

## Levels of Care

### Introduction:

In order to provide safe chemotherapy administration to pediatric oncology patients in the community, "Levels of Care" have been defined and resource requirements identified. Level IV care is delivered at BC Children's Hospital (BCCH). Levels I, II and III care may be provided in the community depending on available resources.

- Level I: simple outpatient chemotherapy
- Level II: complex outpatient chemotherapy
- Level III: complex inpatient chemotherapy
- Level IV: tertiary pediatric oncology referral centre

Certain phases of cancer chemotherapy should always be given in a tertiary (Level IV) pediatric referral centre, BCCH e.g. initiation of chemotherapy, Acute Myelogenous Leukemia (AML) treatment, blood and marrow transplant (BMT) preparative regimen.

Patients receiving Investigational New Drugs (IND's), on Phase II studies (evaluating efficacy) or on certain research studies will receive these therapies and be monitored at BCCH.

Drugs administered under the Special Access Program (SAP) may, under certain circumstances, be given in the local community.

Occasionally the same drug may be both an IND for a patient on a research study and be available under the SAP for a patient not on study. Under these circumstances the above recommendations still stand.

Patients receiving drugs that may result in a delayed anaphylactic reaction (e.g. PEG Asparaginase) must be observed and monitored throughout the risk period (3 hours for intramuscular (IM) injection). Staff competent to manage anaphylaxis must be available on site during this period.

(Refer to: <http://www.bccancer.bc.ca/HPI/ChemotherapyProtocols/Policies.htm>)

- Chemotherapy orders:  
Must be written by a qualified physician, familiar with the chemotherapeutic agents being prescribed and with their indications and side effects. All orders must be double checked by a chemotherapy competent pharmacist and a chemotherapy competent nurse.
- Personnel:  
A physician, nurse and pharmacist must be identified to take responsibility for ensuring levels of care and standards are maintained and for communicating with BCCH.
- Nursing Skills:  
It is essential that, at all levels, there are nurses who are competent in chemotherapy administration and are experienced in the prompt assessment and management of treatment related complications such as sepsis. Only nurses certified in central line care should access central lines.
- Communication:  
Optimum and safe care can only be given when there is good documentation and communication. Currently BCCH does not have an electronic medical record. Communication is a process that involves patients, nurses, allied health care workers, physicians and consultants. Telephone, fax and electronic mail are all useful tools to facilitate good communication and should be available at all care levels. Accessibility and Availability are important aspects of good communication.

## Level I Care

Simple outpatient chemotherapy

### **Definition:**

- Hospital facility that has a chemotherapy competent (adult or pediatric) nurse familiar with administration of chemotherapeutic agents with minimal risk of acute or delayed anaphylactic reactions. Can be given:
  - Intravenous (IV) push, preferably via central line (eg. Dactinomycin, Cytarabine, Anthracyclines\*  $\leq 25$  mg/m<sup>2</sup>)
  - IV intermittently via mini bag, preferably via central venous line (CVL) (eg. Anthracyclines\*  $> 25$  mg/m<sup>2</sup>, VinCristine, VinBlastine, Bleomycin<sup>^</sup>, Methotrexate  $\leq 300$  mg/m<sup>2</sup>)
  - Subcutaneous (SC) or via Insuflon catheter (eg. GCSF)

\*obtain echo results prior to administering anthracyclines. Cardiac monitoring for anthracyclines as per BCCH Cardiology recommendations

<sup>^</sup>obtain pulmonary function test results (may be performed at another hospital) prior to administering Bleomycin

### **Required Available Services**

- **Pharmacy:**
  - provide above chemotherapy according to BCCA guidelines for safe handling (<http://www.bccancer.bc.ca/HPI/ChemotherapyProtocols/Policies.htm>)
  - provide drugs for anaphylaxis
  - provide IV and oral form of antiemetic 5-HT3 antagonist (eg. Ondansetron)
- **Laboratory:**
  - CBC including differential and platelets, coagulation profile
  - liver function tests
  - electrolytes including calcium and magnesium, BUN, creatinine
  - cultures: bacterial (blood from CVL, throat, urine)
  - blood crossmatch
- **Nursing skills:**
  - Chemotherapy competent nurse (adult or pediatric) with certification in central line care. Otherwise nurse must have peripheral IV skills including experience in giving vesicants through a peripheral IV
  - Knowledge of side effects of chemotherapy
  - Management of anaphylaxis
  - Management of extravasation
- **Resources**
  - BCCH website [www.kidscancer.bc.ca](http://www.kidscancer.bc.ca)
  - BCCA website [www.bccancer.bc.ca](http://www.bccancer.bc.ca)
- **Equipment**
  - Pediatric resuscitation equipment
  - Biohazardous disposal equipment
  - CVL supplies
- **Physician requirement**
  - Physician with experience in simple chemotherapy available (on call) 24 hrs/day, 7 days/week

## Level II Care

More complex outpatient chemotherapy

### Definition

- Hospital facility able to admit children
- Has a chemotherapy competent pediatric nurse certified in central line care and familiar with administration of chemotherapeutic agents that can be given by  $\leq 6$  hour infusion as well as chemotherapy in Level I care
- Level II care chemotherapy includes all drugs in Level 1 care as well as the following: Etoposide\*, Carboplatinum, Cyclophosphamide  $\leq 1000$  mg/m<sup>2</sup>, 5-fluorouracil  $< 800$  mg/m<sup>2</sup>, intrathecal (IT) chemotherapy, and intramuscular (IM) PEG Asparaginase^

\*monitor blood pressure q15 mins during infusion

^monitor for potential delayed anaphylaxis for 3 hours. Staff competent to manage anaphylaxis must be available on site during this period

### Required Available Services

- **Pharmacy – as per Level 1 Care in addition to the following:**
  - provide drugs for anaphylaxis
  - provide the following IV antibiotics: Vancomycin, Ampicillin, Aminoglycoside (Tobramycin, Gentamicin or Amikacin), Ceftazidime, Amphotericin B, Acyclovir, IV Morphine (as per BCCH Pediatric Dosage Guidelines)
- **Laboratory – as per Level 1 Care in addition to the following:**
  - Cerebral Spinal Fluid (CSF) tests including cytology
- **Nursing skills – as per Level 1 Care in addition to the following:**
  - Chemotherapy competent pediatric nurse including certification in central line care
  - Knowledge of side effects of chemotherapy given in Level I and II Care
  - Management of mucositis
  - Experience with nursing procedures for IT chemotherapy
- **Resources**
  - BCCH website [www.kidscancer.bc.ca](http://www.kidscancer.bc.ca)
  - BCCA website [www.bccancer.bc.ca](http://www.bccancer.bc.ca)
- **Equipment**
  - As in Level 1 Care
- **Physician requirement**
  - Pediatrician available (on call) 24 hours/day, 7 days a week
  - Pediatrician with oncology experience available in the community
    - must be experienced in IT chemotherapy administration and familiar with and follow the BCCA guidelines for administration of IT chemotherapy  
[http://www.bccancer.bc.ca/NR/rdonlyres/B10C0DC3-D799-45E8-8A61-A93F00906737/44556/STPolicyIII50Intrathecallabelling\\_1Apr2010.pdf](http://www.bccancer.bc.ca/NR/rdonlyres/B10C0DC3-D799-45E8-8A61-A93F00906737/44556/STPolicyIII50Intrathecallabelling_1Apr2010.pdf)
- **Additional personnel**
  - Dietitian
  - Physiotherapist / Occupational Therapist
  - Social worker

## Level III care

Outpatient and Inpatient chemotherapy

### Definition

- Hospital facility with dedicated pediatric beds and ICU facilities
- Has inpatient chemotherapy competent pediatric nurses who are also certified in central line care and familiar with administration of chemotherapeutic agents that require infusion >6 hours as well as Level I and II care chemotherapy and IT chemotherapy
- Treats at least 10 new pediatric oncology patients per year
- Has 1.0 FTE pediatric oncologist in the community
- Level III Care chemotherapy include Cyclophosphamide or Ifosfamide with mesna, and complex multidrug chemotherapy. **Drugs that may be given with specific guidelines** such as high dose Methotrexate with folinic acid rescue, Cisplatin

### Required Available services

- **Pharmacy – as per Level I and II Care in addition to the following:**
  - Provide the following IV antibiotics: Piperacillin/Tazo or Ticarcillin, Metronidazole
- **Laboratory:**
  - Full laboratory service available 24 hours/day, 7 days a week
  - Process additional drug levels as needed
- **Nursing skills – as per Level I and II Care in addition to the following:**
  - Nurses with peripheral IV skills in pediatric patients
  - Knowledge of side effects chemotherapy of Level I, II and III care
- **Resources**
  - BCCH website [www.kidscancer.bc.ca](http://www.kidscancer.bc.ca)
  - BCCA website [www.bccancer.bc.ca](http://www.bccancer.bc.ca)
- **Equipment**
  - As in Level I and II Care
- **Physician requirement – as per Level II Care in addition to the following:**
  - Pediatric oncologist available in the community for consultation
- **Additional personnel**
  - Dietitian
  - Physiotherapist
  - Occupational Therapist
  - Social worker
  - Psychologist
  - Child life

## Level IV Care

Full pediatric Oncology Services

### **Definition:**

- Hospital facility able to diagnose, plan and supervise pediatric oncology care
- Dedicated oncology inpatient ward and outpatient clinic including the ability to perform BMT
- Full complement of pediatric subspecialists
- Pediatric oncologist available 24 hours/day, 7 days a week
- Pediatric oncology trained nurses
- Experience and participates in Children's Oncology Group (COG) protocols and research
- Able to access pediatric radiotherapy facility

### **Required Available Services**

- **Pharmacy - as per Level I, II and III Care in addition to**
  - Phase II chemotherapy agents, Investigational New Drugs (IND) and drugs administered under the Special Access Program (SAP)
- **Laboratory: as per Level I, II and III Care in addition to**
  - Collect, process and send research study samples to various research facilities
- **Nursing skills:**
  - Association of Pediatric Hematology/Oncology Nurses (APHON) Chemotherapy and Biotherapy certification (level 1 and 2) including certification in central line care
- **Continuing Education/Quality control:**
  - Pediatric oncology program of continuing education for physicians, nurses and allied health care professionals
  - System for evaluating quality control including complications and outcomes
- **Resources**
  - BCCH website [www.kidscancer.bc.ca](http://www.kidscancer.bc.ca)
  - BCCA website [www.bccancer.bc.ca](http://www.bccancer.bc.ca)
  - COG website [www.childrensoncologygroup.org](http://www.childrensoncologygroup.org)
- **Equipment – as per Level I, II and III Care**
- **Physician requirement**
  - Pediatric oncologist available 24 hours/day, 7 days a week
- **Additional personnel – as per Level II and III Care in addition to the following:**
  - Advanced Practice Nurses
  - Research Nurse Coordinator
  - Administrative Support Staff
  - Network Medical Consultant and Coordinator
  - Clinical Research Associates
  - Parent/Patient Advocate
  - Teachers
  - Spiritual care