children's Regional Enhanced & Subspecialty Surgical Services	Children's Provincial Surgical Subspecialty Services
6.2	Child & family-centered care	<p>See Appendix 4 (glossary) for general attributes which contribute to child & family-centered care.</p> <p>Surgery specific components:</p> <ul style="list-style-type: none"> • Programs & resources are in place to prepare children & families for surgery. e.g., age-appropriate videos & written materials/books about what to expect, preadmission tours of the surgical suite & coaching parents/care givers about ways to reduce their child's anxiety & contribute to positive surgical outcomes. • Policies & practices promote parents to be actively involved in supporting their children undergoing surgery. Policies include guidance on when it is & is not appropriate for parents to be present during the induction & immediate recovery phases. Policies accessible to staff, physicians, children & parents & posted on the HA website. 	Same as T2.	Same as T3.	Same as T4.	Same as T5.
6.3	BC Pediatric Early Warning Systems (PEWS)	<p>BC PEWS is implemented in all areas as defined by Child Health BC. Systems are in place to monitor its consistent use.</p> <p>Site-specific escalation protocol is in place to follow-up signs of clinical deterioration as identified through the BC PEWS.</p> <p>Nurses are educated on the use of the BC PEWS. Physicians are familiar with the BC PEWS, including the tool & escalation process.</p>	Same as T2.	Same as T3.	Same as T4.	Same as T5.

2.2.2 Knowledge Sharing & Transfer/Training

		T2	T3	T4	T5	T6
		General Surgical Services	Child-Focused Surgical Services	Children's Comprehensive Surgical Services	Children's Regional Enhanced & Subspecialty Surgical Services	Children's Provincial Surgical Subspecialty Services
1.0	Student learning					
1.1	Medical students, residents & fellows		If designated by UBC, provides <i>non-pediatric specific</i> surgical placements/learning experiences for medical students and family practice, surgery and anesthesiology residents.	Same as T3.	Designated by UBC as a training site for <i>non-pediatric specific</i> surgical placements/learning experiences for medical students and family practice, surgery and anesthesiology residents. If designated by UBC, provides <i>pediatric-specific</i> placements/learning experiences for surgical & anesthesiology residents in specialties where pediatric specialists are physically present on site.	Designated by UBC as a training site to provide <i>pediatric-specific</i> surgical & anesthesia placements/learning experiences for medical students, residents & pediatric medicine & surgery subspecialty residents/fellows. Range of learning experiences is broad, including placements in pediatric surgery, pediatric specialty surgeries, pediatric anesthesia, pediatric ED, NICU & PICU. In conjunction with UBC, develops model for training pediatric surgery, pediatric specialty surgery & pediatric specialty anesthesiology residents/fellows in BC.

		T2	T3	T4	T5	T6
		General Surgical Services	Child-Focused Surgical Services	Children's Comprehensive Surgical Services	Children's Regional Enhanced & Subspecialty Surgical Services	Children's Provincial Surgical Subspecialty Services
1.2	Nursing, allied health & other undergraduate, graduate & post-graduate students		Specific pediatric med/surg experiences/placements, if available, are negotiated between the site & applicable learning institution.	Provides pediatric-specific med/surg experiences/placements for a broad range of undergraduate, graduate & post-graduate students. Specific experiences are negotiated between the site & applicable learning institution.	Same as T4.	Same as T5 plus: Experiences/placements include pediatric-specific surgery, specialty surgery & anesthesia.
2.0	Continuing education					
2.1	Physicians	Hospital/HA privileging policies are consistent with provincial privileging policies, including pediatric specific requirements for physicians that provide care to children. Facilitates physician access to learning activities that support the maintenance of pediatric surgical and anesthesia competencies & ongoing physician privileging requirements. This includes opportunities to practice critical skills where limited opportunity exists in practice (e.g., off-site, outreach & simulation experiences).	Same as T2.	Same as T3 plus: In collaboration with T5 & T6, develops & shares educational resources & offers regional learning activities that support the maintenance of pediatric surgical and anesthesia competencies & ongoing physician privileging requirements (e.g., presentations at regional conferences, arranging regional PALS training).	Same as T4.	Same as T5 plus: Develops & shares educational resources & partners with HAs, provincial & national organizations to offer province-wide learning activities that support the maintenance of pediatric surgical and anesthesia competencies & ongoing physician privileging requirements (e.g., presentations at surgical conferences, offering PALS training). Provides pediatric surgical and anesthesia experiences on-site & via outreach & simulation for T1, T3 & T3 physicians.

		T2	T3	T4	T5	T6
		General Surgical Services	Child-Focused Surgical Services	Children's Comprehensive Surgical Services	Children's Regional Enhanced & Subspecialty Surgical Services	Children's Provincial Surgical Subspecialty Services
2.2	Nurses & allied health care providers	<p>Mechanism is in place to regularly review staff education needs related to maintenance of competencies in pediatric surgical care.</p> <p>Facilitates staff access to learning activities based on identified practice gaps, including practice of critical clinical skills where limited opportunity exists in practice (e.g., off-site, outreach & simulation experiences).</p>	Same as T2.	<p>Same as T3 plus:</p> <p>In collaboration with T5 & T6, develops & shares educational resources & offers regional learning activities that support staff to maintain competencies in pediatric surgical care.</p>	Same as T4.	<p>Same as T5 plus:</p> <p>Develops & shares educational resources & partners with HAs, provincial & national organizations to offer province-wide learning activities that support staff to maintain competencies in pediatric surgical care (e.g., best practice workshops).</p> <p>Provides pediatric surgical experiences on-site & via outreach & simulation for T1, T3 & T3 staff.</p>

2.2.3 Quality Improvement/Research

		T2	T3	T4	T5	T6
		General Surgical Services	Child-Focused Surgical Services	Children's Comprehensive Surgical Services	Children's Regional Enhanced & Subspecialty Surgical Services	Children's Provincial Surgical Subspecialty Services
1.0	Quality improvement (QI)	<p>Participates in QI processes within the HA, including reviews of at-risk surgical and anesthesia cases. If child involved, physicians & staff with pediatric & surgical/anesthesia expertise participate in the review, as appropriate.</p> <p>Implements recommendations & evaluates the outcome.</p>	<p>Same as T2 plus:</p> <p>Provides pediatric &/or surgical/ anesthesia expertise for T2 case reviews, if requested.</p>	<p>HA QI processes in place to <i>specifically</i> review & improve the safety & quality of children's surgical/ anesthesia care within the HA. QI program includes the elements outlined in Appendix 1.</p> <p>In collaboration with T5/T6, tracks pediatric surgery and anesthesia-specific safety & quality indicators <i>within the HA</i> (i.e., NSQIP or similar approach). See Appendix 1, Table 1.2 & 1.3 for examples of indicators.</p> <p>Provides pediatric &/or surgical/anesthesia expertise in T2 or T3 case reviews, if requested.</p>	Same as T4.	<p>QI processes in place to <i>specifically</i> review & improve the safety & quality of children's surgical/ anesthesia care within the T6 service.</p> <p>Invites external pediatric &/or surgical/anesthesia experts to participate in case reviews, as appropriate.</p> <p>Participates in the American College of Surgeons National Surgery Quality Improvement Program (NSQIP), pediatric stream.</p> <p>In collaboration with T4/T5, tracks pediatric surgery and anesthesia-specific safety & quality indicators at a provincial level. See Appendix 1, Table 1.2 & 1.3 for examples of indicators.</p>
		<p>Participates in regional & provincial initiatives to improve the quality & safety of children's surgical care.</p>	Same as T2.	<p>In collaboration with T5, leads pediatric surgery/anesthesia quality improvement initiatives within the HA (e.g., guideline, protocol or pathway development; targeted education; enhanced resources, facilities or communication; peer review presentations).</p> <p>Participates in provincial initiatives quality & safety initiatives.</p>	Same as T4.	<p>Same as T5 plus:</p> <p>Leads provincial initiatives to improve the quality & safety of children's surgical care (e.g., guideline, protocol or pathway development; targeted education; enhanced resources, facilities or communication; peer review presentations).</p> <p>Participates in national networks of pediatric &/or surgical and anesthesia service providers.</p>

		T2	T3	T4	T5	T6
		General Surgical Services	Child-Focused Surgical Services	Children's Comprehensive Surgical Services	Children's Regional Enhanced & Subspecialty Surgical Services	Children's Provincial Surgical Subspecialty Services
	Quality improvement (QI) cont'd	Concepts of child & family-centred care are incorporated into surgical programming (see glossary).	Same as T2.	Same as T3.	Same as T4.	Same as T5.
		Organizational mechanisms in place to obtain child/family feedback on the services provided. Incorporates feedback, as appropriate.	Same as T2.	Same as T3.	Same as T4.	Same as T5.
		Reviews trends at a local level of hazards, adverse events & near misses (including those that involve children's surgical/anesthesia care) as per reports generated from the BC Patient Safety Learning System (PSLS). Takes local action to reduce future occurrences.	Same as T2.	Same as T3 plus: In collaboration with T5, reviews trends <i>within the HA</i> of hazards, adverse events & near misses that involve children's surgical/anesthesia care as per reports generated from the BC PSLS. Takes regional action to reduce future occurrences.	Same as T4.	Same as T5 plus: In collaboration with T4/T5, reviews <i>provincial</i> trends of hazards, adverse events & near misses that involve children's surgical and anesthesia care. Takes provincial action to reduce future occurrences.
		System supports in place to enable health care providers to provide care that is consistent with current guidelines for children's surgical & anesthesia care.	Same as T2.	Same as T3.	Same as 42.	Same as T5 plus: In collaboration with CHBC & HAs, develops & disseminates guidelines on relevant topics related to children's surgical & anesthesia care.
2.0	Research			Participates in research related to children's surgical and anesthesia care.	Conducts and supports others to conduct research related to children's surgical and anesthesia care. Disseminates research findings.	

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Appendix 1: Quality Improvement Program Requirements T4, T5 & T6

Table 1.1: Elements of a QI Program

QI Program Specific to Children's Surgical Care:

- Is a confidential quality improvement activity that is protected by all provincial & federal statutes.
- Is integrated with all appropriate HA/hospital quality improvement & safety programs & with the HA Board quality committee or equivalent.
- Has a specific focus on improving children's surgical care.
- Involves representatives of all surgical disciplines that provide care to children, as well as anesthesiology, pediatrics, neonatology, radiology & the Emergency Department.
- Is led by a physician leader for surgery, children's surgery or designate.
- Functions include:
 - Determining specific procedures appropriate to perform within each surgical specialty at each facility based on the tier designation of the service & the guidelines provided in this document. See Table 1.1.a (below) for criteria to consider.
 - Tracking safety & quality indicators & addresses related issues. See Tables 1.2 & 1.3 (below) for examples of indicators.

Table 1.1.a: Examples of Safety Indicators Specific to Children's Surgical Care

Criteria to Consider in Determining Specific Procedures Appropriate to Perform within each Surgical Specialty at Each Facility within an HA

- Availability of surgeons credentialled to perform a given procedure as per the local credentialling/privileging process;
- Availability of anesthesia providers credentialled to provide anesthesia to children as per the local credentialling/privileging process;
- Availability of nurses & other staff trained & comfortable in providing care to children pre, intra & post-operatively for a given procedure;
- Availability of clinical diagnostic & support services and pediatric equipment required for a given procedure;
- Availability of parent/child educational resources for a given procedure;
- Availability of appropriate post-operative environment for a given procedure if an inpatient stay is anticipated (e.g., general pediatric unit, NICU, PICU);
- Site capacity to manage foreseeable complications of a given procedure (e.g., co-location of specialists/sub-specialists, equipment, clinical diagnostic & support services, etc); &
- Distance for parents/children to travel if a procedure is not available locally.

Table 1.2: Examples of Safety Indicators Specific to Children's Surgical Care

- Cardiac or respiratory arrest, acute change in respiratory support or administration of emergency vasoactive medications in the OR or within 72 hours postoperatively.
- Unplanned reintubation in the OR, post anesthesia care unit or within 72 hours postoperatively.
- Foreign body left in during procedure.

- Major perioperative anesthetic event or complication: clinically significant laryngospasm, bradycardia, hypotension, apnea, O2 desaturation) & requiring intervention.
- Unanticipated event resulting in death or serious injury (i.e., wrong site surgery, wrong patient, wrong procedure, retained foreign body).
- Unplanned return to the OR within 72 hours of operation.
- Unscheduled admission to the hospital for inpatient care within 30 days.
- Unscheduled admission or transfer to the intensive care unit or a higher level of care within 72 hours of operation.
- Transfer to another institution for higher level of care within 72 hours of a procedure.
- Death within 30 days.

Table 1.3: Examples of Quality Indicators Specific to Children's Surgical Care

Process indicators

- Compliance with guidelines, protocols & pathways
- Appropriateness of pre-hospital & ED triage/referral
- Delay in assessment, diagnosis, technique or treatment
- Appropriateness of documentation
- Timeliness & availability of imaging reports
- Timely participation of subspecialists
- Availability of OR
- Availability of family services
- Consistency of outpatient follow-up

Outcome indicators

- Mortality
- Morbidity (complications): e.g., postoperative pneumonia, embolism, pressure ulcers, infections (bloodstream, urinary tract, wound, etc), bleeding, wound dehiscence, transfusion reactions; admissions for perforated appendix
- Functional and quality of life outcomes
- Patient and family satisfaction
- Length of stay and cost

Adapted from the American College of Surgeons, 2014¹⁴ and AHRQ Pediatric Quality Indicators web page²²

Appendix 2: Surgical Capability of T2 & T3 Surgical Services

This list identifies procedures appropriate for T2 and T3 surgical services to perform locally on healthy children ages 2 and over to avoid unnecessary transfers. This list is not limited - other procedures that are within the scope of a T2 and T3 service may also be performed at a given site.

The list was developed to support T2 and T3 in **planning** surgical services. Individual patient factors, including age and medical complexity, may require a child to be referred/transferred to a higher tier of service.

T5/T6 services are available anytime for telephone consultation about a specific case.

The list was developed from (1) work done in other jurisdictions (Australia and the UK); (2) data from BC hospitals re procedures currently performed at hospitals providing T2 and T3 services; and (3) the expert opinion of the Pediatric Surgical Working Group.

Service	Procedure	Healthy Children			
		T2*		T3	
		Ages 2 & Over		Ages 2 & Over	Ages 14 & Over
		Urban	Rural & remote**		
Gen Surgery	Appendectomy		Y	Y	
	Cholecystectomy		Y	Y	
	Hernia repair		Y	Y	
	Drainage of abscess		Y	Y	
Dental	Excision/extraction, tooth			Y	
	Restoration, tooth			Y	
Ophthalmol	Strabismus surgery			Y	
	Nasal-lacrimal duct surgery			Y	
	Chalazion surgery			Y	
Orthopedics	Closed reduction of fractures			Y	
	Arthroscopic knee procedures				Y
ENT	Tonsils & adenoids			Y	
	Ear tube insertion			Y	
	Release of tongue tie			Y	
	Reduction of nasal fracture			Y	
	Removal of foreign body in esophagus			Y (rural & remote sites only)	
Plastic Surgery	Hand fractures			Y	
Plastics/Gen Surg	Excision of skin lesion			Y	
Urology	Torsion of testis			Y	
Urol/Gen Surg	Circumcision			Y	
	Cystoscopy			Y (emergency only)	Y

*Assumes hospital provides a non-elective surgical service (a few T2 sites limit procedures on children to elective dental procedures on children only).

** Rural & remote is not defined by size of community but by travel time that may affect the care of the child. For this purpose, rural and remote means travel time to a T3-T6 service is more than 2 hours.

Appendix 3: Pediatric-Specific Anesthesia Equipment

This **non-exhaustive list** of anesthesia equipment & supplies is provided as a reference for sites that perform surgery on children. Local variation may be appropriate.

Category	Equipment
Needles and IV supplies	<ul style="list-style-type: none"> • 22 and 24 G butterflies and IV catheters • Small arm boards and tourniquets • IV flush saline syringes • Tegaderm dressings • 2" conform bandages • Connectors and extension sets
Airway supplies	<ul style="list-style-type: none"> • Airways from size 000 to 2 • Small filters for ped circuit • Pediatric size laryngoscope handles • Laryngoscope blades sizes 00 to 2; 2 different styles • Ped circuit masks, size from neonate to #2 child • Ped McGill forceps
Monitoring equipment	<ul style="list-style-type: none"> • BP cuffs, various sizes from neonate to small child • Precordial stethoscope • Saturation monitor attachments • Esophageal stethoscopes with temperature sensor • Neonatal ECG electrodes
Circuits	<ul style="list-style-type: none"> • Oral Rae tubes • Cuffed and Uncuffed ET tubes • Suction catheters • Pediatric yanker suctions, disposable • ET stylettes • Pediatric circuits and ambu bags • O₂ masks and some positioning equipment
IV fluids	<ul style="list-style-type: none"> • 500ml bags of Ringers • Mini drip solution sets and extension tubing

Appendix 4: Glossary

Registered Nurse with "pediatric skills"

- Demonstrates a broad understanding of growth and development. Distinguishes between normal and abnormal growth and development of infants, toddlers, children and youth.
- Understands the psychological impacts of care provision (including hospitalization) at different developmental stages (infant, toddler, preschooler, school aged and youth).
- Understands how to provide a physically and psychologically safe environment appropriate to the age and condition of the child.
- Demonstrates understanding of the physiological differences between infants, children and adults and their implications for assessment and care.
- Assesses a child's normal parameters, recognizes the deviations from the normal and acts appropriately on the findings.
- Demonstrates knowledge of common pediatric conditions and their management.
- Demonstrates understanding of fluid management in an infant and child.
- Calculates and administers medications and other preparations based on weight based dosages.
- Assesses child and family's knowledge and provides teaching specific to the plan of care and condition or procedure.
- Communicates effectively and works in partnership with children and families (children and family-centred care).
- Aware of and accesses pediatric-specific clinical guidelines and protocols.
- Responds to patient deterioration/acute urgent situations in an appropriate and timely manner.
- Commences and maintains effective basic pediatric life support, including 1- and 2-rescuer infant and child CPR, AED use and management of airway obstructions.
- Provides referrals to public health nursing, nutrition and utilizes contact with the child and family to promote child health. e.g., immunization, child safety.
- Assesses pain and intervenes as appropriate.*
- Initiates and manages peripheral IV infusions on children;* consults expert clinicians as necessary. Identifies and manages complications of IV therapy.

*Refer to body of document for examples of interventions appropriate at each tier.

References: NSW's Guidelines for Care in Acute Care Settings,⁵ BC Children's Pediatric Foundational Competencies on-line course²³ and BC Children's CAPE tools (2008-2010).²⁴

"Enhanced pediatric skills" (refers to RNs and others on the interdisciplinary team)

- Demonstrates in-depth knowledge in a specific area of clinical care (e.g., respiratory diseases, sexual assault, diabetes, wound management, etc).
- Performs comprehensive assessments and plans, provides and evaluates care in children with suspected or known issues in specific areas of clinical care.

Reference: BC Children's CAPE tools.²⁴

"Safe pediatric bed"

All hospitals that admit children must take steps to ensure the environment is as safe as possible for children. For a T2 service, this includes:

- Physical safety:
 - Area is physically safe for children with any potentially dangerous equipment, medications, chemicals or fluids out of reach or in locked cupboards.
 - Physical separation of children from adult patients is recommended. If physical separation is not possible, children are not in the same area/unit as adults who are under the influence of, or withdrawing from alcohol or chemical substances, known sex offenders, a danger to themselves or others and/or are confused and/or wandering.
 - Furniture meets appropriate safety standards for children. e.g., cribs with safe side rails and crib domes (if needed) for children 2 years of age or less.
- Psychological comfort:
 - Parents/primary caregivers are able to stay with their children 24/7 during hospitalization.
 - Self-served food and drink is in close proximity.
- Knowledgeable staff:
 - Sufficient "RNs with pediatric skills" are allocated each shift to ensure adequate supervision and care relevant to the age and nursing needs of child.
 - Criminal record checks are required as part of the credentialing and/or hiring process for all staff and physicians (as per legislation).
- Equipment and supplies:
 - Pediatric emergency equipment and supplies are in close proximity (refer to Appendix 1 in the Medical Tiers in Full document for a non-exhaustive list of equipment and supplies).

Additional requirements for a T3 service:

- Psychological comfort:
 - Access to child-friendly bathrooms and space for changing diapers.
 - Facilities for breastfeeding and breast milk storage.
 - Safe space(s) and age-appropriate facilities/equipment for children and youth to play/be entertained. e.g., age appropriate media, books or board games.

"Safe pediatric unit"

T3 to T6 services are required to have a "safe pediatric unit(s)" to provide inpatient care to children. In addition to the requirements for a safe bed, a "safe pediatric unit" includes:

- Physical safety:
 - Children are cared for on a dedicated pediatric inpatient unit(s).
 - Pediatric unit is functionally separate from adult patients, preferably with a door that can be closed and not opened by young children.
 - Regulated hot water temperature and secure electrical outlets are present on the unit.
- Psychological comfort:
 - Bedside sleeping facilities and ideally a kitchenette with fridge and microwave are available for parents/primary care givers.
 - Youth-friendly facilities/activities are available.

Child and family-centred care

Child and family-centred is one of the tenets of pediatric care. For all tiers, this means:

- Services are delivered in line with the principles of the UN Convention on the Rights of the Child (version in child friendly language is at: <http://www.unicef.org/rightsite/files/uncrcchildfriendlylanguage.pdf>).
- Children and their families are actively involved in health care planning and transitions.
- Children and their families are provided information about care options available to them in a way they can understand. This allows them to make informed choices.
- The chronological and developmental age of the child is considered in the provision of information and care.
- Families are actively encouraged to participate in the care of their child.
- Education is provided to children and their families who wish to be involved in providing elements of their own/their child's care.
- When families stay in hospital to help care for a child:
 - The environment supports family presence and participation (e.g., overnight accommodation, sitting room, quiet room/area for private conversation and facilities for making refreshments).
 - Consideration is given to their practical needs, including regular breaks for personal needs, to obtain food/drink, make telephone calls, etc.
- Information and support is given to families on how to access funds for travel to and from specialist centres.
- Information is available for children and their families in several formats including leaflets and videos. Information is culturally and age-appropriate and is provided in a variety of commonly used languages.
- Child and their families have access to professional interpreter services.
- Children and their families are provided with contact details for available support groups, as appropriate.
- Transition pathways are in place to allow for seamless transition to adult services.
- Children and families are actively encouraged to assist in identifying safety risks (e.g., ask questions about medications, question providers re hand washing etc).
- Opportunities are available for children and their families to provide input on the quality and safety of care provided (e.g., surveys, committees, rounds, parent advisory council, etc).

Adapted from:

- Institute for Healthcare Improvement, the National Initiative of Children's Healthcare Quality and the Institute for Patient- and Family-Centered Care, Patient- and Family-Centered Organizational Self-Assessment Tool, 2013.²⁵
- Welsh Assembly Government, All Wales Universal Standards for Children and Young People's Specialised Healthcare Services, 2008.²⁶
- Maurer, M et al, Guide to Patient and Family Engagement: Environmental Scan Report (Agency for Healthcare Research and Quality), 2012.²⁷