TIERS
IN FULL

CHILDREN'S SURGICAL SERVICES

Approved: July 2016
Minor update: December 2021

childhealthbc.ca

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

Contents

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Child Health BC. *Children's Surgical Services.* Vancouver, BC: Child Health BC, Dec 2021.

Child Health BC acknowledges the principle authors, O'Donnell M, Williams J, Skarsgard E, and the contribution of the Surgical Tiers Working Group members: Appleby J, Bhalla M, Blair P, Boardman A, Buonassisi T, Duncan P, Ferguson K, Froese N, Fryer M, Hatcher S, Hayashi A, Johns J, Laukkanen C, Macleod M, Maharaj M, McGeough C, Matthews ML, O'Donnell M, Reimer E, Scrivens S, Skarsgard E, Thain L, Tuff Y, Whelan P, Williams J.

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 Surgery[1]
2. **Tiers in Brief** to Support System Planning: Provides a high-level description of the tiers, including responsibilities and requirements.
3. **Tiers in Full** to Support Operational Planning: Provides detailed description of the responsibilities and requirements at each tier ***(this document)*.**

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,[2,3] New South Wales,[4-7] Australia,[8] the United Kingdom [9-13] 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 documents [15-18] and the Royal College of Physicians and Surgeons Competencies [19,20]) and nursing standards.[21,22]

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

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

The document does not include surgical services provided in/by:

- Private offices or clinics of dentists, surgeons or other physicians (beyond the influence of the tiers of service initiative).[ii]
- Emergency Departments (EDs) (discussed in the Children's ED Services document).
- Neonatal Intensive Care Units[iii] (refer to Tiers of Perinatal Care at: www.perinatalservicesbc.ca).

1.3 Recognition of the Tiers

The Child Health Tiers of Service Framework includes 6 tiers of service. The Children's Surgical Services module recognizes 5 out of the 6 tiers. T1 (Prevention, Primary & Emergent Health Services) is not applicable to the Surgical Tiers.

Tier	Child Health Framework Tiers of Service	Children's Surgical Services
T1	Prevention, Primary & Emergent Health Service	
T2	General Health Service	General Surgical Service
T3	Child-Focused Health Service	Child-Focused Surgical Service
T4	Children's Comprehensive Health Service	Comprehensive Surgical Service for Children
T5	Children's Regional Enhanced & Subspecialty Health Service	Regional Surgical Service for Children
T6	Children's Provincial Subspecialty Health Service	Provincial Surgical Service for Children

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.

[ii] This document may also be helpful to HAs when establishing standards for contracted services (e.g., HA contract with a private clinic to perform dental surgery on children).

[iii] Responsibilities and requirements for the general care of neonates is discussed in the NICU Levels of Care document. Surgery-specific components of the care are included in this (surgical) document.

Table 1: Medical Complexity

The American Society of Anesthesiologists (ASA)[23] score is used as a proxy for "medical complexity."

Medical Complexity	ASA Score	Description
Low	ASA 1	• Healthy child (no acute or chronic disease), normal BMI percentile for age.
	ASA 2	• Child with mild systemic disease – no functional limitation (e.g., asymptomatic congenital cardiac disease, well controlled dysrhythmias, asthma without exacerbation, well controlled epilepsy, noninsulin dependent diabetes mellitus, abnormal BMI percentile for age, mild/moderate OSA, oncologic state in remission, autism with mild limitations).
Modest	ASA 3	• Child with severe systemic disease – definite functional limitation (e.g., uncorrected stable congenital cardiac abnormality, asthma with exacerbation, poorly controlled epilepsy, insulin dependent diabetes mellitus, morbid obesity, malnutrition, severe OSA, oncologic state, renal failure, muscular dystrophy, cystic fibrosis, history of organ transplantation, brain/spinal cord malformation, symptomatic hydrocephalus, premature infant PCA, full term infants <6 weeks of age).
Severe	ASA 4	• Child with severe systemic disease – a constant threat to life (e.g., symptomatic congenital cardiac abnormality, congestive heart failure, active sequelae of prematurity, acute hypoxicischemic encephalopathy, shock, sepsis, disseminated intravascular coagulation, automatic implantable cardioverterdefibrillator, ventilator dependence, endocrinopathy, severe trauma, severe respiratory distress, advanced oncologic state).
	ASA 5	• Moribund child not expected to survive 24 hrs with or without surgery (e.g., massive trauma, intracranial hemorrhage with mass effect, patient requiring ECMO, respiratory failure or arrest, malignant hypertension, decompensated congestive heart failure, hepatic encephalopathy, ischemic bowel, or multiple organ/system dysfunction).

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.

Table 2: Procedural Complexity

Procedural Complexity	Description
Low	• 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	• 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 not negligible; OR • Risk of intra or post-operative complication(s) is not negligible; OR • Post-operative care requires RNs and an interdisciplinary team with med/surg knowledge and skills that works exclusively or primarily with children; AND • 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	• 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 *Applicable to T2 – T6*	• 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 & 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)

		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 (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.

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 surgical services.

Sections are divided as follows:

3.1 Clinical Service
3.2 Knowledge sharing & transfer/training
3.3 Quality improvement & research

Notes about the TOS for Children's Surgical Services:

1. The Tiers of Service (TOS) framework describes a future **(not current)** state model and is intended to support future planning of children's surgical services in BC. The module describes **minimum** expectations to provide a **safe, sustainable,** and **appropriate** level of children's surgical services.

2. The tier identified for a given service represents the highest tier of that service which is available at that facility under usual circumstances (i.e., minimum expectations). Occasional exceptions may occur, usually due to geography and transportation, in which patients may be managed and/or procedures/interventions performed on an unplanned/emergency basis that would not normally be within the capacity of a given site, but which are performed if the resources are available (trained personnel, equipment, etc.) because the risk of transport is greater than the risk of performing the intervention/procedure locally. These special situations are **not** specified in this module.

3. This document is 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.

2.2.1 Clinical Service

2.2.1.1 Responsibilities

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

			T2			T3			T4			T5			T6		
			General Surgical Service			Child-Focused Surgical Service			Comprehensive Surgical Service for Children			Regional Surgical Service for Children			Provincial Surgical Service for Children		
			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 & 2	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 yrs & up	A1 & S			A1 & S							A1 & S	PA & PS[2]			PA & PS[3]
	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 & 5	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). 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.
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 + 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 + 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 based on results of ongoing professional practice valuation & outcomes within an effective CQI program).
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.

		T2	T3	T4	T5	T6
		General Surgical Service	**Child-Focused Surgical Service**	**Comprehensive Surgical Service for Children**	**Regional Surgical Service for Children**	**Provincial Surgical Service for Children**
1	Service reach	Community health service area(s)/local health area.[iv]	Multiple local health areas/health service delivery area.	Health service delivery area/health authority.	Health authority.	Province.
2	Surgical settings	• Day care (mostly) • Planned	• Day care & inpatient • Planned & unplanned	• Day care & inpatient • Planned & unplanned	• Day care & inpatient • Planned & unplanned	• Day care & inpatient • Planned & unplanned
3	Surgeons & anesthesia providers	*Surgical specialties:* Variable, depending on local surgeon availability. General surgeon or family practice physician with enhanced surgical skills available in rural & remote sites (not 24/7). *Anesthesia:* Anesthesia provider (specialist or family practice physician) available during times surgical procedures are performed. Transfer algorithm in place when surgical or anesthesia provider is not available.	*Surgical specialties:* General surgeon on-call 24/7. Strive to have dental surgery, ophthalmology, orthopedics, ENT, plastics and urology on-call 24/7. Transfer algorithm in place at times appropriate surgical specialty is not available (e.g., vacations). *Anesthesia:* Anesthesia provider (specialist or family practice physician) on-call 24/7.	*Surgical specialties:* Specialists on-call 24/7 & available 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. *Anesthesia:* Anesthesiologist who meets the age-specific credentialling requirements available on-call 24/7 to provide anesthesia to children ages 6 mos - 2 yrs.	*Surgical specialties:* Specialists available on-call 24/7 & available 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 T6 service. Pediatric surgical specialists available for some specialties (not 24/7). At a minimum, this includes a pediatric (general) surgeon and one other pediatric surgical specialist. *Anesthesia:* Pediatric anesthesiologist on-call 24/7.	Surgical specialties: Pediatric surgical specialists on-call 24/7 & available to assess & definitively manage children with all types of surgical conditions, including multi-system trauma. *Anesthesia:* Pediatric anesthesiologist(s) available 24/7.
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)

[iv] See www.bcstats.gov.bc.ca/statisticsbysubject/geography/referencemaps/Health.aspx for a map of Health Authorities (HAs), Health Service Delivery Areas (HSDAs) and Local Health Areas (LHAs) in BC.

		T2	T3	T4	T5	T6
		General Surgical Service	**Child-Focused Surgical Service**	**Comprehensive Surgical Service for Children**	**Regional Surgical Service for Children**	**Provincial Surgical Service for Children**
5	Pre-day of surgery screening & anesthesia consultation	Clearly describable process to screen & follow- up anesthetic, medical & behavioural risk in healthy children (ASA 1 & 2) ages 2 & over (e.g., blood work, anesthesia consult if required, etc). Provides pre-operative teaching for children undergoing common, low complexity procedures & their families.	Same as T2.	Same as T3 plus: • Includes children ages 6 mos - 2 yrs old. • Provides pre-operative teaching for children undergoing a broad range of low complexity procedures.	Same as T4 plus: • Includes children ages 0 - 6 months & children who have modest medical complexities (ASA 3). • Provides pre-operative teaching for children undergoing medium & a limited range of specific high complexity procedures.	Same as T5 plus: • Includes children who have severe medical complexities (ASA 4 & 5). • Provides pre-operative teaching for children undergoing a broad range of high complexity procedures.
6	Day of surgery check-in & preoperative care	Checks in & prepares children ages 2 & over pre-operatively undergoing common, low complexity procedures. Assesses condition & takes action if issues identified.	Same as T2.	Same as T3 plus: • Includes children ages 6 mos - 2 yrs old. • Provides pre-op care for children undergoing a broad range of low complexity procedures.	Same as T4 plus: • Includes children ages 0 - 6 months & children who have modest medical complexities. • Provides pre-op care for children undergoing medium & a limited range of specific high complexity procedures.	Same as T5 plus: • Includes children who have severe medical complexities. • Provides pre-op care for children undergoing a broad range of high complexity procedures.
7	Intraoperative care (OR)	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 Service	**Child-Focused Surgical Service**	**Comprehensive Surgical Service for Children**	**Regional Surgical Service for Children**	**Provincial Surgical Service for Children**
8	Post-anesthetic care immediately post-op		Provides **q 5-15 min** post-op monitoring (pulse, respiration, BP, O_2 saturation) until child is stable. Temperature & input/output on arrival to PACU & as necessary thereafter. Nursing staffing is based on the guidelines provided in the National Association of PeriAnesthesia Nurses of Canada (NAPANc) Standards for Practice.[v, 24]	Same as T2.	Same as T3.	Same as T4.	Same as T5 plus:
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.	Same as T3 plus: • Includes children ages 6 mos - 2 yrs old. • Provides post-op care for children who have undergone a broad range of low complexity procedures.	Same as T4 plus: • Includes children ages 0 - 6 months & children who have modest medical complexities. • Provides post-op care for children who have undergone medium & limited range of specific high complexity procedures.	Same as T5 plus: • Includes children who have severe medical complexities. • Provides post-op care for children who have undergone a broad range of high complexity procedures.

[v] Due to the wide range of practice settings, acuity, and individual considerations no single published ratio for nursing staffing is automatically applicable in all settings where children receive care. When creating safe staffing guidelines, factors that may need to be considered include assessment of the patient needs, acuity of the patient population, availability of specialized equipment and resources such as Child Life, competency, and level of education of staff, and family/caregiver involvement. NAPANc recommends that a minimum of two competent nurses, one who is competent in PeriAnesthesia nursing, should be present when a child is in Phase I, with or without the presence of a parent.

			T2 General Surgical Service	T3 Child-Focused Surgical Service	T4 Comprehensive Surgical Service for Children	T5 Regional Surgical Service for Children	T6 Provincial Surgical Service for Children
	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: • Includes children ages 6 mos - 2 yrs old. • Prepares children who have undergone a broad range of low complexity procedures for discharge.	Same as T4 plus: • Includes children ages 0 - 6 months & children who have modest medical complexities. • Prepares children who have undergone medium & limited range of specific high complexity procedures for discharge.	Same as T5 plus: • Includes children who have severe medical complexities. • Prepares children who have undergone a broad range of high complexity procedures for discharge.
10	Post-op care:[vi] 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: • 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.	Same as T4 plus: • Monitoring frequency may be more frequent than q1h & for prolonged periods.	Same as T5.

[vi] 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 Service	**Child-Focused Surgical Service**	**Comprehensive Surgical Service for Children**	**Regional Surgical Service for Children**	**Provincial Surgical Service for Children**
10 cont'd	Post-op care: Inpatients cont'd	Pain management & anxiolysis	Assesses pain using age, developmentally & culturally appropriate, evidence-based pain assessment tool(s). Provides age, developmentally & culturally appropriate, evidence-based non-pharmacological pain-relieving interventions. Administers weight-based doses of analgesics via topical, oral, enteral, intranasal & rectal routes. Manages complications of analgesia (e.g., manage airway, administer antidotes).	Same as T2 plus: • Administers weight-based doses of analgesics via SQ & IM injection & intermittent IV routes.	Same as T3 plus: • Administers analgesics via patient controlled IV route. • Administers weight-based doses of analgesics via continuous IV to children ages 2 years & over.	Same as T4 plus: • Administers analgesics via continuous IV to children ages 6 mos & over. Optional (not required): May offer epidural anesthesia/analgesia if: (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.	Same as 5 plus: • Manages pain for children of any age that require an extended & innovative range of options & routes. Includes regional analgesia/anesthesia (e.g., epidurals, nerve blocks).
		Post-op complications	Manages common post-op complications (e.g., urinary retention, fever, surgical site infection requiring IV antibiotics). Refers to T3-T6 as necessary.	Same as T2.	Same as T3 plus: • Manages complex post-op complications, including children referred/transferred from T2 & T3 services within the HA.	Same as T4 plus: • Manages complex post-op complications, including children referred/transferred from T2, T3 & T4 services within the HA.	Same as T5 plus: • Manages complex post-op complications, including children referred/transferred from T2 - T5 services throughout the province. • Management often involves multiple pediatric subspecialists.

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

[vii] 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 Service	**Child-Focused Surgical Service**	**Comprehensive Surgical Service for Children**	**Regional Surgical Service for Children**	**Provincial Surgical Service for Children**
10 cont'd	Post-op care: Inpatients cont'd	Nutrition manage-ment	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 & healthy weights, accurate weights & measures. NG tubes: Inserts, replaces & maintains NG tubes for short-term hydration. Verifies placement using acceptable practice standard (e.g., x-ray, pH). Maintains established G-tubes. Supports breastfeeding mothers & assists with breastfeeding-related challenges.	Same as T2 plus: 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. Determines selection & amounts of standard oral & enteral formulas for oral intake. NG tubes: As per T2. G-tubes: Maintains & replaces established G-tubes. GJ tubes: Maintains established GJ tubes.	Same as T3 plus: Provides nutrition advice & growth monitoring for children with stable nutrition needs & a broad range of medium complexity medical conditions. Determines selection & amounts of & specialized oral & enteral formulas for oral or enteral intake. NG tubes: Inserts, replaces & maintains NG tubes required for nutritional management. G-tubes: As per T3. GJ tubes: As per T3. Initiates, administers & monitors TPN. Teaches children/families about home enteral nutrition.	Same as T4 plus: Provides nutrition advice & growth monitoring for children with significant (but stable) nutrition vulnerabilities & medical complexities. NG tubes: As per T4. G-tubes: Establishes G-tubes. Maintains & replaces established G-tubes. GJ tubes: Establishes GJ tubes. Maintains & replaces established GJ tubes (in radiology). Available as a resource *within the HA* on days, M-F.	Same as T5 plus: Provides nutrition advice & growth monitoring for children with changing & complex nutrition needs & all levels of medical complexity. NG, G, GJ tubes: As per T5. Available as a resource *throughout the province* on days, M-F.

			T2	T3	T4	T5	T6
			General Surgical Service	**Child-Focused Surgical Service**	**Comprehensive Surgical Service for Children**	**Regional Surgical Service for Children**	**Provincial Surgical Service for Children**
10 cont'd	Post-op care: Inpatients cont'd	Wound manage-ment	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 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).	Same as T2.	Provides specialized counselling for children/families with 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 providers within the HA on ways to support the psychosocial/ emotional care of children/families.	Same as T4 plus: Assesses, formulates diagnoses & provides 1:1 psychological interventions for referred children/families with acute &/or complex med/surg conditions.	Same as T5 plus: Upon request, provides consultation to providers throughout the province on ways to support the psychosocial/emotion al & psychological care of children/families with acute &/or complex med/surg conditions.

			T2	T3	T4	T5	T6
			General Surgical Services	**Child-Focused Surgical Services**	**Comprehensive Surgical Service for Children**	**Regional Surgical Service for Children**	**Provincial Surgical Service for Children**
10 cont'd	Post-op care: Inpatients cont'd	Rehabil-itation	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: • Supporting activities of daily living • Encouraging mobilization • Providing splinting, casting & equipment • Assessing the environment for safety & accessibility Documented plan in place to manage children requiring timely & time-bound rehabilitation post-discharge.	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: • Supporting activities of daily living • Encouraging mobility • Providing splinting, casting & equipment • Assessing the environment for safety & accessibility Documented plan in place to manage children requiring timely & time-bound rehabilitation post-discharge. 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.

			T2	T3	T4	T5	T6
			General Surgical Services	**Child-Focused Surgical Services**	**Comprehensive Surgical Service for Children**	**Regional Surgical Service for Children**	**Provincial Surgical Service for Children**
10 cont'd	Post-op care: Inpatients cont'd	Dis-charge	Prepares children ages 2 & over who have undergone common, low complexity procedures & their families for discharge. Creates & implements discharge plans which involve referrals to local community-based services. (e.g., IDP, PT, OT, SLP, audiologist, PHN). Implements plans for children with complex discharge needs that were developed by/in collaboration with services at higher tiers.	Same as T2.	Same as T2 plus: • Includes children ages 6 mos - 2 yrs old. • Prepares children who have undergone a broad range of low complexity procedures for discharge. In collaboration with providers in the child's home community, creates & implements complex discharge plans which may involve referrals to pediatric specialists/ subspecialists (e.g., nursing support services, at-home program, specialty clinics). Often involves interdisciplinary case conferences with representatives from multiple agencies & documented discharge-specific plans. Implements plans for children with complex discharge needs that were developed by/in collaboration with services at higher tiers.	Same as T4 plus: • Includes children 0 - 6 mos old & children who have modest medical complexities. • Prepares children who have undergone medium & a limited range of specific high complexity procedures for discharge.	Same as T5 plus: • Includes children who have severe medical complexities. • Prepares children who have undergone a broad range of high complexity procedures for discharge. In collaboration with providers in the child's home community, creates & implements complex discharge plans which may involve multiple pediatric specialists/ subspecialists (e.g., nursing support services, at-home program & specialty clinics) & resources/equipment (e.g., NG or CVC care at home, home vent, home TPN, etc). Often involves interdisciplinary case conferences with representatives from multiple agencies & documented discharge-specific plans. Systematically contacts patients/families post-discharge to follow-up on immediate post-operative concerns (e.g., pain, nausea, medical follow-up required).

		T2	T3	T4	T5	T6
		General Surgical Services	**Child-Focused Surgical Services**	**Comprehensive Surgical Service for Children**	**Regional Surgical Service for Children**	**Provincial Surgical Service for Children**
11	Deteriorating / emergency situations	Uses BC Pediatric Early Warning System (PEWS) to identify, communicate, mitigate & escalate signs of clinical deterioration. Implemented in all areas as defined by CHBC. Site-specific escalation protocol is in place to follow-up signs of clinical deterioration as identified through the BC PEWS. Assesses & stabilizes critically ill children while arranging & awaiting transfer. Determines most appropriate location within facility to maintain critically ill child while awaiting transfer (dependent on local resources).	Same as T2.	Same as T3 plus: Capacity to perform endotracheal intubation 24/7 (on-site MD or RT).	Same as T4 plus: Refer to Children's Critical Care Module for availability of critical care services to receive critically ill children.	Same as T5.

		T2	T3	T4	T5	T6
		General Surgical Services	**Child-Focused Surgical Services**	**Comprehensive Surgical Service for Children**	**Regional Surgical Service for Children**	**Provincial Surgical Service for Children**
12	Outpatient pre- & post-op follow-up care	Pre and post-op care provided by surgeon in surgeon's office.	Same as T2.	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).	Same as T4 plus: Some subspecialty-specific interdisciplinary outpatient clinics available for children with complex needs. Some clinics involve more than one type of physician specialist (e.g., Cleft Lip Clinic, Club Foot Clinic, Feeding & Swallowing Clinic, Respiratory Clinic and Torticollis Clinic).	Broad range of subspecialty-specific interdisciplinary outpatient clinics available for children with complex needs. Many clinics involve more than one type of physician specialist. Examples: Cardiac Surgery Clinic, Cleft Palate/ Craniofacial/Jaw Clinic, Scoliosis Clinic, Burns Clinic, Vascular Anomalies Clinic, Complex Feeding Clinic, Congenital Malformation Clinic.
13	Child & family-centered care	See Appendix 4 (glossary) for general attributes which contribute to child & family-centered care. Surgery specific components: • 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.	Same as T2.	Same as T3.	Same as T4.	Same as T5.

		T2	T3	T4	T5	T6
		General Surgical Services	**Child-Focused Surgical Services**	**Comprehensive Surgical Service for Children**	**Regional Surgical Service for Children**	**Provincial Surgical Service for Children**
		• 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.				

2.3.1.2 Requirements

		T2	T3	T4	T5	T6
		General Surgical Service	**Child-Focused Surgical Service**	**Comprehensive Surgical Service for Children**	**Regional Surgical Service for Children**	**Provincial Surgical Service for Children**
1.0	**Providers**					
1.1	**Physicians**					
	Surgeon(s)	Surgical specialties: Variable, depending on surgeon availability (locally & via outreach). General surgeon or family practice physician with enhanced surgical skills available in *rural & remote sites* (not 24/7). 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). Transfer algorithm in place when surgical provider is not available.	Surgical specialties: General surgeon on-call 24/7 & available on-site as needed. 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). Surgeons meet the currency requirements in the Provincial Privileging document for the relevant specialty. Transfer algorithm in place at times appropriate surgical specialty is not available (e.g., vacations)	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. Surgeons meet the meet currency requirements in the Provincial Privileging document for the relevant specialty.	Same as T4 plus: Pediatric surgery specialists available for some specialties (not 24/7). At a minimum, this includes a pediatric (general) surgeon and one other pediatric surgical subspecialist. Surgeons have completed a pediatric fellowship & meet the currency volumes + CME requirements in the Provincial Privileging document for the relevant specialty (including pediatric specific requirements, if identified).	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 currency volumes + CME requirements in the Provincial Privileging document for the relevant specialty (including pediatric specific requirements, if identified). Pediatric surgical support for trauma team on-call 24/7 & available on-site as needed. Pediatric surgery specialists available on-call 24/7 to provide advice to health care providers throughout the province on pediatric surgery-related topics.

		T2	T3	T4	T5	T6
		General Surgical Service	**Child-Focused Surgical Service**	**Comprehensive Surgical Service for Children**	**Regional Surgical Service for Children**	**Provincial Surgical Service for Children**
Physicians	Anesthesia provider(s)	Anesthesia provider (specialist or family practice physician) available on-site for scheduled pre-operative anesthetic consultations & during times surgical procedures are performed. Anesthesia providers meet the currency requirements in the Provincial Privileging documents: • Anesthesiologists: 400 hrs/yr. • Family practice (FP) anesthesia provider: current clinical activity to meet licensure requirements of the CPSBC, of which 150 hrs/yr are self-reported anesthesia-related activity PLUS 30 hrs of anesthesia-related CME over a 3-year cycle.	Anesthesia provider (specialist or family practice physician) on-call 24/7 & available on-site as needed. Also available for scheduled pre-operative anesthetic consultations. Anesthesia providers meet the currency requirements in the Provincial Privileging document: • Anesthesiologists: 400 hrs/yr. • FP anesthesia provider: current clinical activity to meet licensure requirements of the CPSBC, of which 150 hrs/yr are self-reported anesthesia-related activity PLUS 30 hrs of anesthesia-related CME over a 3-year cycle.	Anesthesiologist on-call 24/7 & available on-site as needed to provide anesthesia to children, including children ages 6 mos - 2 yrs. Also available for scheduled pre-operative anesthetic consultations. Anesthesiologist meets the currency requirements in the Provincial Privileging document: • Children ages 2 & older: 400 hrs/yr includes recent experience working with children ages 2 & over. • Children ages 6 mos - 2 yrs: 400 hrs/yr includes recent experience working with children ages 6 mos to 2 yrs.	Pediatric anesthesiologist on-call 24/7 & available on-site as needed. Also available for scheduled pre-operative anesthetic consultations. Pediatric anesthesiologists meet the currency requirements in the Provincial Privileging document: • Children ages 6 mos & older: See T4. • Children ages 0 - 6 mos: 12-month pediatric anesthesiology fellowship, 400 hrs/yr including recent experience working with children ages 0 -6 mos + least 20 CPD credits/yr pertaining to pediatric anesthesiology.	Pediatric anesthesiologist on-call 24/7 & available on-site as needed. Also available for scheduled pre-operative anesthetic consultations. Pediatric anesthesiologists meet the currency requirements in the Provincial Privileging document to provide anesthesia to children of all ages (see T 5) plus: • Cardiac anesthesia: Additional 6-month fellowship in pediatric cardiac anesthesiology + at least 50 pediatric cardiac cases/yr + at least 20 CPD credits/yr pertaining to pediatric cardiac anesthesiology. Pediatric anesthesiologists available 24/7 as a resource to health care providers throughout the province.

		T2	T3	T4	T5	T6
		General Surgical Service	**Child-Focused Surgical Services**	**Comprehensive Surgical Service for Children**	**Regional Surgical Service for Children**	**Provincial Surgical Service for Children**
Physicians	Other specialist physicians	Pediatrician from *within HA* (or BCCH if transportation corridors are such that the accepted referral pathway is direct to BCCH) available by phone or via virtual care to discuss cases 24/7.	Pediatrician on-call 24/7 & available on-site as needed.	Same as T3.	Pediatrician or pediatrician designate (e.g., resident) on-site 24/7. This does not include the ED physician. Pediatric medicine subspecialists available for on-site consultation in higher volume services (e.g., cardiology, neurology) - 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**					
	Nurses: Pre-day of surgery screening & anesthesia consultation	RN with pediatric assessment skills & knowledgeable about range of surgeries performed on-site available for scheduled pre-operative assessments for children ages 2 & older.	Same as T2.	Same as T3 plus: Surgical caseload includes children ages 6 mos - 2 yrs old & a wider range of procedures.	RN with pediatric assessment skills & knowledgeable about range of surgeries performed on-site available for scheduled pre-operative assessments for children ages 2 & older. Surgical caseload includes children ages 0 - 6 mos & children with modest medical complexities.	Pediatric RN with extensive pediatric surgery knowledge available for pre-operative assessments days, M-F. Surgical caseload includes children of all ages & children with severe medical complexities.

		T2	T3	T4	T5	T6
		General Surgical Service	**Child-Focused Surgical Service**	**Comprehensive Surgical Service for Children**	**Regional Surgical Service for Children**	**Provincial Surgical Service for Children**
Nurses	Nurses: Day of surgery check-in & pre-operative care	RN with pediatric assessment skills & knowledgeable about range of surgeries performed on-site available to check in children ages 2 yrs & older & provide pre-operative care on day of surgery.	Same as T2.	Same as T3 plus: Surgical caseload includes children ages 6 mos - 2 yrs old & a wider range of procedures.	RN with pediatric assessment skills & knowledgeable about range of surgeries performed on-site available to check children in & provide pre-operative care on day of surgery. Surgical caseload includes children ages 0 - 6 mos & children with modest medical complexities.	Pediatric RN with extensive pediatric surgery knowledge available to check children in & provide pre-operative care on day of surgery. Surgical caseload includes children of all ages & children with severe medical complexities.
	Nurses: Intraoperative care (OR)	OR RNs have experience scrubbing/circulating for the range of surgeries performed on site. Experience is mostly with adults. OR RNs assigned to pediatric cases (ages 2 yrs & older) have received pediatric-specific orientation which includes familiarization with: • Relevant pediatric surgical procedures • Pediatric specific OR protocols • Pediatric-specific OR equipment • Management of pediatric emergencies in the OR. RNs have completed Pediatric Foundation Online course,[8] ENPC &/or PALS.	Same as T2.	Same as T3 plus: Surgical caseload includes children ages 6 mos - 2 yrs old & a wider range of procedures. OR RNs scrub/circulate for pediatric surgeries as part of the caseload within their assigned surgical specialty (e.g., 3 days/wk) on a regular basis (e.g., 2 - 3 times per week).	OR RNs scrub/circulate for pediatric surgeries as part of the caseload within their assigned surgical specialty (e.g., 2 - 3 times per week). Surgical caseload includes children ages 0 - 6 mos & children with modest medical complexities.	Pediatric OR RNs 24/7. Surgical caseload includes children of all ages & children with severe medical complexities. RNs receive pediatric specific orientation/ education & practice exclusively or primarily with children.

[8] https://Ubccpd.ca/course/pediatric-foundations. Course is 3 modules.

		T2	T3	T4	T5	T6
		General Surgical Service	**Child-Focused Surgical Service**	**Comprehensive Surgical Service for Children**	**Regional Surgical Service for Children**	**Provincial Surgical Service for Children**
Nurses	Nurses: Post-anesthetic care immediately post-op	Post-anesthetic care RNs assigned to pediatric cases regularly recover children ages 2 & over that have undergone general anesthetics. Orientation includes familiarization with: • Relevant pediatric surgical procedures • Pediatric-specific post-anesthetic care protocols • Pediatric specific post-anesthetic care equipment • Management of pediatric emergencies in the post-anesthetic care period. RNs have completed Pediatric Foundations Online course [25], ENPC &/or PALS (ENPC &/or PALS recommended).	Same as T2.	Same as T3 plus: Post-anesthetic care RNs assigned to pediatric cases regularly recover children ages 6 mos & older undergoing a broad range of surgical procedures on a daily basis.	Same as T4 plus: Post-anesthetic care RNs assigned to pediatric cases regularly recover children ages 0 - 6 mos & children with modest medical complexities.	Pediatric anesthetic care RNs 24/7. Surgical caseload includes children of all ages & children with severe medical complexities. RNs receive pediatric specific post-anesthetic care orientation/education & practice exclusively or primarily with children. Current ENPC &/or PALS recommended.

		T2	T3	T4	T5	T6
		General Surgical Service	**Child-Focused Surgical Service**	**Comprehensive Surgical Service for Children**	**Regional Surgical Service for Children**	**Provincial Surgical Service for Children**
Nurses	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 Foundation On-line 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 Foundation On-line 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 Foundation On-line 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 *Medical Tiers in Full* document.	Same as T4 plus: Pediatric RN(s) assigned to specialty clinics have "enhanced skills" (see glossary) in the relevant specialty area(s).	Pediatric RN(s) assigned to specialty clinics have “enhanced skills” (see glossary) in the relevant subspecialty area(s). Broad range of subspecialty clinics.
	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.

		T2	T3	T4	T5	T6
		General Surgical Service	**Child-Focused Surgical Service**	**Comprehensive Surgical Service for Children**	**Regional Surgical Service for Children**	**Provincial Surgical Service for Children**
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.	Social worker(s) practice is exclusively or primarily pediatrics or, if not, team members have significant exposure to facilitate development of pediatric-specific expertise. Child life specialist available days, M-F. Spiritual care practitioner available on-call 24/7 & available on-site as needed. Psychologist with pediatric expertise.[9] 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.

[9] 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 Service	**Child-Focused Surgical Service**	**Comprehensive Surgical Service for Children**	**Regional Surgical Service for Children**	**Provincial Surgical Service for Children**
1.4	Allied health	Generalist PT, OT & dietician available on request on days, M-F, for individual cases. Practice is predominantly with adults. Pediatric dietician available via HealthLink days, M-F. Generalist pharmacist available as per Accreditation Canada standards, including on-call service (standards not specific to pediatrics).	Staff with general pediatric knowledge & skills available on request for individual cases. Practice is predominantly with adults but includes some children. • RT available on-site days, M-F. On-call (& available to come to the site if required) outside these hours. • PT available days, M-F (may be on-site PT or PT arrangement via service agreement). • OR available days, M-F (may be on-site OT or OT arrangement via service agreement). • Dietician available days, M-F. Pharmacist as per T2.	Staff has general pediatric knowledge & skills. Practice includes both adults & children. • RT available on-site 24/7. • PT available days, M-F. • OT available days, M-F. • Dietician available days, M-F. • OT or SLP available to perform swallowing assessment days, M-F. Pharmacist with pediatric expertise[10] available on-site days, M-F. Outside these hours, general pharmacist is available on-call for telephone consultation.	• RT available on-site 24/7. • PT available days, M-F. • OT available days, M-F. • Dietician available days, M-F. • OT or SLP available to perform swallowing assessment days, M-F. Staff on days, M-F practices exclusively or primarily in pediatrics or, if not, team members have significant exposure to develop pediatric-specific expertise. After-hours coverage (if available) is usually provided by generalists. Clinical pharmacy specialist(s) in pediatrics[11] available on-site days, M-F. Outside these hours, general pharmacist is available on-call for telephone consultation.	Pediatric specialists: • RT available on-site 24/7. • PT available days, M-F. • OT available days, M-F. • SLP available days, M-F. • Dietician available days, M-F. • OT or SLP available to perform swallowing assessment days, M-F. 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. Team practices exclusively or primarily with children. Psychosocial professionals assigned to subspecialty clinics have "enhanced skills" (see glossary) in relevant subspecialty area(s). Broad range of subspecialty clinics.

[10] 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.

[11] 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 Service	**Child-Focused Surgical Service**	**Comprehensive Surgical Service for Children**	**Regional Surgical Service for Children**	**Provincial Surgical Service for Children**
				Note: Physicians, nurses, psychosocial & allied health professionals work consistently together as a pediatric interdisciplinary team.	Allied health professionals assigned to subspecialty clinics have "enhanced skills" (see glossary) in the relevant subspecialty area(s). Limited number of subspecialty clinics.	
1.5	Other: • IV starts • Wound/ostomy • Pain management • Lactation consultant • Feeding & swallowing team • Complex feeding & nutrition service	Clearly describable process in place to manage difficult pediatric IV starts. Clearly describable process in place to manage breastfeeding related challenges.	Same as T2 plus: Clearly describable process to access wound/ostomy RN. Clearly describable process to access lactation consultant.	Same as T3 plus: Wound/ostomy RN on-site days, M-F (for adults & children). Pain management team on-site days, M-F (for adults & children).	Wound/ostomy RN on-site days, M-F (for adults & children). Pain management team on-site days, M-F (for adults & children). Pediatric feeding & swallowing team available locally to provide oral motor & dietary assessment/consultation days, M-F. Capacity available locally to perform video fluoroscopy feeding studies.	Clearly describable process in place to manage difficult pediatric IV starts. Pediatric wound/ostomy RN on-site days, M-F. Pediatric pain mgt team available on-site days, M-F. Lactation consultant on-site days, M-F. Pediatric feeding & swallowing team available on-site to provide oral motor & dietary assessment/consultation days, M-F. Capacity available on-site to perform video fluoroscopy feeding studies. Pediatric complex feeding & nutrition service available on-site.

		T2	T3	T4	T5	T6
		General Surgical Service	**Child-Focused Surgical Service**	**Comprehensive Surgical Service for Children**	**Regional Surgical Service for Children**	**Provincial Surgical Service for Children**
2.0	**Facilities**					
2.1	Pre-day of surgery screening & anesthesia consultation	Space to review patient records & talk to patients/families, health care providers, etc by phone. Child-friendly space for in-person pre-day of surgery assessments/anesthetic consults.	Same as T2.	Same as T3.	Same as T4.	Same as T5 except space is set up for the exclusive use of children & can accommodate parents.
2.2	Day of surgery check-in & pre-operative care	Child-friendly space to complete check-in & pre-op care on day of surgery. Child visible to nursing staff during waiting period. Space accommodates parents. May occur in a "traditional" check-in/pre-operative area with the surgical suite (mixed adults & children) or on an inpatient 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).	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).
2.3	Intraoperative care (OR)	OR(s) & OR equipment is appropriate for children. Space can accommodate parents during induction of anesthesia.	Same as T2.	Same as T3.	Same as T4.	ORs are set-up for the exclusive use of children. Space can accommodate parents during induction of anesthesia.

		T2	T3	T4	T5	T6
		General Surgical Service	**Child-Focused Surgical Service**	**Comprehensive Surgical Service for Children**	**Regional Surgical Service for Children**	**Provincial Surgical Service for Children**
2.4	Post-anesthetic care immediately post-op	Child-friendly space to recover patients immediately post-op. Able to create a "visual barrier" between a child & other intubated patients. Can accommodate parents.	Same as T2.	Separate child-friendly space available for recovery of children in the immediate post-op period. Can accommodate parents.	Separate child-friendly space available for recovery of children in the immediate post-op period. Can accommodate parents.	Post-anesthetic care space for recovery of children immediately post-op is set-up for the exclusive use of children (equipment, pictures on the wall, etc). Can accommodate parents.
2.5	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/unit. Unit meets criteria for "safe pediatric unit" (see glossary).	Dedicated pediatric inpatient resources/ teaching units, grouped by specialties/subspecialties. Units meet criteria for "safe pediatric unit" (see glossary).

		T2	T3	T4	T5	T6
		General Surgical Service	**Child-Focused Surgical Service**	**Comprehensive Surgical Service for Children**	**Regional Surgical Service for Children**	**Provincial Surgical Service for Children**
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 T5 NICU. On-site T5 PICU.	On-site T6 NICU. On-site T6 PICU.
3.0	**Clinical diagnostic & support services**	Refer to relevant modules (under development).				

		T2	T3	T4	T5	T6
		General Surgical Service	**Child-Focused Surgical Service**	**Comprehensive Surgical Service for Children**	**Regional Surgical Service for Children**	**Provincial Surgical Service for Children**
4.0	**Volumes per year**					
4.1	Minimum surgical procedures/yr[12]		Based on a 3-year average: Surgical procedures, (day care & inpatient), ages 0 - 16.9 yrs: 200 cases/yr AND one of the following: 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). OR Med/surg inpatient days, 0 - 16.9 yrs: >500/yr (excl NICU)	Based on a 3-year average: Surgical procedures, (day care & inpatient), ages 0 - 16.9 yrs: 500 cases/yr, including neonates AND one of the following: 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). OR Med/surg inpatient days, 0 - 16.9 yrs: >1,500/yr (excl NICU)	Based on a 3-year average: Surgical procedures, (day care & inpatient), ages 0 - 16.9 yrs: 1,000 cases/yr, including neonates AND one of the following: 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). OR Med/surg inpatient days, 0 - 16.9 yrs: >4,500/yr (excl NICU)	Based on a 3-year average: Surgical procedures, (day care & inpatient), ages 0 - 16.9 yrs: 4,000 cases/yr, including neonates AND one of the following: Med/surg visits, ages 0 - 16.9 yrs: >8,000/yr. (excl NICU); OR Med/surg inpatient days, 0 - 16.9 yrs: >20,000/yr (excl NICU)

[12] 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 Service	**Child-Focused Surgical Service**	**Comprehensive Surgical Service for Children**	**Regional Surgical Service for Children**	**Provincial Surgical Service for Children**
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	Pediatric anesthesia cart - see Appendix 3 for a reference list. Inpatients: Refer to *Children's General Medicine: Tiers in Full* (Appendix 1) for guidelines on equipment & supplies for sites that admit children.	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 Service	**Child-Focused Surgical Service**	**Comprehensive Surgical Service for Children**	**Regional Surgical Service for Children**	**Provincial Surgical Service for Children**
1.0	**Student learning**					
1.1	Medical students, residents & fellows		If designated by UBC, provides *non-pediatric specific* 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 *non-pediatric specific* surgical placements/learning experiences for medical students and family practice, surgery and anesthesiology residents. If designated by UBC, provides *pediatric-specific* 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 *pediatric-specific* 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 Service	**Child-Focused Surgical Service**	**Comprehensive Surgical Service for Children**	**Regional Surgical Service for Children**	**Provincial Surgical Service for Children**
1.2	Nursing, nurse practitioners, 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 T2- T5 physicians.

		T2	T3	T4	T5	T6
		General Surgical Service	**Child-Focused Surgical Service**	**Comprehensive Surgical Service for Children**	**Regional Surgical Service for Children**	**Provincial Surgical Service for Children**
2.2	Nurses & allied health care providers	Mechanism is in place to regularly review staff education needs related to maintenance of competencies in pediatric surgical care. 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).	Same as T2.	Same as T3 plus: In collaboration with T5 & T6, develops & shares educational resources & offers regional learning activities that support staff to maintain competencies in pediatric surgical care.	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 staff to maintain competencies in pediatric surgical care (e.g., best practice workshops). Provides pediatric surgical experiences on-site & via outreach & simulation for T2 - T5 staff.

2.2.3 Quality Improvement/Research

		T2	T3	T4	T5	T6
		General Surgical Service	**Child-Focused Surgical Service**	**Comprehensive Surgical Service for Children**	**Regional Surgical Service for Children**	**Provincial Surgical Service for Children**
1.0	Quality improve-ment (QI)	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. Implements recommendations & evaluates the outcome.	Same as T2 plus: Provides pediatric &/or surgical/ anesthesia expertise for T2 case reviews, if requested.	HA QI processes in place to *specifically* review & improve the safety & quality of children's surgical/ anesthesia care within the HA. QI program includes the elements outlined in Appendix 1. In collaboration with T5/T6, tracks pediatric surgery and anesthesia-specific safety & quality indicators *within the HA* (i.e., NSQIP or similar approach). See Appendix 1, Table 1.2 & 1.3 for examples of indicators. Provides pediatric &/or surgical/anesthesia expertise in T2 or T3 case reviews, if requested.	Same as T4.	QI processes in place to *specifically* review & improve the safety & quality of children's surgical/ anesthesia care within the T6 service. Invites external pediatric &/or surgical/anesthesia experts to participate in case reviews, as appropriate. Participates in the American College of Surgeons National Surgery Quality Improvement Program (NSQIP), pediatric stream. 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.
		Participates in regional & provincial initiatives to improve the quality & safety of children's surgical care.	Same as T2.	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). Participates in provincial initiatives quality & safety initiatives.	Same as T4.	Same as T5 plus: 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). Participates in national networks of pediatric &/or surgical and anesthesia service providers.

		T2	T3	T4	T5	T6
		General Surgical Service	**Child-Focused Surgical Service**	**Comprehensive Surgical Service for Children**	**Regional Surgical Service for Children**	**Provincial Surgical Service for Children**
	Quality improve-ment (QI) cont'd	Engages patients/families who have received care locally to obtain feedback on services provided (processes may not be pediatric-specific). Incorporates feedback, as appropriate.	Same as T2.	Same as T3 plus: Engages patients/families who have received care regionally to obtain feedback on services provided (processes may not be pediatric-specific). Incorporates feedback, as appropriate. Structures in place to support patient/family engagement in regional service planning & identification of priorities for improvement (structures may not be pediatric specific). Collaborates with CHBC & T4/T5/T6 to support child/youth/families in the identification of priorities for improvement for child/youth services offered across multiple BC HAs.	Same as T4.	Same as T5 plus: Structures in place to support child/youth/family engagement in provincial service planning & identification of priorities for improvement for services which are unique to T6 (structures are pediatric specific).
		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 *within the HA* 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 *provincial* trends of hazards, adverse events & near misses that involve children's surgical and anesthesia care. Takes provincial action to reduce future occurrences.

		T2	T3	T4	T5	T6
		General Surgical Service	**Child-Focused Surgical Service**	**Comprehensive Surgical Service for Children**	**Regional Surgical Service for Children**	**Provincial Surgical Service for Children**
	QI cont'd	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 interprofessional research related to children's surgical and anesthesia care. Disseminates research findings. Helps T2-T5 providers integrate research findings into practice.

3.0 References

1. Hanley G. Summary of the evidence volume-outcome relationship in pediatric surgery. http://Childhealthbc.ca/tiers-service/childrens-surgical-services. 2013:1-15.

2. Queensland Health. Surgical services - children's. CSCF v3.2. https://www.health.qld.gov.au/__data/assets/pdf_file/0025/444436/cscf-surgical-childrens.pdf. 2014:1-22.

3. Queensland Health. Anaesthetic services - children's. CSCF v3.2. https://www.health.qld.gov.au/__data/assets/pdf_file/0018/444510/cscf-anaesthetic-childrens.pdf. 2014:1-18.

4. NSW Department of Health. Children and adolescents - admission to services designated level 1-3 paediatric medicine & surgery. https://www1.health.nsw.gov.au/pds/ActivePDSDocuments/PD2010_032.pdf. 2010;PD2010_032.

5. NSW Department of Health. Guidelines for networking of paediatric services in NSW; http://www.nchn.org.au/a2k/docs/GuidelinesforNetworkingofPaediatricServicesinNSWDecember2002.pdf. 2002.

6. NSW Department of Health. NSW health guide to the role delineation of clinical health services. https://www.health.nsw.gov.au/services/pages/role-delineation-of-clinical-services.aspx. 2019:1-164.

7. NSW Department of Health. Guidelines for care in acute care settings. https://www1.health.nsw.gov.au/pds/ActivePDSDocuments/PD2010_034.pdf. 2010;PD2010_034.

8. Royal Australasian College of Physicians (PACP) Paediatric and Child Health Division, the Association for the Wellbeing of Children in Health Care and Children's Hospitals Australasia. Standards for the care of children and adolescents in health services; https://www.accypn.org.au/wp-content/uploads/ACHS_Standard1_2008.pdf. 2008:1-12.

9. UK Department of Health. Getting the right start: National service framework for children - standard for hospital services; https://Assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/199953/getting_the_right_start_-_National_Service_Framework_for_Children_Standard_for_Hospital_Services.pdf. 2003;31352.

10. UK Department of Health. Commissioning safe and sustainable specialised paediatric services: A framework of critical inter-

dependencies. http://www.symmetricpartnership.co.uk/userfiles/documents/Spec_Paeds_Final_Oct_08_dh_088069.pdf. 2008;288254:1-36.

11. National Health Services (NHS) England. NHS standard contract for paediatric surgery: Surgery (and surgical pathology, anaesthesia & pain. https://www.england.nhs.uk/wp-content/uploads/2013/06/e02-paed-surg-surgi-path-anaes.pdf. 2013:1-24.

12. Children's Surgical Forum of The Royal College of Surgeons of England. Standards for children's surgery; https://www.rcseng.ac.uk/library-and-publications/rcs-publications/docs/standards-for-childrens-surgery/?_id=31E24D1C16CF4BAB8A21B17515B32FC3&_z=z. 2013:1-32.

13. The Royal College of Surgeons, (UK). Children's surgical forum: Ensuring the provision of general paediatric surgery in the district general hospital; https://www.rcseng.ac.uk/library-and-publications/rcs-publications/docs/ensuring-the-provision-of-general-paediatric-surgery-in-the-district-general-hospital/. 2010:1-11.

14. American College of Surgeons. Optimal resources for children's surgical care; https://www.facs.org/quality-programs/childrens-surgery/childrens-surgery-verification/standards. 2015:1-98. https://www.facs.org/quality-programs/childrens-surgery/childrens-surgery-verification/standards. Accessed Dec 10, 2016.

15. BC Medical Quality Initiative. Family practice anesthesia dictionary. http://Bcmqi.ca/Published%20Dictionaries/FamilyPracticeAnesthesia(2019-07)%20-%20rv.pdf. 2019:1-15. http://bcmqi.ca/Published%20Dictionaries/FamilyPracticeAnesthesia(2019-07)%20-%20rv.pdf. Accessed May 1, 2021.

16. BC Medical Quality Initiative. Family practice enhanced surgical skills dictionary. http://Bcmqi.ca/Published%20Dictionaries/Family%20Practice%20Enhanced%20Surgical%20Skills%20(2021-03).pdf. [June 28, 2019]. 2021:1-13.

17. BC Medical Quality Initiative. Anesthesiology clinical privileges. http://Bcmqi.ca/Published%20Dictionaries/anesthesiology(2019-07).pdf. 2019:1-23.

18. BC Medical Quality Initiative. General surgery, pediatric surgery & other surgery subspecialty documents. http://Bcmqi.ca/Published%20Dictionaries/GeneralSurgery(2017-09).pdf. 2017:1-19.

19. Royal College of Physicians and Surgeons. Pediatric surgery competencies; file:///C:/Users/user/downloads/pediatric-surgery-competencies-e%20(6).pdf. 2021:1-23.

20. Royal College of Physicians and Surgeons of Canada. General surgery competencies; file:///C:/Users/user/downloads/general-surgery-competencies-e%20(1).pdf. 2020:1-33.

21. American Operating Room Nurses. Position statement on perioperative safe staffing and on-call practices. file:///C:/Users/user/downloads/PosStat-personnel-safe-staffing-on-call-practices.pdf. 2014:1-14.

22. Operating Room Nurses Association of Canada. ORNAC standards, guidelines, and position statements for perioperative registered nurses. 15th ed. https://www.csagroup.org/store/product/ORNAC-2021/. 2021.

23. American Society of Anesthesiologists. ASA physical status classification system. file:///C:/Users/user/downloads/asa-physical-status-classification-system.pdf. 2020:1-4.

24. National Association of PeriAnethesia Nurses of Canada, (NAPAN). Resources 6 - PeriAnesthesia care of the pediatric client in all perianesthesia, 4th edition phases; http://Napanc.ca/assets/forms/Resource%206-%20%20PeriAnesthesia%20Care%20of%20the%20Pediatric%20Client%20(1).pdf. 2020:1-47.

25. BC Children's Hospital. Pediatric foundations online modules; https://Ubccpd.ca/course/pediatric-foundations. Provincial Health Services Authority Web site. https://ubccpd.ca/course/pediatric-foundations. Updated 2021. Accessed May 1, 2021.

26. U.S. Department of Health and Human Sciences. Pediatric quality indicators overview; http://www.qualityindicators.ahrq.gov/modules/pdi_resources.aspx. Agency for Healthcare Research and Quality Web site. http://www.qualityindicators.ahrq.gov/modules/pdi_resources.aspx. Accessed May 1, 2021.

27. Institute for Healthcare Improvement, the National Initiative of Children's Healthcare Quality & the Institute for Patient- and Family-Centered Care. Patient- and family-centered care organizational self-assessment tool; http://www.ihi.org/resources/pages/tools/PatientFamilyCenteredCareOrganizationalSelfAssessmentTool.aspx. 2013.

28. Welsh Assembly Government. All Wales universal standards for children and young people's specialised healthcare services. http://www.wales.nhs.uk/sites3/documents/355/All%20Wales%20Universal%20Standards%20for%20Children%20and%20Young%20People's%20Specialised%20Healthcare%20Services%20-english.pdf. 2008:1-28.

29. Agency for Healthcare Research and Quality. Guide to patient and family engagement; https://www.ahrq.gov/research/findings/final-reports/ptfamilyscan/ptfamily3b.html#Strategies. https://www.ahrq.gov/ Web site. https://www.ahrq.gov/research/findings/final-reports/ptfamilyscan/ptfamily3b.html#Strategies. Updated 2018. Accessed May 1, 2021.

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, 2015 [14] and AHRQ Pediatric Quality Indicators web page [26]

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.

		Healthy Children			
		T2*		T3	
		Ages 2 & Over			
Service	Procedure	Urban	Rural & remote**	Ages 2 & Over	Ages 14 & Over
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	
Opthalmol	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	• 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	• 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	• BP cuffs, various sizes from neonate to small child • Precordial stethoscope • Saturation monitor attachments • Esophageal stethoscopes with temperature sensor • Neonatal ECG electrodes
Circuits	• Oral Rae tubes • Cuffed and Uncuffed ET tubes • Suction catheters • Pediatric yanker suctions, disposable • ET stylettes • Pediatric circuits and ambu bags • O_2 masks and some positioning equipment
IV fluids	• 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, [6] BC Children's Pediatric Foundation Online Course [25] and BC Children's CAPE tools (2008-2010).

"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.

"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.

- Mechanisms to promote safety amongst children and youth with mental health conditions, such as:
  - Regular site-wide safety risk assessments (as per WorkSafe BC violence risk assessments). e.g., Personal alarms or panic buttons available where required? Appropriate staffing to prevent staff working alone/in isolation).
  - Least restraint and seclusion procedures (see Provincial Least Restraint Guidelines, 2018).
  - Environmental/room and unit safety checks/rounds and documentation in alignment with BC Provincial Violence Prevention Curriculum.
  - Guidelines to ensure personal searches are conducted only as required for safety, as per trauma informed guidelines.

  Reference: *BC Children's Hospital (2019). 2019 ONCAIPS-BC Provincial Child & Adolescent Inpatient Mental Health Standards. BC Children's Hospital, Child and Adolescent Psychiatry.*

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/uncrcchilldfriendlylanguage.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. [27]
  - Welsh Assembly Government, All Wales Universal Standards for Children and Young People's Specialised Healthcare Services, 2008. [28]
  - Maurer, M et al, Guide to Patient and Family Engagement (Agency for Healthcare Research and Quality), 2018. [29]

Appendix 5: Change Log

Document	Date	Description of Change
Initial approval (by CHBC Steering Committee & Provincial Surgical Executive Committee)	July 1, 2016	
Minor updates	2016 - 2018	Updates to align with other modules developed subsequently to the surgical module (e.g., critical care module)
Minor update	2020	Clinical service: • Service reach: Changed T2 from "local community/local health area" to "community health service area(s)/local health area" to match change in MOH designations. • Surgeons & anesthesia providers: To more accurately reflect the intent of the availability of pediatric surgical specialists available, added "at a minimum, this includes a pediatric (general) surgeon and one other pediatric surgical subspecialist." • Pre-admission care: Changed title to "Pre day of surgery screening & anesthesia consultation." Minor changes in text to add clarity for self-assessment. • Preoperative care: Changed title to "Day of surgery check-in & preoperative care." Minor changes in text to add clarity for self-assessment. • Post-anesthetic care unit: Changed title to "Post-anesthetic care immediately post-op." • Post-op care: Day care: Minor changes in text to add clarify for self-assessment. • Post-op care: Updated to align with medical module (e.g., nutrition management, deteriorating situations). Minor changes in text to add clarity for self-assessment. • Child & family-centred care: Moved into responsibilities from requirements.
Minor update	Sept 2021	• Changed titles of Tiers 4 – 6 (to simplify): Comprehensive Surgical Service for Children (T4), Regional Surgical Service for Children (T5), Provincial Surgical Service for Children (T6).

Document	Date	Description of Change
		• Table 1: Updated ASA descriptions (including examples) to match updated descriptions by the American Society of Anesthesiologists. • Updated requirements of anesthesiologists and surgeons to align with updated provincial privileging documents. • Updated the requirements for nursing staffing guidelines to align with updated NAPANc guidelines. • Pain management & psychosocial & spiritual support responsibilities: updated to align with medical module. • T6: Add responsibility for contacting patients/families post-discharge to follow-up on immediate post-operative concerns (e.g., pain, nausea).
Minor update	Dec 2021	Requirements: 2.0 Facilities: • Updated the NICU requirement for T5 and T6 to align with updated requirements in PSBC TOS documents.