**Children’s & Women’s Health Centre of BC Pediatric Pod – Lower Mainland Pharmacy Services Pharmacy Practice Residency Program**

**Pediatric Oncology**

# DESCRIPTION

Children's & Women's Health Centre of British Columbia (C&W) consists of B.C.'s Children's Hospital, B.C.'s Women's Hospital and Health Centre, and Sunny Hill Health Centre for Children. C&W has the largest maternal-fetal-newborn clinical service in Canada and is the major referral centre for acutely ill or injured children in B.C. C&W has more than 400 in-patient beds including a pediatric intensive care unit and neonatal special care nursery. The C&W Pediatric Oncology rotation is a required rotation of the Pediatric Pod for the Lower Mainland Pharmacy Services (LMPS) Residency Program.

This rotation consists of one month on the Oncology Inpatient Unit with the oncology/hematology/bone marrow transplant team. Patients are admitted to hospital with a variety of malignancies or hematological disorders.

Clinical pharmacists maintain daily familiarity with medication regimens for all patients on the ward, through patient profile review and attendance at morning rounds. The pharmacist sets patient care priorities based upon an assessment of individual patients’ likelihood of experiencing drug-related problems and identification of existing drug- related problems. The pharmacist develops and implements a care plan for priority patients, defines monitoring criteria, and evaluates outcomes of recommendations. Significant patient care events (e.g. medication history, pharmacokinetic evaluation, adverse reaction/drug interaction documentation, patient/family medication counseling) are documented in the patient’s health record. The pharmacist also provides drug information, in-service education, formulary and medication policy review and support to the nursing and medical staff.

# GOALS

* The Resident will develop organizational and clinical skills required to provide pharmaceutical care on an oncology ward.
* The Resident should be able to function effectively and independently in the pediatric oncology setting.

# BC PHARMACY PRACTICE RESIDENCY PROGRAM OBJECTIVES

These are working objectives and should be achieved by the end of the BC Pharmacy Practice Residency Program.

Pharmaceutical Care:

* Identify patients most likely to experience drug-related problems (DRPs)
* Develop a patient database from the health record, the patient or family, and other caregivers
* Identify and prioritize a patient’s DRPs
* Interpret patients’ laboratory results and be able to use the information in the assessment of the patient’s DRPs
* Retrieve and evaluate data from the literature for the purpose of solving DRPs
* Develop and implement a pharmacy care plan by evaluating therapeutic alternatives, defining goals of therapy, and developing a monitoring plan
* Communicate care plan and discuss patients’ pharmacotherapy with the team
* Document the provision of pharmaceutical care in the patient’s health record
* Describe the pathophysiology of the diseases and the pharmacology of the treatment(s) for the purpose of identifying, preventing and resolving the patient’s

drug-related problems

* Report any significant adverse drug reactions

Clinical pharmacokinetics:

* Describe the basic principles of clinical pharmacokinetics and pharmacokinetic parameters of the patients’ medications as well as drugs commonly used on the unit
* Integrate pharmacokinetic principles with patient-specific parameters (e.g. demographics, disease states, serum drug concentrations, laboratory results,

therapeutic endpoints) to perform appropriate calculations/estimations to optimize

drug therapy

* Communicate and document pharmacokinetic recommendations to the medical and/or nursing staff

Patient Interview and Education:

* Interview patients to obtain a complete and accurate medication history
* Interview patients to assess attainment of pharmacotherapeutic goals
* Identify patients who may require medication counselling and communicate appropriate information to them and/or their families
* Demonstrate the use of patient counselling aids

# ROTATION-SPECIFIC OBJECTIVES:

General Principles

Upon completion of this rotation, the pharmacy resident should be able to:

* Define and describe common pediatric oncology diseases.
* List common adverse effects of chemotherapy.
* Describe how to manage common adverse effects of chemotherapy.
* Describe and identify the most common types of drug-related problems oncology patients encounter and how they can be monitored and resolved.
* Describe the rationale, objectives and adverse consequences of bone marrow transplantation in pediatric patients.

Chemotherapy Agents

Upon completion of this rotation, the pharmacy resident should be able to describe the mechanism of action, dosage considerations, pharmacokinetic parameters and toxicities

of the following medication classes:

* Antineoplastics
* Antiemetics
* Antibiotics, Antifungals and Antivirals
* Analgesics
* Monoclonal Antibodies
* Colony stimulating factors

Supportive Care

Upon completion of this rotation, the pharmacy resident should be able to describe the usual etiology, clinical presentation, treatment, monitoring, and prognosis of the following complications secondary to chemotherapy in pediatrics:

* Tumour lysis syndrome
* Cancer pain management
* Management of nausea and vomiting
* Febrile neutropenia
* Mucositis

# RESIDENT’S OWN OBJECTIVES

Residents will identify several of their own objectives for the rotation. These should be documented in their ePortfolio and assessed at evaluation points during the rotation.

1.

2.

3.

# REQUIRED ACTIVITIES

The Resident will:

1. Attend and participate in daily (10:00 – 12:00), medical rounds on ward T8 daily, or as directed by the preceptor. Attend Monday afternoon multi-disciplinary rounds

(15:00 - 16:00) weekly on 2 occasions.

1. Provide pharmaceutical care to the medical patients on the ward as per the objectives above. This involves daily patient evaluation for efficacy and toxicity of existing therapy as well as detecting and solving potential drug-related problems. Patient load will be determined based on the Resident’s previous experience and proficiency and will be modified at the discretion of the preceptor.
2. Assist in the initiation and continuation of appropriate drug therapy.
3. Provide medication counselling and perform medication histories on all patients under his/her care when appropriate.
4. Provide discharge counselling to all patients who require it and liaise with community pharmacist and/or physician whenever indicated (via letter, PharmaNet, verbal).
5. Document all clinical activities in the patient’s health record as deemed appropriate.

Notes should be discussed with the preceptor BEFORE placing them in the chart.

1. Attend pharmacy education sessions (e.g., journal club and other scheduled presentations).
2. If time permits, the resident may attend Grand Rounds at The Chan Centre for Family Health Education from September to June on Friday mornings from 8:30am - 9:30am. Schedule of topics are available at: <https://pediatrics.med.ubc.ca/events/grand-rounds-schedule-and-presentations/>
3. Prepare two topics per week for discussion with preceptor. These may include topics pre-selected by the preceptor as well as specific topics on which the student would particularly like to expand their knowledge base. Topic discussions should be incorporated into the resident’s daily patient discussions with the preceptor. Didactic discussions are optional.
4. Meet daily with preceptor daily to discuss the patients being followed, issues of interest, therapeutic controversies, ongoing evaluation, and special topics (outlined in

#9).

1. Complete and submit any relevant procedure logs to the preceptor via one45 during the course of the rotation. Please see <http://www.lmpsresidency.com/residents/resident-manual/procedure-logs>for further details.
2. Present one case presentation to the pharmacy staff.
3. If time permits, provide an in-service to nursing or medical staff at the discretion of the preceptor OR lead a journal club for the pharmacy staff at the discretion of the preceptor.
4. Other activities as assigned by preceptor.

*Note: Failure to complete all required activities will result in failure of the rotation. All attempts will be made to adhere to the required activities format as outlined above. However, some modifications may be necessary.*

# GENERAL STRUCTURE OF THE ROTATION - See Attached Tentative Schedule POTENTIAL TOPICS FOR DISCUSSION

The resident will encounter a variety of pediatric conditions, disease states and their

pharmacotherapy (during patient care activities and discussions with the preceptor), which may include the following:

* Acute lymphoblastic leukemia
* Acute myelogenous leukemia
* Hodgkin’s Disease or other types of lymphoma
* Neuroblastoma
* Wilm’s Tumour
* Brain Tumours
* Rhabdomyosarcoma
* Osteogenic Sarcoma
* Ewing’s sarcoma
* Germ cell tumours

# COMMUNICATION EXPECTATIONS

1. The resident will discuss all recommendations with the preceptor prior to implementation, unless otherwise arranged with the preceptor.
2. The Resident will discuss all written chart notes with the preceptor prior to placing them in the chart, with the exception of medication histories and allergy clarifications,

unless otherwise arranged with the preceptor.

1. The Resident will notify the preceptor in advance of required off-site activities and absences.
2. The resident is encouraged to provide on-going, daily feedback to the preceptor to

assist in enriching his or her own learning experience throughout the course of the rotation.

# PRECEPTOR RESPONSIBILITIES

The preceptor will:

1. Meet with the resident on day 1 of the rotation to discuss the goals and objectives of the rotation and work with the resident to develop a schedule for all rotation-specific activities and therapeutic discussions.
2. Clearly communicate expectations of the resident at the start of the rotation and throughout the rotation as required.
3. Provide the resident with a brief orientation and introduction to the pharmacy department, ward, and health care team.
4. Meet with the resident briefly every morning to triage and identify patients for work- up.
5. Meet with the resident daily (for 1 to 2 hours) to discuss and review all patients under the resident’s care, incorporating clinical and therapeutic topic discussions at least 2- 3 times per week.
6. Be available to the resident in person or by phone at all times during the rotation.
7. Schedule a presentation date and time with the department and assist the resident in selecting their topic for their journal club/nursing in-service/case presentation at least 2 weeks in advance of the scheduled date.
8. Review and provide feedback on any relevant procedure logs submitted by the resident via one45 during the course of the rotation.
9. Provide informal feedback to the resident on their performance on a daily basis, and complete and discuss all required written evaluations with the resident by the completion of the rotation.

# EVALUATION PROCESSES

The evaluation procedure is an essential process in the Pharmacy Practice Residency Program. The process serves to document the activities and progress of the pharmacy practice resident throughout the year. The process also helps to reveal strong rotations as well as areas/individuals that require further development.

Guidance on Evaluation Policies and workflow are available at

<http://www.lmpsresidency.com/residents/resident-manual/evaluation-policies>

* 1. The resident will receive a written, formative evaluation at the midpoint of the rotation. This evaluation will take into account the rotation-specific objectives and the resident’s own learning objectives.
	2. The resident will receive a written, summative evaluation at the end of their rotation. This evaluation will take into account the rotation-specific objectives and

the resident’s own learning objectives.

* 1. The resident will receive continuous feedback throughout the rotation and this will be considered part of the evaluation process.
	2. The resident will provide written evaluations of both the preceptor and the

rotation and complete a written self-evaluation prior to the last day of the rotation.

* 1. The preceptor and resident will discuss their respective evaluations in person at midpoint and on the last day of the rotation.

# READING / REFERENCES

These readings and references can be found at the link below, on the C&W pharmacy teamsite >> Education >> Residency Rotation >> Pediatric Oncology, or in UBC Library.

# General

* PDQ Cancer Information Summaries: Pediatric Treatment:

<https://www.cancer.gov/publications/pdq/information-summaries/pediatric-treatment>

* COG Family Handbook 2nd Edition (C&W pharmacy teamsite)

# Chemotherapy Adverse Effects

* Late Effects of Treatment for Childhood Cancer (PDQ)-Health Professional Version:

<https://www.cancer.gov/types/childhood-cancers/late-effects-hp-pdq>

# Bone Marrow Transplantation

* BMT Supportive Care Guideline (C&W pharmacy teamsite)
* Childhood Hematopoietic Cell Transplantation (PDQ) – Health Professional Version

<https://www.cancer.gov/types/childhood-cancers/child-hct-hp-pdq>

* Mallhi K et al. Hematopoietic cell transplantation and cellular therapeutics in the treatment of childhood malignancies. Pediatr Clin N Am 2015;62:257-73

# Chemotherapy

* The Cancer Drug Manual, published by the B.C. Cancer Agency. Available on line at: [http://www.bccancer.bc.ca/health-professionals/clinical-resources/cancer-drug-](http://www.bccancer.bc.ca/health-professionals/clinical-resources/cancer-drug-manual/drug-index) [manual/drug-index](http://www.bccancer.bc.ca/health-professionals/clinical-resources/cancer-drug-manual/drug-index)

# Fever and Neutropenia

* Lehrnbecher T et al. Guideline for the management of fever and neutropenia in children with cancer and hematopoietic stem-cell transplantation recipients: 2017 update. J Clin Oncol 2017;35:2082-95 <http://ascopubs.org/doi/abs/10.1200/JCO.2016.71.7017>
* BCCH Fever and Neutropenia Guidelines: [http://policyandorders.cw.bc.ca/resource-](http://policyandorders.cw.bc.ca/resource-gallery/Documents/BC%20Children%27s%20Hospital/00.00%20Fever%20Neutropenia%20is%20a%20Medical%20Emergency.pdf) [gallery/Documents/BC%20Children's%20Hospital/00.00%20Fever%20Neutropenia](http://policyandorders.cw.bc.ca/resource-gallery/Documents/BC%20Children%27s%20Hospital/00.00%20Fever%20Neutropenia%20is%20a%20Medical%20Emergency.pdf)

[%20is%20a%20Medical%20Emergency.pdf](http://policyandorders.cw.bc.ca/resource-gallery/Documents/BC%20Children%27s%20Hospital/00.00%20Fever%20Neutropenia%20is%20a%20Medical%20Emergency.pdf)

# Other Infection

* Maertens J et al. ECIL guidelines for preventing Pneumocystis jirovecii pneumonia in patients with haematologizal malignancies and stem cell transplant recipients. J Antimicrob Chemother 2016;71:2397-404
* Groll AH et al. Fourth European conference on infections in leukaemia (ECIL-4): guidelines for diagnosis, prevention, and treatment of invasice fungal diseases in

paediatric patients with cancer or allogeneic haemopoietic stem-cell transplantation.

Lancet 2014;15:e357-40

* Lighter-Fisher J et al. Preventing infections in children with cancer. Pediatri Rev 2016;37:247-441

# Leukemia

* Hunger SP, Mullighan CG. Acute lymphoblastic leukemia in children. N Engl J Med 2015;373:1541-52
* Rubnitz JE. Current management of childhood acute myeloid leukemia. Pediatr Drugs 2017;19:1-10

# Nausea and Vomiting

* Patel P et al. Guideline for the prevention of acute chemotherapy-induced nausea and vomiting in pediatric cancer patients: A focused update. Pediatr Blood Cancer 2017;64:e26542
* POGO Guideline for the classification of the acute emetogenic potential of antineoplastic medication in pediatric cancer patients.

[https://www.pogo.ca/\_media/File/guidelines/POGO%20Emetogenicity%20Classificati](https://www.pogo.ca/_media/File/guidelines/POGO%20Emetogenicity%20Classification%20Guideline%20Final-rev-%20250111.pdf)

[on%20Guideline%20Final-rev-%20250111.pdf](https://www.pogo.ca/_media/File/guidelines/POGO%20Emetogenicity%20Classification%20Guideline%20Final-rev-%20250111.pdf)

* Flank J et al. Guideline for the treatment of breakthrough and the prevention of refractory chemotherapy-induced nausea and vomiting in children with cancer.

Pediatr Blood Cancer 2016;63:1144-51.

# Cancer Pain

* Mercadante D and Giarratano A. Pharmacological management of cancer pain in children. Crit Rev in Oncol/Hematol 2014;91:93-7

# Osteogenic and Ewing’ sarcoma

* Kim JH et al. Pediatric osteogenic sarcoma. Curr Opin Pediatr. 2010; 22(1): 61-6.
* Karosa AO. Ewing’s sarcoma. Am J Health Syst Pharm. 2010; 67(19): 1599-605.
* Jaffe N. Osteosarcoma: review of the past, impact on the future. The American Experience. Cancer Treat Res. 2009; 152:239-62.

# Brain tumors

* Bouffet E. Common Brain Tumours in children. Paediatr Drugs 2000. 2(1): 57-66

# Neuroblastoma

* Colon NC et al. Neuroblastoma. Advances in Pediatrics 2011;58:297-311.

# Late effects

* Temming P et al. The neurodevelopmental sequelae of childhood leukemia and its treatment. Arch Dis Child. 2010; 95(11):936-40.