

Policy/ Procedure

TITLE: Administration of Cancer Chemotherapy	NUMBER: STP-003
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Applies To:	

NOTE: As of July 15, 2019, sections of this document that have strikethroughs have been replaced:

Intravenous Cancer Chemotherapy Drug Administration has been replaced by [NSHA CAN-ST-002 Administration of Intravenous Systemic Therapy for Cancer](#)

Subcutaneous Cancer Chemotherapy Drug Administration has been replaced by [NSHA MM-CP-001 Administration of Subcutaneous Cancer Systemic Therapy](#)

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PREAMBLE

1. *Cancer Care Nova Scotia (CCNS)* is the provincial cancer program, with a mandate to develop standards of cancer care across Nova Scotia. *CCNS* has developed a “Systemic Therapy Manual for Cancer Treatments”, cataloging the drugs and regimens used for the systemic therapy of cancer.
2. Cancer chemotherapy is systemic therapy to cure, control or palliate people with cancer. The most common routes to administer chemotherapy drugs are oral (PO) and intravenous (IV), but some drugs may be given by intrathecal injection (IT- into the cerebrospinal fluid via the spinal cord), intraperitoneal injection (IP), subcutaneous injection (subcut), intramuscular injection (IM), or intravesicular instillation (into the bladder).
3. Cytotoxic chemotherapy for cancer patients is a high-risk area of pharmacotherapy. These drugs are also used for non-cancer treatment and should be handled and administered with the same criteria as used for cancer treatment.
4. Handling cytotoxic chemotherapy agents is an area of occupational risk for hospital employees. Chemotherapy agents include cytotoxic (cell-killing) agents, which are known to be occupationally hazardous. Non-cytotoxic agents are not proven to have occupational hazards, but should be handled with the same degree of precaution.
5. Portions of this policy may only be performed by a *Registered Nurse with Chemotherapy Certification (RNCC)* who has achieved the Post-Entry Level Competency certification.
6. Specific policies and procedures are needed to ensure quality patient care and optimal occupational safety during the administration of chemotherapy drugs. Oral chemotherapy agents are usually self-administered but reasonable occupational safety precautions should be taken to protect health care staff.
7. Policies and procedures, common to all health districts in Nova Scotia, will enhance clarity and relationships between health care professionals providing chemotherapy care, and thus further improve patient safety and quality care.

SECTION 1.

SAFE HANDLING OF CANCER CHEMOTHERAPY DRUGS/WASTE

GUIDING PRINCIPLES

1. If cytotoxic drugs are administered to patients for non-oncology indications, it is recognized that the occupational risks are the same. Health care providers should follow the policies and procedures in this document for optimal occupational safety.
2. Three basic principles must be considered at all times when handling, transporting or administering cancer chemotherapy drugs:
 - a. Protection of the patient (i.e. using good aseptic technique, prevention of extravasation events,)
 - b. Protection of employees (i.e. using personal protective equipment and specialized techniques, and education of all employees involved at each step that cancer chemotherapy is handled, such as nurses, housekeeping staff, and porters)
 - c. Protection of the environment (i.e. drug administration techniques to avoid leakage, aerosolization or spillage, management of waste materials to minimize environmental contamination)

POLICY

1. Policy statements reflect best practice procedures to ensure patient safety, safe handling and minimal occupational exposure
2. Cancer chemotherapy agents are handled in a manner to ensure:
 - The safety of patients and families and all employees
 - The accuracy and appropriateness of the drug and dose
 - Protection of the patient regarding sterility and safe administration of the parenteral agent
 - Protection of the environment
3. All cancer chemotherapy doses will be transported from pharmacy in containers designed to contain leakage and spills. All chemotherapy doses will be stored in a designated area either in the medication room or other specified area. Storage shelves are not above eye level and have a ledge to prevent potential slip and breakage. Chemotherapy that requires refrigeration will be labeled as such. See the *Chemotherapy Preparation and Stability Chart* in the Systemic Therapy Manual for information on specific drugs.

4. Chemotherapy doses received from pharmacy will be handled by a person wearing personal protective equipment. If there is evidence or suspicion that the package is damaged, it is handled as a potential cytotoxic spill.
5. Parenteral cancer chemotherapy drugs are prepared and administered using appropriate equipment to ensure product sterility and optimal protection for the health care provider.
 - Sterile disposable equipment is used for all cancer chemotherapy drugs and doses. Once the equipment is used for chemotherapy administration, it is considered cytotoxic.
 - When available, closed system devices will be used for preparation and administration of cancer chemotherapy and other occupationally hazardous drugs.
 - The IV line/tubing will be attached (and primed with the flushing solution, as appropriate) in the Chemotherapy Preparation Area before the chemotherapy bag is connected. All connections should be luer locked and taped with water proof tape.
 - The RNCC should not spike any IV bag containing chemotherapy. If it is necessary, the chemotherapy bag is to be spiked at waist level over a plastic backed absorbent pad.
 - The RNCC will never remove the spike from any bag that has contained cytotoxic chemotherapy. For each infusion bag, a separate IV line is required- this line/tubing will be attached by the pharmacy.
 - When disconnecting a used secondary IV line and bag, the RNCC will flush the line with the solution from the main line (e.g. back-prime) before disconnecting. Clamp the tubing and cover the connection with gauze to catch any droplets. Remove the secondary line from the main line. DO NOT DISCONNECT the IV bag from the tubing.
 - All preparation for administration of cytotoxic drugs will be done at the bedside/chairside and not in the medication or clean utility room.
 - A clear, clean work surface is necessary so as to not contaminate surrounding objects. A plastic backed absorbent pad should be placed on the work surface to decrease the risk of contamination.
 - Always work at waist level.
16. Health Care Providers follow best practice procedures, to ensure safety in the administration of cytotoxic agents and with handling cytotoxic waste.
 - All employees involved in any aspect of the handling of cytotoxic drugs and/or waste are informed about the risks of occupational exposure.
 - All employees who routinely handle cytotoxic drugs or waste will receive training on safe handling practices.

- All equipment for safe handling must be available to employees for administration of chemotherapy and disposal of cytotoxic waste. Safe handling equipment and Personal Protective Equipment (PPE) should be stored in one designated area of the unit.
 - Protective equipment must be used by all employees to reduce the risk of exposure to cytotoxic agents and waste.
 - In an effort to minimize cytotoxic exposure, protective equipment is **not** be worn outside of the administration area except when managing a cytotoxic spill.
 - Employees who are pregnant, attempting to conceive or father a child, or who are breast feeding, may request to be transferred to other duties that do not involve handling cytotoxic drugs. Each department will develop a policy to provide direction with this issue.
 - An eye wash station is accessible to the chemotherapy administration area.
 - A safety shower or equivalent (e.g. hand held spray device) is readily accessible.
17. Strict hygiene procedures are developed and followed in the chemotherapy administration area. Employees will not eat, drink, chew gum, apply cosmetics or store food in or near the chemotherapy administration area.
18. Patient excreta (i.e. urine, feces) that are contaminated with cytotoxic drugs or their metabolic byproducts must be handled as cytotoxic waste materials for at least 48 hours following the last dose of chemotherapy administered.
19. Cytotoxic waste is **not** mechanically or manually compacted. Cytotoxic waste is disposed in accordance with all applicable provincial guidelines (national guidelines of the Canadian Council of Ministers of the Environment) for the handling of hazardous and toxic waste.

EQUIPMENT

1. Personal Protective Equipment (PPE) is required when administering cytotoxic drugs and handling cytotoxic waste. Best practice recommends thorough hand washing with soap and water before donning PPE and immediately after removing. Personal Protective Equipment includes:
- a. GOWNS
- A long sleeve, back closure, water/drug repellent, disposable protective gown with solid front and tight fitting cuffs (elastic or knit)
 - The gown is discarded at least once daily or if soiled or torn during administration/handling.
 - The gown is not worn outside the chemotherapy administration area except when managing a chemotherapy spill or disposing of cytotoxic waste.

b. GLOVES

- Disposable powder-free non-latex gloves designed and validated for chemotherapy administration (e.g. Nitrile glove)
- Wash hands thoroughly with soap and water before donning gloves and immediately after removing gloves.
- Gloves are changed regularly, at least every 30 minutes , or immediately if they are torn, punctured or contaminated. Gloves must be changed between each patient.

c. MASKS

- Properly fitted masks must be used when there is a risk of exposure to an uncontained amount of cytotoxic agent or when there is risk of aerosolization of cytotoxic drugs (N95 masks meeting NIOSH respiratory protection standards).

d. GOGGLES

- Protective eyewear (i.e. safety glasses with side shields) must be used during cleaning procedures or when there is a risk of aerosolization of cytotoxic drugs and during the clean up of any spill.
- If there is any risk of splashing, masks with face shields should be worn.

e. DISPOSAL CONTAINERS

- All cytotoxic drug waste is separated from general waste. Clearly labeled cytotoxic waste receptacles are kept in all areas where cytotoxic drugs are administered.
- Leak-proof, puncture proof sharps containers that clearly and visibly display the cytotoxic hazard symbol are required for disposal of contaminated administration equipment such as needles, syringes, glass bottles and intravenous catheters, bags and tubing.
- Non-sharp closed-lid waste containers lined with double plastic bags that clearly and visibly display the cytotoxic hazard symbol are required for disposal of contaminated non-breakable materials such as disposable PPE, dressings, gauzes or ostomy equipment.
- When full, the sharps and non-sharp containers are disposed by housekeeping as cytotoxic waste, according to DHA policies.

BEST PRACTICE PROCEDURE

SAFE HANDLING OF CANCER CHEMOTHERAPY DRUGS / WASTE

1. Employees will follow best practice procedures for the identification, containment, collection, segregated storage, and disposal or removal of cytotoxic waste materials. Cytotoxic waste includes all materials used for the preparation and administration of cytotoxic drugs and the patient's excreta following administration.
 - a. Implement cytotoxic precautions as outlined above:
 - b. For inpatients, record in the Kardex the start and stop time of cytotoxic precautions:
 - c. For inpatients, place a 'cytotoxic caution' sign at the foot of patient's bed
 - d. Ensure that cytotoxic equipment is available at the bedside/ chairside
 - e. Protect spillage from waste containers by covering them with an incontinent pad for transport (i.e. cover bedpan while taking to toilet). To decrease the risk of exposure by aerosol or droplets, the toilet lid should be closed (or it should be covered with an incontinent pad) when flushed. If the patient is sharing a room, his/her bedpan, basin, urinal and other equipment should be stored at his/her bedside.
 - f. Employees should protect her/himself from possible contamination from body excreta. When emptying bedpans, changing wet soiled linen, changing dressings and/or other care where there is risk of exposure, a gown and gloves should be worn.
 - g. A cytotoxic non-sharps container should be left at the bedside/chairside so the patient is able to dispose of waste.
 - h. When disconnecting tubings, needles and other equipment, cover the connection site with gauze to catch any droplets.

CLEANING CHEMOTHERAPY ADMINISTRATION AREA AND EQUIPMENT

POLICY

1. The Chemotherapy Administration Area should be cleaned at least once daily when in use, in accordance to written procedures. If a specific bed space area is used for more than one patient during the day, the bed space area must be cleaned and disinfected between each patient.
2. It is recommended all surfaces in the Chemotherapy Administration Area be non-porous.
3. Each district will have a procedure for decontamination of the chemotherapy administration area.
4. The chemotherapy area will be regularly decontaminated (for removal of chemotherapy agents) according to district procedures.

BEST PRACTICE PROCEDURE

1. Housekeeping employees will be trained and supervised to perform decontamination and disinfection of the Chemotherapy Administration Area in accordance with written procedures.
 - a. Safety glasses with side shields, gowns, and protective chemotherapy gloves are worn for cleaning and decontaminating work. Face shields should be worn if splashing is possible. The gloves must be chemically resistant to the decontamination or cleaning agent used. Employees must wash hands thoroughly with soap and water immediately after removing gloves.
 - b. All work surfaces in the Chemotherapy Administration Area (e.g., chairs, side tables, stretchers, counter tops and supply carts) are decontaminated and disinfected daily.
 - c. Floors in the Chemotherapy Administration Area are decontaminated and disinfected daily. Floor mops used in the Chemotherapy Administration Area may not be used in any other areas of the institution (except another Chemotherapy Administration Area) and should be kept in a utility room in or adjacent to the Chemotherapy Administration Unit.
 - d. Any porous surfaces in the administration area must be regularly laundered to minimize contamination of the area.
 - e. Storage shelving is emptied of all supplies and cleaned and disinfected at least once monthly in the Chemotherapy Administration Unit.
 - f. Refrigerators, freezers, shelves, and other areas where pharmacy-prepared sterile products are stored are decontaminated and disinfected at least once

monthly.

2. Waste generated throughout the cleaning or decontamination procedures is collected in suitable plastic bags (labeled as cytotoxic waste), and removed according to district procedures.

CYTOTOXIC SPILLS

POLICY

1. All employees who routinely handle cytotoxic drugs or waste are trained in proper spill management and cleanup procedures.
2. Employees will follow established policies and procedures for cytotoxic spill management and clean up procedures.
3. The circumstances and handling of spills are documented and reported according to district policies and procedures.
4. Spill kits, containing all materials and equipment necessary to clean a spill, are available and readily accessible at each area where hazardous drugs are handled. A written procedure for spill management is included in each spill kit. Spill kits are either assembled or purchased. Components of a spill kit include (but may not be limited to):
 - a. 2 pairs disposable non-latex gloves- large size
 - b. Low permeability gown and shoe covers
 - c. Safety glasses, splash goggles or face shield
 - d. Respirator mask (unless included in face shield)
 - e. plastic backed absorbent sheets or spill pads (sufficient to absorb a spill of up to 1000mL)
 - f. Disposable towels or swabs for absorbing and cleaning liquid spills
 - g. At least 2 sealable plastic waste bags "Cytotoxic Waste"
 - h. Disposable scoop for collecting glass fragments
 - i. Puncture-resistant container for glass fragments, clearly labeled as cytotoxic waste container
 - j. Cleaning solution for cleaning and decontamination of area
 - k. Instructions on the management of a cytotoxic chemotherapy spill.
 - l. Warning signs to alert other staff to the hazard and isolate the area of the spill.

BEST PRACTICE PROCEDURE

1. Employees should know procedures to follow in case of accidental skin or eye contact with cytotoxic agents and/or waste.

2. In the event of a cytotoxic spill, these steps are to be followed for clean up procedure:
 - a. Alert other staff in the area of the potential hazard; limit access to the area while a spill kit is obtained and then place the warning sign (from the kit) in a prominent position.
 - b. Remove the contents from the spill kit. Don personal protective equipment in this order: the mask/face shield, the safety glasses, one pair of non-latex gloves, gown, shoe covers, and the second pair of non-latex gloves.
 - c. For a liquid spill, carefully place an absorbent pad over the spilled liquid. Absorb as much liquid as possible into the pad.
 - d. If the spill involves a powder, carefully place a damp disposable pad over the powder and then carefully pat the spill area to adsorb as much powder as possible.
 - e. If there is broken glass in the spill, carefully pick up the glass pieces using the disposable scoop and place all glass in the puncture-proof container.
 - f. Gather up the contaminated pads. Discard all of this waste into the cytotoxic waste container or bag.
 - g. Repeat steps until the entire spill has been cleared.
 - h. Use the cleaning solution to wash the area of the spill thoroughly, discarding all waste generated into the waste container.
 - i. Rinse the area well with clean water.
 - j. Dry the area completely to prevent accidental slippage on wet floor.
 - k. Discard all used items including personal protective equipment into the cytotoxic waste container or bag. Remove protective apparel in the following sequence: top pair of gloves, safety glasses, mask, shoe covers and gowns.
 - l. Wearing second pair of gloves, double bag with the aide of a second person and dispose of these gloves.
 - m. Arrange for collection of waste according to institution policy.
 - n. Wash hands thoroughly with soap and water.
 - o. Arrange for hospital cleaning staff to re-clean the area.
 - p. Arrange for a replacement spill kit to be obtained.
 - q. Notify the Health Services Manager or Charge Nurse and complete an 'Occurrence/Safety Report' as per District policy
3. Employees exposed during spill management document the incident as per institutional policy as soon as possible.
4. In the event that an employee or patient/family member is contaminated with a cytotoxic agent, the following procedure is followed:

- a. All overtly contaminated protective clothing is removed and placed in the cytotoxic waste container.
- b. All contaminated personal clothing is removed and, if heavily contaminated, the clothing is discarded into the cytotoxic waste container. Clothing with a minimal amount of contamination is laundered separately and rinsed well.
- c. An emergency shower or equivalent (e.g. hand-held spray device) is used if appropriate. If this is not available, then the contaminated area of skin is washed with soap and rinsed with large amounts of water.
- d. Eyes that have been exposed to a cytotoxic agent are thoroughly irrigated with water or isotonic eyewash for as long as possible (e.g. up to 15 minutes). Contact lenses, if not flushed from the eye, are removed as soon as possible and discarded. An eyewash station is used, if available or water splashed by hand into the eye from a faucet. It is not recommended to irrigate the eye directly with running water from a faucet because of the potential for water pressure damage to the eye. In all cases where the eye is contaminated by a cytotoxic agent, ophthalmologic advice should be sought.
- e. If the skin is broken or there is a needle-stick injury, blood is expressed from the wound and the affected area is irrigated with plenty of water.
- f. Seek medical attention as soon as practical.
- g. Contact district occupational health and safety officer as soon as possible (after seeking medical attention)
- h. Employees exposed during spill management will complete a report (as per institutional policy) as soon as possible.

SECTION 2.

CANCER CHEMOTHERAPY DRUG ADMINISTRATION

GENERAL ADMINISTRATION PRACTICE

POLICY

1. Best practice procedures to ensure safety standards are followed for the administration, handling and disposal of cancer chemotherapy drugs.
2. Chemotherapy administration facilities maintain documentation of all quality monitoring processes and records, which may include:
 - a. Maintenance logs for all equipment
 - b. Certification status of all Registered Nurses involved in chemotherapy administration.
3. To administer cancer chemotherapy, the Registered Nurse (RN) must successfully complete an approved Post-Entry Level Certification (PELC) program. This RN will be designated as a Registered Nurse with Chemotherapy Certification (*RNCC*).
 - a. Chemotherapy given by routes other than intravenous may be given by a RN, as described in the policies for each section below.
4. The *RNCC* administers only chemotherapy drugs that have been approved for the Level of Care designation assigned to the local hospital.
5. Intraperitoneal and intravesical cancer chemotherapy will be administered according to the Levels of Care designation for the facility.
6. The *RNCC* is knowledgeable of the procedures for managing anaphylaxis and a suspected extravasation.
7. A regimen specific Physician Pre-printed Order (PPO) form must be used for chemotherapy prescriptions (when available provincially). If a PPO does not exist for a specific protocol, the physician / nurse practitioner (NP) will use the generic chemotherapy template PPO to prescribe the chemotherapy. When the PPO's are available provincially, the *RNCC* will not accept chemotherapy orders written any other way. A physician / NP may order other fluids, volumes, rates or methods of delivery as warranted by specific patient situations. Rationale for modifications will be documented on the PPO. (See Policies and Procedures on Ordering Cancer Chemotherapy).
8. Specialized chemotherapy procedures (e.g. intrathecal, intraperitoneal, pleurodesis, intraoperative, intra-hepatic or intra-arterial infusions) may be administered by other specialists, such as surgeons, internists, gastroenterologists or radiologists, only according to specific policies & procedures approved by the district health authority consistent with the Levels of Care model.

9. Prior to administration of any chemotherapy drug(s), the *RNCC* will perform a pretreatment assessment of the patient, provide appropriate education to the patient, and verify the PPO, according to procedures in each section below.
10. The *RNCC* will provide education, psychosocial-spiritual support and counseling to the individual with cancer and their families.
11. The Oncology Pharmacy Service prepares all parenteral cytotoxic chemotherapy doses for the hospital. In some facilities, intravesicular BCG, and oral chemotherapy (including crushing or splitting of tablets, nasogastric and topical preparations) may also be prepared by the Oncology Pharmacy Service.

~~INTRAVENOUS CANCER CHEMOTHERAPY DRUG ADMINISTRATION POLICY~~

NOTE: As of July 15, 2019, this section has been replaced by [NSHA CAN-ST-002 Administration of Intravenous Systemic Therapy for Cancer](#)

- ~~1. To administer cancer chemotherapy the RN must be deemed competent in: completing a pre-treatment nursing assessment; safe handling of chemotherapy drugs; administering infusional cancer chemotherapy and administering IV direct cancer chemotherapy; and management of adverse effects. The RN must be certified as a Registered Nurse with Chemotherapy Certification (RNCC).~~
- ~~2. The RNCC must be competent in IV therapy initiation, and care and maintenance of central venous access devices (CVAD).~~
- ~~3. The RNCC is competent in IV direct administration of drugs, when it is required for specific protocols and/or procedures (i.e. hypersensitivity reactions).~~
- ~~4. Prior to administration of chemotherapy, the RNCC will assess the patient, provide necessary education and verify the chemotherapy order.~~
- ~~5. The main IV line, which is attached to the indwelling IV catheter, will be a non-chemotherapy containing solution. All IV bags and IV injections will be made into the secondary line connection(s) to the main line.~~
- ~~6. Prior to administration, the RNCC is responsible to know if a chemotherapy drug is classified as a vesicant, irritant or non-irritant. Medications are labelled "Vesicant" or "Irritant" as appropriate for each drug.~~
- ~~7. Vesicant drugs administered **peripherally** may be given via two routes: intermittent infusion or IV direct. Exception: Vincristine **must** be given via minibag and not IV direct (to avoid any possibility of this drug being given accidentally as an intrathecal dose).~~
- ~~8. Vesicant drugs administered by intermittent peripheral infusion (mini bag) must be administered by gravity and never administered via an infusional pump.~~
- ~~9. When administering vesicant drugs **peripherally**, the RN will start a new venous access for any IV site older than 2 hours. The antecubital fossa must not be used for vesicant drugs (It is also recommended to avoid the vessels of the hand or wrist, if possible.)~~
- ~~10. If a vesicant requires administration by continuous infusion, a central venous access device (CVAD) and an infusion pump is required.~~
- ~~11. When administering a series of chemotherapy drugs, the sequence should be vesicants first, irritants and then non-irritants. Small volume infusions are commonly administered prior to large volume infusions. An exception to this is an established protocol that has a specific sequence, which requires a specific agent to be administered first due to pharmacokinetic reasons (i.e., clearance, synergism).~~
- ~~12. For the inpatient units, it is recommended that initiation or discontinuation of a~~

~~cancer chemotherapy infusion not occur around the change of shift.~~

BEST PRACTICE PROCEDURE

Pre-treatment Assessment and Teaching

- ~~1. Prior to the administration of chemotherapy a pre-treatment assessment will be completed. Patients will also be assessed in between cycles, as needed to maintain patient safety, and as clinically indicated. The assessment parameters must include but are not limited to:
 - ~~a. Height and current weight~~
 - ~~b. Vital signs~~
 - ~~c. History & Physical and toxicity assessment.~~
 - ~~d. History of allergies and anaphylactic reactions. Review procedure for hypersensitivity reactions (if appropriate)~~
 - ~~e. Performance status (ECOG)~~
 - ~~f. Lab values (CBC & differential, LFT's, creatinine, etc.)~~
 - ~~g. Assessment of the emotional, sexual, psychosocial and financial impact of the diagnosis and treatment on the patient and family~~
 - ~~h. Assessment of the patient's (or parent/guardian's) understanding and learning needs~~~~
- ~~2. The Oncology Nurse will educate the patient/family in collaboration with other oncology health professionals (see Patient Education Standards for Adults). Teaching is documented on a chemotherapy teaching tool as per DHA. Parameters of teaching plan must include (but not limited to):
 - ~~a. Description of chemotherapy treatment, including drugs, specific protocol, scheduling and administration~~
 - ~~b. Review of potential side effects (immediate, early and delayed), management and self care practices to prevent/manage side effects, coping, psychosocial support~~
 - ~~c. Review of cytotoxic precautions for both inpatients and ambulatory patients (see Appendices 2 & 3)~~~~

Chemotherapy Verification

- ~~3. Prior to the administration of cancer chemotherapy in any District Health Authority facility, the RNCC who is administering the chemotherapy will:
 - ~~a. Verify that the consent has been obtained.~~
 - ~~b. Confirm the initial BSA (if used to calculate the dose) or recalculate the BSA (Standard BSA formula) if weight has changed by greater than 10% from baseline~~
 - ~~c. Recalculate the creatinine clearance (for AUC dosing) with each cycle of chemotherapy (e.g. each dose of Carboplatin)~~
 - ~~d. Recalculate or verify all doses, to confirm accuracy of calculations~~~~

- ~~e. Verify that the correct drug(s) have been ordered consistent with the cycle and week(s) as defined by the regimen. Compare with last treatment order.~~
 - ~~f. Verify that the dose or dosage range is appropriate for the patient and treatment plan using an approved reference.~~
 - ~~g. Review lab results and other diagnostic test/procedures required by the regimen, and ensure these have also been reviewed by the physician.~~
 - ~~h. Verify pre-hydration if ordered~~
 - ~~i. Verify pre-medication as ordered~~
 - ~~j. Determine the sequence of the drugs to be infused; vesicants, then irritants, then non-irritants, unless otherwise specified~~
 - ~~k. Review procedure for extravasation and hypersensitivity reactions (if appropriate)~~
 - ~~l. Verify with another RNCC (or registered nurse, nurse practitioner, pharmacist or physician, if another RNCC is not available) that the information on the chemotherapy drug label matches the information on the physician order and/or medication administration record (MAR).~~
 - ~~m. Check patient's name, patient identification number, drug name and dose, route, time, infusion rate, and diluent solution.~~
 - ~~n. Both RNs must sign the MAR and Chemotherapy Administration Checklist and Calculation Form (as per DHA procedures) when the checking is completed.~~
 - ~~o. Inspect all chemotherapy admixtures for expiry date, particulate matter, signs of incompatibility, degradation or contamination prior to administration.~~
 - ~~p. Verify that the full name and patient identification number on the chemotherapy drug label matches the full name and patient identification number on the patient's identification armband or equivalent personal identification on the patient, as per DHA procedures.~~
- ~~4. Correct drug(s), dose(s), BSA calculations, creatinine clearance (as appropriate), infusion rate calculations (as appropriate), correct cycle/date(s), and lab tests must be verified by two oncology health professionals (e.g. oncology nurse(s), oncology pharmacist), performing the verification **independent from one another**, and the calculations will be documented as per DHA procedures.~~
- ~~a. If any calculation (dose, BSA or AUC) differs by 10% or more from the order, these must be clarified with the prescriber before drug administration~~

~~Administration of Intravenous Cancer Chemotherapy~~

- ~~1. Intravenous cancer chemotherapy may only be administered by a *Registered Nurse with Chemotherapy Certification (RNCC)*.~~
- ~~2. Safety precautions, as outlined in Section 1, must be followed during the administration of all cytotoxic drugs to prevent undue exposure of the health care worker and the patient.~~

- ~~3. Ensure that a physician is accessible in case of an emergency.~~
- ~~4. Determine the method and route of infusion:
 - ~~a. Method: Chemotherapy drugs may be administered by intermittent or continuous infusion as a secondary (piggy-backed) IV or by direct IV push via the side arm of a free flowing primary IV.~~
 - ~~b. Route: Infusional chemotherapy may be administered via a peripheral IV or CVAD.~~~~
- ~~5. When administering chemotherapy through a peripheral IV or CVAD:
 - ~~a. Prepare the following equipment:
 - ~~f. Primed IV administration sets (primary and secondary)~~
 - ~~f. If IV bag is supplied with an un-primed line, the line must be back-primed prior to administration~~
 - ~~f. Alcohol/antimicrobial swabs~~
 - ~~f. plastic backed absorbent pad~~
 - ~~f. Personal Protective Equipment (PPE) as outlined above~~
 - ~~f. Equipment as outlined in CVAD and IV Initiation policies. A small gauge IV intercath #22-24 is recommended.~~~~
 - ~~b. Don PPE~~
 - ~~c. Work over a plastic backed absorbent pad at waist level.~~
 - ~~d. Initiate peripheral IV or CVAD access as per facility policy and procedure. A clear dressing must be used to ensure visualization of the access site at all times.~~
 - ~~e. Monitor vitals signs before initiating the chemotherapy. More frequent vital sign monitoring may be required if ordered or as appropriate for the drug, the protocol, risk of hypersensitivity reactions and clinical trials.~~
 - ~~f. The IV mainline solution must be compatible with the chemotherapeutic agents to be given.~~
 - ~~g. Administer pre hydration and pre medication as ordered~~
 - ~~h. Connect chemotherapy as a secondary infusion.~~
 - ~~i. Do not prime any IV line with chemotherapy drug. All IV lines are primed with a non drug solution (NS/D5W).~~
 - ~~j. Ensure all connections are luer locked and taped with water proof tape if indicated (i.e. continuous infusion, restless patient, home chemotherapy).~~
 - ~~k. Before chemotherapy infusion, check that the spike connection to the bag is secure.~~
 - ~~l. Infuse approximately 10-20 ml of IV fluid prior to chemotherapy to verify patency of IV access site~~~~

- ~~m. Verify blood return immediately prior to initiating chemotherapy. The frequency that blood return must be verified during the administration will be determined based on the vesicant and irritant potential of the drugs (refer to vesicant/irritant procedures below).~~
 - ~~n. Infuse chemotherapy at prescribed rate~~
 - ~~o. Monitor the patient for chemotherapy induced hypersensitivity reactions as determined by the drug. Question the patient and assess for any local or systemic reactions and if present initiate interventions as outlined in the Algorithm for the Management of Hypersensitivity Reaction (Appendix 2).~~
 - ~~p. Assess for signs and symptoms of infiltration/ extravasation at the access site throughout the infusion. Ask the patient if they are experiencing any abnormal sensation, burning or pain at IV site, or any other concerns. The frequency of this monitoring will depend on the drug and route of administration (refer to vesicant/irritant procedures below). Follow the algorithm for Cancer Chemotherapy Extravasation (Appendix 1).~~
 - ~~q. Following chemotherapy administration and/or between drugs, the line is flushed with 50 mL of compatible IV solution, unless otherwise indicated.~~
 - ~~r. At the end of the infusion(s) dispose of the IV chemotherapy administration set intact into the cytotoxic waste container (DO NOT DISCONNECT the IV bag from the tubing).~~
 - ~~s. Document chemotherapy administration on the patient's chart / MAR.~~
- ~~6. To administer vesicants, irritants and non-irritant drugs, the RNCC will follow all of the steps of administration as outlined above along with the following:~~
- ~~7. Vesicant Drugs:~~
- ~~a. Vesicant drugs may be administered peripherally or via a CVAD.~~
 - ~~b. Vesicant drugs may be administered as an intermittent infusion or as a continuous infusion~~
 - ~~c. Vesicant drugs administered by intermittent peripheral infusion will be delivered via the direct IV method of administration or by piggyback infusion in a minibag.~~
 - ~~d. Vesicants are never administered continuously via peripheral infusion. If a vesicant requires administration by continuous infusion, a CVAD and an infusion pump is required.~~
- ~~8. Procedure to Administer Vesicant Drugs via Peripheral Intermittent Infusion~~
- ~~a. It is recommended that a short, small gauge (20-24), flexible IV cannula be used to administer vesicants peripherally. This will decrease vein trauma during insertion.~~

- ~~b. When administering vesicant peripherally, the RN will start a new venous access for any IV site older than 2 hours.~~
- ~~c. Choose an appropriate IV site. The antecubital fossa must not be used for vesicant drugs (It is also recommended to avoid the vessels of the hand or wrist, if possible.).~~
- ~~d. RNCC must stay with the patient for the duration of the peripheral vesicant infusion.~~
- ~~e. The RNCC must constantly monitor peripheral venous patency while administering the drug, regardless of which method is used (IV direct or mini-bag).~~

9. Peripheral – Direct IV :

- ~~a. Cleanse the lowest Y-port with an alcohol swab. Place a 2x2 gauze under the injection port to absorb any droplets. Insert the syringe containing the vesicant drug into the injection port. Open IV clamp on the mainline and ensure the IV is free flowing.~~
- ~~b. Verify blood return and patency immediately prior to initiating the vesicant injection~~
- ~~c. Administer the vesicant drug at the prescribed rate of infusion~~
- ~~d. The RNCC will ensure the IV continues to flow freely and IV patency is verified **every 3mLs** by aspiration of blood return and assessment of the signs and symptoms of extravasation. (Follow algorithm for Cancer Chemotherapy Extravasation, as indicated).~~
- ~~e. Following chemotherapy administration and/or between drugs, the line is flushed through the injection port with 10 mL of compatible IV solution. In addition to this, 50 mL of IV solution is flushed through the mainline. Once the procedure is completed saline lock, discontinue or continue IV, depending on orders.~~

10. Peripheral – Mini Bag

- ~~a. For intermittent vesicant infusion via minibag, attach the secondary medication line to the medication port or lower Y-port of the mainline IV.~~
- ~~b. Verify blood return and patency immediately prior to initiating the vesicant infusion~~
- ~~c. Infuse as quickly as possible by gravity drip. Vesicant drugs administered peripherally by mini bag must never be administered via an infusional pump~~
- ~~d. The RNCC will ensure the IV continues to flow freely and IV patency is verified **every 5 minutes** during infusion by aspiration of blood return and assessment of the signs and symptoms of extravasation. (Follow algorithm for Cancer Chemotherapy Extravasation, as indicated).~~

- e. ~~Following chemotherapy administration and/or between drugs, the mainline is flushed with 50 mL compatible IV solution.~~

11. CVAD- Intermittent Vesicant Administration:

- a. ~~When vesicant drugs are infused via intermittent infusion either by IV direct injection method or mini bag infusion, through a CVAD, blood return is checked prior to administration.~~
- b. ~~The RNCC will monitor for the signs and symptoms of extravasation during the administration (Follow algorithm for Cancer Chemotherapy Extravasation, as indicated).~~
- c. ~~For **IV direct** injections via CVAD - cleanse the lowest Y-port with an alcohol swab. Place a 2x2 gauze under the injection port to absorb any droplets. Insert the syringe containing the vesicant drug into the injection port. Open IV clamp on the mainline and ensure the IV is free flowing. Administer the vesicant drug at the prescribed rate of infusion. Blood return is not routinely checked during administration unless patency is questioned. Following chemotherapy administration and/or between drugs, the line is flushed through the injection port with 10 mL of compatible IV solution. In addition to this, 50 mL of IV solution is flushed through the mainline. Once the procedure is completed saline lock, ~~discontinue or continue IV, depending on orders.~~~~
- d. ~~For **Mini bag** infusions via CVAD - attach the secondary medication line to the medication port or lower Y-port of the mainline IV. Infuse as quickly as possible by gravity drip or by an infusion pump. Blood return is not routinely checked during administration unless patency is questioned. Following chemotherapy administration and/or between drugs, the mainline is flushed with 50 mL compatible IV solution~~

12. CVAD- Continuous Vesicant Administration:

- a. ~~For continuous vesicant infusion via CVAD, attach the secondary medication line to the medication port or lower Y-port of the mainline IV.~~
- b. ~~When vesicant drugs are administered by continuous infusion through a CVAD, blood return is checked prior to administration and at least once per shift during infusion (while in the hospital or at each visit to ambulatory area).~~
- c. ~~Administer the vesicant drug at the prescribed hourly rate of infusion.~~
- d. ~~For continuous infusions of vesicants via a CVAD, monitor CVAD site and patient sensation at least once every hour. (Follow algorithm for Cancer Chemotherapy Extravasation, as indicated).~~
- e. ~~Following chemotherapy administration and/or between drugs, the mainline is flushed with 50 mL compatible IV solution.~~

Irritant Drugs:

- ~~13. Irritant chemotherapy drugs are administered using the same equipment and procedures as outlined above.~~
- ~~a. Irritant drugs may be administered peripherally or via a CVAD.~~
 - ~~b. Irritant drugs may be administered as an intermittent infusion or as a continuous infusion~~
 - ~~c. Irritant drugs that are administered by intermittent peripheral infusion will be delivered via the direct IV method of administration or by piggyback infusion in a minibag.~~
 - ~~d. If an Irritant requires administration by continuous infusion, a CVAD and an infusion pump is required (with the exception of designated regimens)~~
 - ~~e. Blood return and patency is verified immediately prior to initiating the irritant infusion~~
 - ~~f. For all peripheral infusions of irritants, monitor IV site and patient sensation every 30 minutes. Check for blood return at least once every hour. Check for blood return more often if there is any discomfort.~~
 - ~~g. For continuous infusions of irritants via a CVAD, monitor CVAD site and patient sensation at least once every hour, and check blood return at least once per shift (inpatient area)~~

Non-Irritant Drugs:

- ~~14. Non-irritant chemotherapy drugs are administered as a direct IV injection or intermittent IV infusion or as a continuous infusion through a peripheral IV or CVAD.~~
- ~~a. The preferred method to administer non-irritant drugs is to follow the same procedures and precautions as irritant chemotherapy agents, outlined above.~~
 - ~~b. In some circumstances, non-irritant drugs may be administered as a direct injection into the IV catheter followed by a flush injection (without the use of a free-flowing IV line). This would be specified in the drug monograph, the Systemic Therapy Manual or district policy.~~

Ambulatory Infusion Chemotherapy by an Elastomeric Infusion Pump:

15. Elastomeric infusion pumps are non-electronic infusion pump designed for ambulatory infusions.
16. The flow rate of an elastomeric infusion pump (Infusor) is most accurate:
- a. When the flow restrictor connector is at a temperature of 33.3° C
 - b. With a diluent solution of 5% Dextrose
 - c. With a catheter 22 gauge or larger
 - d. When filled to the labelled nominal volume

- e. When the balloon reservoir and the flow restrictor / luer lock connection are at the same height
17. Prepare the following equipment for this procedure:
- a. PPE
 - b. Plastic backed absorbent pad
 - c. Alcohol swabs
 - d. 2 x 10 mL pre-filled normal saline syringes
 - e. Waterproof tape
 - f. Pre-filled elastomeric ambulatory infusion pump
 - g. Carrying device / pouch
 - h. Transparent dressing
18. An extension tubing will be added to the infusor tubing by pharmacy to allow for additional length as well as providing a clamp.
19. All elastomeric infusion pumps will arrive at the nursing unit with the line primed with the chemotherapy agent.
20. To connect the elastomeric infusion device:
- a. Verify the elastomeric infusion pump delivers correct hourly rate.
 - b. Prior to removing the infusion pump from the sealed bag, inspect for leakage.
 - c. Working over a plastic backed absorbent pad, remove the infusion pump from the sealed bag. Ensure the protector cap on top of the infusion pump is secure and the clamp is closed.
 - d. Verify patency of IV / CVAD by checking for blood return. Flush with 20mL 0.9% sodium chloride.
 - e. Working over a plastic backed absorbent pad, remove the cap from the end of the extension tubing. Ensure the liquid has moved to the end of the tubing.
 - f. Attach the tubing of the ambulatory infusion pump to the adaptor on the central venous access device. Secure luer lock connections tightly.
 - g. Tape all connections with waterproof tape (as per district policies).
 - h. Open clamps.
 - i. Secure the flow restrictor to the patient's skin.
 - j. Leaving the elastomeric infusion pump in a plastic bag, place the elastomeric infusion pump in a carrying device. Should be carried at waist level
 - k. Review patient teaching.
 - l. Ensure patient has been notified of return date/time for pump disconnect /change.

- m. Document procedure and patient teaching.
21. To disconnect the elastomeric infusion device:
- a. Perform hand hygiene, don PPE.
 - b. Ensure the full dose of medication has been infused by the device.
 - c. Working over a plastic backed absorbent pad, close all clamps.
 - d. Disconnect elastomeric infusion pump tubing from CVAD.
 - e. Dispose of elastomeric infusion pump in a cytotoxic waste container
 - f. Flush IV / central line. Continue or discontinue IV therapy according to orders.
 - g. Complete dressing / cap changes as required.
 - h. Document procedure
22. All patients will be educated on the home management of an ambulatory elastomeric infusion pump. Patient education will include:
- a. Key parts of the infusion pump (clamps, flow restrictor, elastomeric balloon)
 - b. Care at home including any activity restrictions
 - c. Routine checks to be performed on the pump
 - d. Actions to take if a problems arise
 - e. Follow up appointments
23. A chemotherapy spill kit will be provided to all ambulatory patients receiving chemotherapy using an elastomeric infusion pump. See Appendix 2.

ADMINISTRATION OF SUBCUTANEOUS OR INTRAMUSCULAR CHEMOTHERAPY

NOTE: As of July 15, 2019, the subcutaneous section has been replaced by [NSHA MM-CP-001 Administration of Subcutaneous Cancer Systemic Therapy](#)

POLICY

1. ~~Subcutaneous and~~ intramuscular cytotoxic cancer chemotherapy may only be administered by a *Registered Nurse with Chemotherapy Certification (RNCC)* or a Registered Nurse (RN) with additional knowledge and skills about cytotoxic precautions, management of expected toxicities and other care required by oncology patients. See Appendix 2.
2. ~~Subcutaneous cytotoxic cancer chemotherapy doses may be self-administered in the home setting by the patient and/or family member with self-administration teaching.~~
3. Safety precautions, as outlined in Section 1, should be followed during the administration of all cytotoxic drugs to prevent undue exposure of the health care provider and the patient.
4. To administer cancer chemotherapy the *RNCC* must be deemed competent in: completing a pre-treatment nursing assessment; administering ~~subcutaneous and/or~~ intramuscular cancer chemotherapy.
5. Prior to administration of chemotherapy, the *RNCC* will assess the patient, provide necessary education and verify the chemotherapy order.
6. For ~~subcutaneous or~~ intramuscular injection a syringe will be prepared in the chemotherapy preparation area of the pharmacy. A protective cap is placed on the end of the syringe.
7. Vesicants or irritant chemotherapy agents are not to be administered by ~~subcutaneous or~~ intramuscular route.
8. Ensure adequate platelet count (greater than $> 50 \times 10^9$ cells/L) for intramuscular (IM) injection.
9. Air should not be expelled from syringes prior to administration.

Equipment:

- Appropriate personal protective equipment (nitrile gloves, chemo gown).
- Non-permeable plastic backed absorbent pad
- Appropriate gauge and length of needle(s)
 - i. ~~For subcutaneous injections, it is recommended to use 26 gauge needles (or higher gauge, unless specified by manufacturer)~~
 - ii. For intramuscular injections, it is suggested to use 22-27 gauge needles of appropriate length (unless a lower gauge is required for the patient or as

specified by manufacturer).

- Skin antiseptic swab
- Cytotoxic waste container.

BEST PRACTICE PROCEDURE

Pre-treatment Assessment and Teaching

1. Prior to the administration of chemotherapy a pre-treatment nursing assessment will be completed. Patients will also be assessed in between cycles, as needed to maintain patient safety, and as clinically indicated. The assessment parameters must include but are not limited to:
 - a. Height and current weight
 - b. Vital signs
 - c. History & Physical and toxicity assessment
 - d. History of allergies and anaphylactic reactions. Review procedure for hypersensitivity reactions (if appropriate)
 - e. Performance status (ECOG)
 - f. Lab values (CBC & differential, LFT's, creatinine, etc.)
 - g. Assessment of the emotional, sexual, psychosocial and financial impact of the diagnosis and treatment on the patient and family
 - h. Assessment of the patient's (*or parent/guardian's*) understanding and learning needs
2. The Oncology Nurse will educate the patient/family in collaboration with other oncology health professionals (see Patient Education Standards for Adults). Teaching is documented on a chemotherapy teaching tool as per DHA. Parameters of teaching plan must include (but not limited to):
 - a. Description of chemotherapy treatment, including drugs, specific protocol, scheduling and administration
 - b. Review of potential side effects (immediate, early and delayed), management and self care practices to prevent/manage side effects, coping, psychosocial support
 - c. Review of cytotoxic precautions for both inpatients and ambulatory patients (see Appendices 2 & 3)

Chemotherapy Verification

3. Prior to the administration of cancer chemotherapy in any District Health Authority facility, the RNCC, who is administering the chemotherapy, will:
 - a. Verify that the consent has been obtained.
 - b. Ensure that a physician is accessible in case of an emergency
 - c. Confirm the initial BSA (if used to calculate the dose) or recalculate the BSA (Standard BSA formula) if weight has changed by greater than 10% from baseline

- d. Recalculate or verify all doses, to confirm accuracy of calculations
 - e. Verify that the correct drug(s) have been ordered consistent with the cycle and week(s) as defined by the regimen. Compare with last treatment order.
 - f. Verify that the dose or dosage range is appropriate for the patient and treatment plan using an approved reference.
 - g. Review lab results and other diagnostic test/procedures required by the regimen, and ensure these have also been reviewed by the physician.
 - h. Verify pre-medication as ordered
 - i. Verify with another *RNCC* (or registered nurse, nurse practitioner, pharmacist or physician, if another *RNCC* is not available) that the information on the chemotherapy drug label matches the information on the physician order and/or MAR.
 - j. Check patient's name, patient identification number, drug name and dose, route, time, infusion rate, and diluent solution.
 - k. Both RNs must sign the MAR and Chemotherapy Administration Checklist and Calculation Form (as per DHA procedures) when the checking is completed.
 - l. Inspect all chemotherapy admixtures for expiry date, particulate matter, signs of incompatibility, degradation or contamination before administration to the patient.
 - m. Verify the full name and patient identification number on the chemotherapy drug label matches the full name and patient identification number on the patient's identification armband or equivalent personal identification on the patient, as per DHA procedures.
4. Correct drug(s), dose(s), BSA calculations, correct cycle/date(s), and lab tests must be verified by two oncology health professionals (e.g. oncology nurse(s), oncology pharmacist), performing the verification **independent from one another**, and the calculations will be documented as per DHA procedures.
- a. If any calculation (dose, or BSA) differs by 10% or more from the order, these must be clarified with the prescriber before drug administration

Procedure ~~Subcutaneous (subcut)~~ or Intramuscular (IM) Injection

5. Chemotherapy stored in the refrigerator should be removed 30 minutes prior to administration, to facilitate patient comfort.
6. Ensure that a physician is accessible in case of an emergency
7. Don PPE
8. Prepare work area by placing a plastic backed absorbant pad on the work surface; ensure cytotoxic sharps container is within easy reach for disposal of equipment.
 - a. If it is anticipated that a work surface will be needed at the bedside, prepare one by placing a non-permeable plastic-backed absorbent drape on a hard, flat surface.

9. Inspect sealed bag (containing the chemotherapy syringe) before opening to ensure there is no spillage within the bag.
10. Select a suitable site for the injection, and prep skin with approved antiseptic swab; allow to dry.
 - a. Ensure the site is rotated each time if repeated administration is required.
11. Remove the chemotherapy syringe from the protective plastic bag onto non-permeable plastic backed pad.
12. Carefully remove the connector top from the Luer-lock syringe and attach an appropriate needle (e.g. 26-gauge needle with a needle length of 8mm). Ensure needles for administration are secure, taking care to minimize risk of spillage on the skin.
13. ~~For subcutaneous injections, use a pinch technique, administer the injection at a 45- or 90 angle. Aspiration is not required prior to the injection of the drug.~~
14. For intramuscular injections, administer the injection using z track technique via ventrogluteal injection site (or as specified in manufacturers' recommendations).
15. Following injection, leave the needle in place for a few seconds then remove slowly to minimize drug leakage from injection site.
16. Remove the syringe and needle. Do NOT recap the needle; ensure safety device is engaged before disposal.
17. Dispose in the cytotoxic sharps container.
18. Following administration, if needed, place gauze over site until bleeding or weeping of the agent has ceased.
19. Cover with occlusive dressing or bandage if necessary.
20. If further injections are required, rotate the site of administration and maintain record of administration sites.
21. Ensure all potentially contaminated materials are placed on the protective work surface. Roll the plastic backed pad with contents, place in the appropriate cytotoxic waste container.
22. Remove PPE (including gloves) and discard into appropriate cytotoxic waste container.
23. Wash hands.
24. Document medication administration and injection site.

INTRAVESICULAR ADMINISTRATION OF CHEMOTHERAPY

POLICY

1. Intravesicular administration agents will be performed by a urologist or a registered nurse with PELC certification for this procedure. For administration of cytotoxic drugs, the nurse must also be an *RNCC*.
2. Intravesicular chemotherapy agents will only be administered if there is a physician available while the instillation is being administered.
3. BCG is a live attenuated virus and should not be handled by employees with known immunological deficiency.
4. BCG is contraindicated within 14 days of TUR of bladder tumour, after a traumatic catheterization, in the presence of hematuria or urinary tract infection, and in acute febrile illness.
5. BCG is reconstituted by a pharmacist or RN with PELC certification through the use of a closed system. Contaminated materials used to administer BCG (e.g. catheter, syringe) must be disposed of in Biohazard containers. All work surfaces must be disinfected with a disinfectant with a tuberculocidal claim.
6. Other drugs used for bladder instillation are Mitomycin, Epirubicin and Interferon. They will be prepared by the pharmacy and handled using all cancer chemotherapy safe handling procedures.

BEST PRACTICE PROCEDURE

Pre-treatment Assessment and Teaching

1. Prior to the administration of each dose of BCG or other intravesicular chemotherapy a pre-treatment nursing assessment will be completed. Patients will also be assessed in between cycles, as needed to maintain patient safety, and as clinically indicated. The assessment parameters must include but are not limited to:
 - a. Vital signs
 - b. History & Physical and toxicity assessment
 - c. History of allergies and anaphylactic reactions.
 - d. The patient's response to previous BCG treatments - especially with regards to hematuria, chills, elevated temperature, frequency and dysuria. Proceed only with a physician's directive if flu-like symptoms were experienced following a previous instillation or are presently being experienced.
 - e. Performance status (ECOG)
 - f. Lab values as ordered on the Pre Printed Order (PPO)
 - g. Assessment of the emotional, sexual, psychosocial and financial impact of the diagnosis and treatment on the patient and family
 - h. Assessment of the patient's understanding and learning needs

- i. Document assessment
2. The Oncology Nurse will educate the patient/family in collaboration with other oncology health professionals (see Patient Education Standards for Adults). Teaching is documented on a chemotherapy teaching tool as per DHA. Parameters of teaching plan must include (but not limited to):
 - a. Explain procedure to patient and provide written teaching instruction for post procedure care at home.
 - b. Description of treatment, including drugs, specific protocol, scheduling and administration
 - c. Review of potential side effects (immediate, early and delayed), management and self care practices to prevent/manage side effects, coping, psychosocial support
 - d. Review of cytotoxic/tuberculocidal precautions

Chemotherapy Verification

3. Prior to the administration of cancer chemotherapy in any District Health Authority facility, the RN administering the intravesicular chemotherapy, will:
 - a. Verify that the consent has been obtained.
 - b. Recalculate or verify all doses, to confirm accuracy of calculations
 - c. Verify that the correct drug(s) have been ordered consistent with the cycle and week(s) as defined by the regimen. Compare with last treatment order.
 - d. Verify that the dose or dosage range is appropriate for the patient and treatment plan using an approved reference.
 - e. Review lab results and other diagnostic test/procedures required by the regimen, and ensure these have also been reviewed by the physician.
 - f. Verify with another RN (or nurse practitioner, pharmacist or physician, if another RN is not available) that the information on the chemotherapy drug label matches the information on the physician order and/or medication administration record (MAR):
 - g. Verify patient's name, patient identification number, drug name and dose, route, time
 - h. Both RNs must sign the MAR and Chemotherapy Administration Checklist and Calculation Form (as per DHA procedures) when the checking is completed.
 - i. Inspect all chemotherapy admixtures for expiry date, particulate matter, signs of incompatibility, degradation or contamination before administration to the patient.
 - j. Verify the full name and patient identification number on the chemotherapy drug label matches the full name and patient identification number on the patient's identification armband or equivalent personal identification on the patient, as per DHA procedures.

4. Correct drug(s), dose(s), correct cycle/date(s), and lab tests must be verified by two oncology health professionals (e.g. oncology nurse(s), oncology pharmacist), performing the verification **independent from one another**, and the calculations will be documented as per DHA procedures.
 - a. If any calculation differs by 10% or more from the order, these must be clarified with the prescriber before drug administration
5. Procedure: BCG Administration When administering **BCG** through intravesicular catheter into the bladder:
 - a. Ensure there is a written physician's order and signed consent
 - b. Ensure that a physician is accessible in case of an emergency
 - c. Prepare the following equipment for this procedure:
 - a. Catheter tray including cleansing solution, lubricant, labelled specimen container
 - b. #12 straight catheter or #14 straight catheter
 - c. 60 mL syringe (luer-lock)
 - d. 50 mL normal saline
 - e. Closed system i.e. BCG reconstitution kit
 - f. Vial of BCG
 - g. Plastic backed absorbent pad
 - h. Cytotoxic waste container
 - i. Mask
 - j. Rubbing alcohol
 - k. Long sleeved chemotherapy gown
 - l. Sterile gloves
 - m. Goggles
 - d. Prepare work area by placing a plastic backed absorbant pad on the work surface; ensure cytotoxic sharps container is within easy reach for disposal of equipment.
 - e. Pour 50 mL sterile normal saline into a sterile urine bottle and lay bottle of BCG beside it. Place a plastic backed absorbent pad under the patient to protect the examination bed from contamination.
 - f. Assemble equipment. Open and arrange catheter tray dropping BCG reconstitution kit onto sterile field as well as 60 mL luer lock syringe. Draw up 50 mL of sterile normal saline.
 - g. Don PPE: gown, mask, goggles (including a face shield if danger of splashes or sprays), and sterile gloves.

- h. Catheterize using a #12 straight catheter or #14 (Coudé tip catheter may be necessary if having difficulty inserting straight catheter. NOTE: Contact a physician if you have not been taught how to insert a Coudé tip catheter)
 - i. Obtain urine for culture and sensitivity and assess for hematuria. Ensure the bladder is completely empty.
 - j. Leave catheter in place.
 - k. Reconstitute BCG in the following manner.
 - a. Take the 50 mL of sterile normal saline holding the syringe in a downward position.
 - b. Lock it into the BCG reconstitution kit.
 - c. Insert bottle of BCG onto other end; 1 mL of normal saline will automatically enter BCG bottle.
 - d. Mix this solution then draw it back into syringe.
 - e. Instill 1 mL of the solution from the syringe back into the bottle, mix and draw back into syringe.
 - l. Lay BCG reconstitution kit on sterile field with BCG bottle far from the catheter tray.
 - m. Insert catheter tip of BCG reconstitution kit into catheter and slowly over three minutes instill the BCG into the bladder.
 - n. Remove catheter, unless otherwise ordered.
 - o. Place catheter, tray, supplies, gown, gloves, goggles and mask in a cytotoxic waste container for disposal.
 - p. Instruct patient to hold solution for two hours. Note: Some patients cannot hold for 2 hours so instruct to hold as long as they can up to 2 hours. Rotate patient position as per protocol orders.
 - q. Ensure the patient can verbalize the instructions regarding safe self-care post BCG administration and how to access assistance if needed.
 - r. Document procedure and patient tolerance and send urine culture to the lab.
 - s. After each patient, clean and disinfect the mixing area and treatment table/area with 70% isopropyl alcohol wearing protective equipment (including mask). All work surfaces must be disinfected with a product that has a tuberculocidal claim.
 - t. In the event of a spill or incontinence, pour copious amounts of the tuberculocidal disinfectant on area and let sit for 10-15 mins. Clean spill and area with detergent. Dispose of all materials in a cytotoxic waste container.
6. When administering other cytotoxic chemotherapy agents (e.g. Mitomycin) through a catheter into the bladder, follow the procedures used for BCG intravesicular administration, except as follows:
- a. Cytotoxic chemotherapy agents are prepared by pharmacy in syringes ready

for instillation.

- b. Administration should be done in a chemotherapy administration unit, if possible.
- c. In the event of a spill or incontinence, handle the same as any other cytotoxic spill.

ADMINISTRATION OF ORAL OR TOPICAL CANCER CHEMOTHERAPY AGENTS (INCLUDING NASOGASTRIC ADMINISTRATION)

POLICY

Preparations may include oral cytotoxic drugs (tablet, capsules or liquid formulations) or the topical application of a cytotoxic drug.

1. Oral and topical cancer chemotherapy doses may be given to hospital patients and patients outside the hospital setting (e.g. continuing or long term care facilities) by Registered Nurses other than *RNCCs* if the RN is knowledgeable about cytotoxic precautions, management of expected toxicities and other care required by oncology patients.
2. Prior to administration of each cycle of oral or topical cytotoxic chemotherapy, the RN will assess the patient, provide necessary education and verify the chemotherapy order. The registered nurse will also assess the patient during the cycle, as necessary.
3. For hospital patients, all oral cytotoxic chemotherapy doses will be prepared by pharmacy including the crushing or splitting of tablets, compounding of liquid oral doses, nasogastric and topical preparations . Doses for nasogastric administration and oral liquid doses will be prepared in oral syringe(s).
4. Cytotoxic tablets and capsules are handled in a manner that avoids skin contact, spread of drug into the air and chemical cross contamination with other drugs. All equipment used in the administration of these drugs is dedicated to this purpose and when necessary clearly labeled as such. .
5. The prescription for oral or topical cytotoxic cancer treatment will be verified by two oncology health professionals (e.g. Oncology Pharmacist, Oncology Nurse, Nurse Practitioner or another oncologist) each time an order is written for oral or topical chemotherapy, before giving the prescription to the patient or sending the prescription by fax to a community pharmacy. See **Ordering Cancer Chemotherapy** policy.
 - a. If two oncology health professionals are not available in the practice setting or by distant communication, the prescription may be verified by one oncology health professional and one other health professional.

BEST PRACTICE PROCEDURE

Pre-treatment Assessment and Teaching

1. Prior to the administration of each cycle of oral or topical chemotherapy, a pre-treatment nursing assessment will be completed. Patients will also be assessed in between cycles, as needed to maintain patient safety, and as clinically indicated. The assessment parameters may include but are not limited to:

- a. Height and current weight
 - b. Vital signs
 - c. History & Physical and toxicity assessment
 - d. History of allergies and anaphylactic reactions
 - e. Performance status (ECOG)
 - f. Lab values as specified on the Pre Printed Order (PPO)
 - g. Assessment of the emotional, sexual, psychosocial and financial impact of the diagnosis and treatment on the patient and family
 - h. Assessment of the patient's (*or parent/guardian's*) understanding and learning needs
2. The nurse will educate the patient/family in collaboration with oncology health professionals (see Patient Education Standards for Adults and Appendix 4). Teaching is documented on a chemotherapy teaching tool as per DHA. Parameters of teaching plan must include (but not limited to):
- a. Description of treatment, including drugs, specific protocol, scheduling and administration
 - b. Review of potential side effects (immediate, early and delayed), management and self care practices to prevent/manage side effects, coping, psychosocial support
 - c. Review of cytotoxic precautions (where appropriate)

Chemotherapy Verification

3. Prior to the administration of cancer chemotherapy in any District Health Authority facility, the RN who is administering the chemotherapy, will:
- a. Verify that the consent has been obtained.
 - b. Verify that the correct drug(s) have been ordered consistent with the cycle and week(s) as defined by the regimen. Compare with last treatment order.
 - c. Verify that the dose or dosage range is appropriate for the patient and treatment plan using an approved reference.
 - d. Review lab results and other diagnostic test/procedures required by the regimen, and ensure these have also been reviewed by the physician.
 - e. Verify pre-medication as ordered
 - f. Verify with another RN (or nurse practitioner, pharmacist or physician, if another RN is not available) that the information on the chemotherapy drug label matches the information on the physician order and/or medication administration record (MAR).
 - g. Check patient's name, patient identification number, drug name and dose, route and time.

- h. Both RNs must sign the MAR and Chemotherapy Administration Checklist and Calculation Form (as per DHA procedures) when the checking is completed.
 - i. Verify the full name and patient identification number on the chemotherapy drug label matches the full name and patient identification number on the patient's identification armband or equivalent personal identification on the patient, as per DHA procedures.
 2. At the beginning of each cycle, correct drug(s), dose(s), correct cycle/date(s), and lab tests must be verified by two oncology health professionals (e.g. oncology nurse(s), oncology pharmacist), performing the verification **independent from one another**, and the calculations will be documented as per DHA procedures.
 - a. If any calculation differs by 10% or more from the order, these must be clarified with the prescriber before drug administration

Oral Cancer Chemotherapy Administration

3. Administer pre-medication, if ordered.
4. When administering oral cancer chemotherapy (including liquid formulations), the Registered Nurse will:
 - a. Ensure oral chemotherapy drugs are stored separately from other medications
 - b. If it is anticipated that a work surface will be needed at the bedside, prepare one by placing a non-permeable plastic-backed absorbent drape on a hard, flat surface.
 - c. Avoid touching the tablets/capsules directly
 - d. Wear gloves when handling oral cancer chemotherapy drugs. If there is a risk of being sprayed or splashed with a liquid chemotherapy agent, additional personal protective equipment is worn.
 - e. Inspect all chemotherapy doses for expiry date, particulate matter, signs of incompatibility, degradation or contamination before administration.
 - f. Drop dose into a medication cup.
 - g. If possible have patient swallow medication whole with a drink of water or preferred liquid.
 - h. Remove gloves and wash hands after handling chemotherapy drugs and equipment
 - i. Dispose of all equipment used in the administration of medication (e.g. medication cups, syringes, gloves, etc) in appropriate cytotoxic waste containers.
 - j. Follow cytotoxic precautions (inpatient unit) or teach cytotoxic precautions for ambulatory patients
 - k. Document chemotherapy administration on the patient's chart/MAR.

Nasogastric Administration

5. When administering cancer chemotherapy via feeding tube the Registered Nurse will:
 - a. Ensure oral syringe containing chemotherapy drug is stored separately from other medications

- b. Wear PPE including approved chemotherapy gloves, chemotherapy gown, face shield/goggles and mask to avoid splashing
- c. Inspect all chemotherapy doses for expiry date, particulate matter, signs of incompatibility, degradation or contamination before administration.
- d. Ensure the tip of the oral syringe containing the drug fits the opening of the feeding tube administration port with a tight seal. Consult the pharmacist if the tip of the syringe does not fit securely.
- e. Place a plastic backed absorbent pad under the oral syringe and under the feeding tube administration port
- f. Assess patency and position of feeding tube, flush as per hospital policy and procedure
- g. Ask patient to close eyes and turn head away from feeding tube administration port
- h. Place gauze around feeding tube and oral syringe when administering the drug to catch any accidental spillage or droplets
- i. Administer agent as ordered.
- j. Remove oral syringe holding gauze around disconnection site; place syringe in plastic bag and dispose in approved cytotoxic waste container
- k. Flush feeding tube as per procedure
- l. Reconnect feeding tube to nutritional feeds unless otherwise ordered
- m. Remove gloves and wash hands after handling chemotherapy drugs and equipment.
- n. Dispose of all equipment used in the administration of drugs (oral syringes, gloves, PPE, incontinent pad, etc) in appropriate cytotoxic waste containers.
- o. Implement cytotoxic precautions
- p. Dispose of feeding tube as cytotoxic waste on removal
- q. Document chemotherapy administration on the patient's chart/MAR.

Topical Administration

6. When administering topical cancer chemotherapy the Registered Nurse will:
 - a. Ensure container(s) with topical chemotherapy drug is(are) stored separately from other medications, enclosed in a sealed plastic bag.
 - a. Wear gloves when handling topical cancer chemotherapy drugs. If there is a risk of occupational exposure, additional PPE is worn.
 - b. Protect the work area with a plastic backed absorbent pad.
 - c. Apply the topical drug in a thin layer to the area to be treated with a sterile tongue blade or cotton tipped applicator at the frequency ordered; avoid contact with unaffected skin and mucous membranes of the eyes, nose and mouth.
 - d. Unless contraindicated, and if the drug is being applied to exposed skin, cover the treated area with an appropriate dressing to prevent exposure to other areas of the body, clothing or people.
 - e. If applicable, remove the drug completely at the end of the required contact time.
 - f. Remove gloves and wash hands after handling chemotherapy drugs and equipment
 - g. Dispose of all equipment used in the administration of medication (medication cups, syringes, gloves, etc) in appropriate cytotoxic waste containers.

h. Document chemotherapy administration on the patient's chart/MAR

ADMINISTRATION OF CANCER CHEMOTHERAPY ON NON-ONCOLOGY UNITS

POLICY

If an oncology patient is to receive cancer chemotherapy on a nursing unit where nursing staff do not have certification for chemotherapy administration:

1. Before administration of cancer chemotherapy in a non-oncology unit, a discussion on a case by case basis needs to occur about options to ensure that priority is considered for the patient who most needs expert oncology nursing care to receive this in the most appropriate location.
2. Administration of intravenous doses, and other doses as included in defined chemotherapy regimens, must be given by a Registered Nurse with Chemotherapy Certification (*RNCC*).
 - a. All reasonable effort should be made to transfer the patient to an oncology unit for parenteral chemotherapy administration and monitoring.
 - b. Exceptions to moving or switching patient care location would include patients with needs for other nursing expertise and support greater than the need for expert oncology nursing care (e.g. ICU monitoring).
 - c. If the patient cannot be transferred, then an *RNCC* must go to the unit and administer parenteral cancer chemotherapy to the patient at that location.
 - d. Patients in long term care or continuing care facilities will be treated at the most accessible ambulatory chemotherapy administration area.
3. Administration of oral, nasogastric, topical, intravesicular, subcutaneous, or intramuscular doses may be given on the non-oncology unit by a RN other than *RNCCs* if the RN is knowledgeable about cytotoxic precautions, management of expected toxicities and other care required by oncology patients. Order verification for cytotoxic cancer chemotherapy doses must involve two independent oncology health professionals. See policy sections on “Administration of Oral or Topical Cancer Chemotherapy Agents (Including Nasogastric Administration)”, “Administration of Intravesicular Chemotherapy” and “Administration of Subcutaneous or Intramuscular Chemotherapy”
4. Employees on the non-oncology units should be educated regarding cytotoxic precautions, management of expected toxicities, cleaning of equipment and patient care area(s), cytotoxic waste management, other occupational safety issues, and other care required by oncology patients after the chemotherapy administration.

DEFINITIONS

<i>BCG</i>	BCG (Bacillus Calmette – Guerin) is a live attenuated strain of mycobacterium bovis (the organism that causes tuberculosis). It is used for the treatment of superficial bladder cancer. The exact mechanism of action is not known but it is thought to produce a local inflammatory reaction as well as an immune response that is toxic to cancer cells.
<i>Cancer Chemotherapy Regimen</i>	A drug or combination of chemotherapy drugs, with predetermined relative or absolute doses, schedule of administration, and often with recommended supportive therapy (e.g. antiemetic, hydration).
<i>Chemotherapy Administration Area</i>	A dedicated (or temporary) space for cancer chemotherapy drug administration. The Chemotherapy Administration Area may include patient beds, stretchers and/or chairs designed for ambulatory IV therapy, chemotherapy waste receptacles, and other equipment appropriate for the drug administration activities performed in the area. Inpatient beds may be designated as a Chemotherapy Administration Area.
<i>Chemotherapy Administration Unit</i>	A facility (usually hospital) unit dedicated for the local preparation and delivery of chemotherapy. A Chemotherapy Administration Unit requires a Chemotherapy Administration Area, a dedicated drug preparation area (which may be located in the hospital pharmacy department), dedicated Registered Nurses with Chemotherapy Certification, and on-site medical supervision. It is desirable that a Chemotherapy Administration Unit has access to a Hospital Pharmacist with Oncology Training.
<i>Chemotherapy Preparation Area</i>	A designated area in the hospital designed for safe preparation of cancer chemotherapy drugs. This area may be located in the hospital pharmacy area, or adjacent to the chemotherapy administration unit. The area is not to be used for direct patient care. The Chemotherapy Preparation Area will include a designated room with the Biological Safety Cabinet and associated facilities (e.g. drug storage, refrigeration unit, drug preparation staging area). There will be sufficient space and environmental controls to ensure occupational safety in this area.
<i>Closed System Device</i>	A drug transfer device which mechanically prohibits the transfer of environmental contaminants into the system and the escape of hazardous drug or vapour concentrations outside the system.

<i>Continuous Infusion</i>	A drug (or a combination of drugs admixed together) administered by an infusion for a period greater than 8 hours' duration (i.e. beyond the hours of operation for an ambulatory administration unit).
<i>Cytotoxic</i>	A drug possessing a specific destructive action on certain cells. Used commonly in referring to antineoplastic drugs that selectively kill dividing cells. Cytotoxic drugs are associated with specific occupational risk concerns.
<i>Disinfection</i>	A process that kills or destroys nearly all disease-producing microorganisms.
<i>Decontamination</i>	The process of the removal of all visible dust, soil, and other foreign material, usually done using water and detergents, or enzymatic products along with physical action such as brushing, in order to render an object safe for handling.
<i>Intermittent Infusion</i>	A drug administered by an infusion of up to 8 hours duration.
<i>Levels of Care for Cancer Chemotherapy</i>	A program to determine the resources [health professionals, services and facilities] and criteria needed to safely administer each chemotherapeutic agent or combination of agents. The Levels of Care plan and designations for systemic chemotherapy are under development by <i>Cancer Care Nova Scotia (CCNS)</i> , and, <i>for pediatric oncology, CCNS in collaboration with the Atlantic Provinces Pediatric Hematology Oncology Network (APPHON)</i> . The service components will include the required degree of expertise for all health care professionals involved in delivery of care to adults <i>or children</i> with cancer, availability of other hospital services and other factors related to patient safety during chemotherapy administration. Chemotherapy regimens will also be categorized [as Basic, Intermediate, Advanced, or Sub-specialty] to determine the health care facility in which the regimen may safely be administered. For some protocols, portions of the entire protocol may be categorized with different levels, allowing for transfer of some of the chemotherapy treatments. Chemotherapy care will not be transferred to a health care facility without the resources in place to deliver that regimen.
<i>Oncology Nurse</i>	A Registered Nurse who is experienced and skilled in the care of cancer patients and their families. Meets the practice standards and competencies for the Specialized Oncology Nurse, as determined by the Canadian Association of Nurses in Oncology (2006)

<i>Personal Protective Equipment (PPE)</i>	Equipment designated for personnel to wear during administration of cancer chemotherapy, and other activities where physical exposure to cytotoxic agents and/or waste is a risk. PPE may include a gown, gloves, goggles/face shield and/or a mask.
<i>Post Entry-Level Competency Certification (PELC)</i>	Post-entry level competencies (PELC) are those skills that are within the scope of practice of a Health Discipline (HD) but beyond the entry-level competencies of that HD. They require additional education (formal or informal) and demonstration of competency prior to an individual being authorized to perform.
<i>Pre-Printed Order (PPO) Form</i>	A preprinted order sheet approved by the appropriate Cancer Site Team and the local DHA Forms Committee (for format). For pediatric oncology, the chemotherapy order forms approved by IWK will be considered as PPO for this document.
<i>Registered Nurse with Chemotherapy Certification (RNCC)</i>	The administration of cancer chemotherapy is a post entry-level competency and requires that a Registered Nurse complete a specified education program. The registered nurse with chemotherapy certification will hold a current certificate from the education program, and will be responsible for maintenance of certification, as defined by the health district (in collaboration with <i>Cancer Care Nova Scotia</i>).
<i>Systemic Therapy</i>	Systemic therapy includes cancer chemotherapy, hormone therapy, immunotherapy and supportive care drugs, and includes drugs given by any route, including oral. These drugs are also used for non-cancer treatment.

APPENDIX 1

Medical Surveillance of Health Care Worker Handling Cytotoxic Drugs and Waste

According to Occupational Safety and Health Administration (OSHA, USA), safe levels of occupational exposure to cytotoxic agents can not be determined. No reliable method of monitoring exposure exists. It is imperative that those who work with cytotoxic agents adhere to practices, as outlined above, to eliminate or reduce occupational exposure.

While there are no direct measurements to indicate total exposure to cytotoxic drugs, individual staff members may opt to follow selected surveillance components by their own means, which may include:

- Reproductive and general health questionnaires by the individual's family physician completed at the time of hire and annually
- Blood work, including complete blood count, liver function tests and urinalysis completed by the individual's family physician at the time of hire and annually
- Physical examination by the individual's family physician at the time of hire and then annually as needed
- Follow up by the individual's family physician for those workers who have shown health changes and/or have been exposed to hazardous drugs (e.g., through spills or during routine handling).

Documentation is maintained by the Occupational Health and Safety department on:

- Any personal contamination from a spill
- Results from any visits to occupational health related to chemotherapy administration activities

APPENDIX 2

Cytotoxic Precautions - Home Teaching

When a patient returns home following treatment with a cytotoxic agent(s) or has chemotherapy infusing at home via an infusion device, the nurse will explain cytotoxic precaution/safe handling practices.

This patient teaching will include:

- The time frame for precautions is **48 hours** after the last dose of chemotherapy
- Education about what is considered cytotoxic (i.e. body excreta)
- Practical advice for family protection from risk of exposure
- Importance of not conceiving during chemotherapy and for a period of time following the completion of therapy. If necessary, contraceptive options will be offered.
- Use of a condom during intercourse to prevent contact with partner's potentially cytotoxic vaginal fluid or semen
- The importance of washing hands thoroughly
- When flushing the toilet, lower the lid and flush the toilet twice
- Pre-wash wet soiled laundry before washing with regular laundry
- Flush all that is flushable
- Items that need to be disposed of but cannot be flushed should be double bagged, labelled 'cytotoxic' and returned to the chemotherapy unit where care was provided (if the chemotherapy unit staff have instructed the patient and family that they will accept these materials) or to another area designated by the local chemotherapy unit program.
- Store garbage so that children and animals cannot be exposed
- Sharp objects should be placed in a leak proof, puncture proof plastic container, sealed well and placed in the double bagged garbage and returned as indicated above.
- Cytotoxic drugs should be stored in leak proof container (i.e. pill container placed in a Tupperware container) and out of reach of children
- Any left over drugs should be returned to the hospital or the community pharmacy for proper disposal
- Any objects (i.e. cutlery) that have been in contact with cytotoxic material/waste should be washed well with soap and water
- Gown and gloves should be worn if a caregiver is at risk of direct contact with a cytotoxic drug (i.e. ointments, lotions). Gloves should be worn if a care giver is at risk of direct contact with body excreta (i.e. vomit, urine, diarrhea, blood).

- Contents of spill kit and clean up procedures for home chemotherapy.

APPENDIX 3

Cytotoxic Precautions in the Hospital

While a patient is in the hospital receiving treatment with a cytotoxic agent(s), the nurse will explain cytotoxic precaution/safe handling practices used by staff and those that should be practiced by the patient.

This patient teaching will include:

- Education about what cytotoxic means and the risks to both staff and other family members.
- Education about what is considered cytotoxic (i.e. body excreta)
- How the health care team protect themselves from exposure
- Practical advice to protect family, visitors and other patients from risk of exposure
- Activities that are OK while chemotherapy is being given (e.g. hugging, kissing, touching)
- How long cytotoxic precautions are needed, and why
- The importance of washing hands thoroughly
- When flushing the toilet, cover the lid with a pad before flushing
- Precautions with other potentially contaminated items, such as dressings, clothing, linens, ostomy supplies, pads, etc.
- Preparation for discharge and education for home precautions.

The education package in current use is available from CDHA and is entitled “Cytotoxic Precautions in the Hospital”.

APPENDIX 4

Patient Education for Oral Chemotherapy Drugs

- Before starting oral chemotherapy, tell your doctor or nurse about other medication and over the counter drugs you are taking.
- Let your doctor, nurse or pharmacist know if you have a problem paying for or getting your cancer medications. There may be services available to help with the prescription costs.
- Tell other doctors, dentists or health care workers that you are taking oral chemotherapy for your cancer. Carry with you, in your wallet or purse, a list of medication you are taking, including your cancer medication.
- Keep the oral chemotherapy in a safe place where children and pets cannot reach them.
- Do not mix your oral chemotherapy pills/tablets with other medication. Keep these pills separate from other medication.
- You should handle your own medications, if possible. If someone else is giving you your oral chemotherapy medications, they should not touch them with their bare hands; they should be wearing gloves or should put the pills in a medication cup.
- Wash your hands before and after handling the medications.
- Do not crush, chew, split, break or cut your pills/tablets or open capsules unless you have been told to do so and shown how to do so in a correct and safe manner by your nurse, doctor or pharmacist.
- Keep your oral chemotherapy medications away from heat, sunlight, or moisture as these may damage the medication and make it less effective.
- Take your oral chemotherapy medications on the correct day and at the correct time of day you have been told by your doctor, nurse or pharmacist. Follow a clock, timer or calendar to keep yourself on track for the correct day and time. If you are uncertain about the time(s) to take your medications, ask your doctor, nurse or pharmacist again, until you clearly understand.
- Be sure you know what to do if you miss a dose. It is important that you do not take two doses at the same time.
- Be sure you know what to do if you vomit after taking your oral chemotherapy.

- Do not get vaccines or immunizations without the consent of your doctor.
- If you take too many pills/capsules by accident or if someone else takes your pills/capsules, contact your cancer doctor immediately; if you are unable to reach your cancer doctor go immediately to the nearest emergency department.
- Return any unused or outdated medications to your pharmacy.
- Plan ahead to make sure you have enough medication for travel, holidays and weekends.
- You should not become pregnant or make a woman pregnant while on oral chemotherapy. If you have questions about birth control, please ask your doctor or nurse for help and advice.
- Read the information you have been given on the side effects of the medication.
- Let your cancer doctor or nurse know right away if you have any side effects of the oral chemotherapy medications.
- Ask if you should avoid certain foods while on your oral chemotherapy medications.
- Follow up appointments for blood work and clinic appointments or phone calls by clinic nurses are important. These help to decide if another cycle of treatment can be started or if treatment should be continued. Remember to keep these appointments.
- Your nurse will tell you about cytotoxic precautions to use in the home. It is important to know that the risks to your family and others in the home are just as serious with oral chemotherapy as they are with chemotherapy given by IV in the hospital. If you do not have the information about home precautions, be sure to ask your nurse as soon as possible.

APPENDIX 5

Guidelines for the Management of Extravasation of Cancer Chemotherapy Agents

Adapted From QEII Pharmacy Department in Conjunction with
Oncology/Medical Surgical Specialities/Transplant Nursing
Date Approved By Oncology Therapy Subcommittee: May 23, 1997

NOTE: As of July 15, 2019, Appendix 5 has been replaced by [NSHA CAN-ST-002 Administration of Intravenous Systemic Therapy for Cancer](#)

I. DEFINITIONS

Infiltration: Refers to the (IV) intravenous cannula which has slipped from a vein into the tissue.

Extravasation: Misdirection of intravenous fluid or medication from a blood vessel into interstitial tissue.

Vesicant: An agent capable of causing tissue necrosis when infiltrated from the vein into the subcutaneous tissue causing progressive severe tissue damage.

Irritant: An agent capable of causing pain and local inflammation but not tissue necrosis.

Venous flare: A local phenomena characterized by infrequent local edema, venous streaking and pruritus along the vein which does not result in tissue damage. This reaction is demonstrated by such agents as doxorubicin, daunorubicin, epirubicin, idarubicin and mechlorethamine and appears to be a local hypersensitivity or inflammatory reaction.

II. CLINICAL DIFFERENCES BETWEEN FLARE REACTIONS AND EXTRAVASATION

VENOUS FLARE REACTION

- dull ache
- erythema
 - proximal along vein
 - tiny papules or itching (pruritis) around point of entry
- edema
 - none or infrequent at the IV site and good blood return is still obtained
- reaction usually resolves in 30-45 min.
- the immediate redness (raised red streak) and swelling can occur resolving quickly and rarely lasts

longer

- ~~pain, burning, stinging~~
- ~~erythema~~
 - ~~seen at site of injection~~
- ~~edema~~
 - ~~Is common, redness, blanching and blistering at injection site; some injuries may occur away from injection site~~
 - ~~blood return may or may not be present (blood return may be absent or sluggish)(blood return may be present i.e. damaged vein - rupture; leak from a damaged vessel; needle may have punctured the wall of the vein leaving a greater portion of the bevel within the lumen of the vein)~~

III. ~~SIGNS AND SYMPTOMS OF A CANCER CHEMOTHERAPY EXTRAVASATION~~
(Vesicant/Irritant Drugs – see individual agents in sections IV & V)

PAIN	<ul style="list-style-type: none"> • Pain, stinging or burning at injection site • May last minutes or hours and eventually subsides
ERYTHEMA	<ul style="list-style-type: none"> • At injection site or along a weakened blood vessel • May not always be present at time of extravasation and may occur later
SWELLING	<ul style="list-style-type: none"> • Can be severe and usually occurs immediately • Loss of IV backflow (backflow may be present, but sluggish); lack of blood return when checking the IV line
ULCERATION- (<u>tissue necrosis</u>)	<ul style="list-style-type: none"> • Usually occurs 48-96 hours later • If partial skin thickness is damaged the area may appear as a blister • If full thickness of skin is damaged, the surface may appear very white and develop an eschar (a slough) • Injury can progress with the formation of deep necrotic lesions and can continue to occur for months

IV. LIST OF VESICANT CANCER CHEMOTHERAPY DRUGS

CANCER- CHEMOTHERAPY VESICANTS	CLINICAL COMMENT ON EFFECTS OF EXTRAVASATION
Generic Name	
Amsacrine	<ul style="list-style-type: none"> • Immediate pain, erythema and swelling • Severe skin ulcers
Dactinomycin	<ul style="list-style-type: none"> • Immediate pain, erythema, swelling • Known to produce severe skin ulcers
Daunorubicin	<ul style="list-style-type: none"> • Immediate pain, erythema and swelling • Severe skin ulcers
Doxorubicin	<ul style="list-style-type: none"> • Immediate pain, erythema and swelling • Severe progressive tissue necrosis • Blisters may appear in 1-2 days and ulceration- days to weeks after extravasation
Epirubicin	<ul style="list-style-type: none"> • Same as doxorubicin
Idarubicin	<ul style="list-style-type: none"> • Same as doxorubicin
Liposomal Daunorubicin	<ul style="list-style-type: none"> • Same as doxorubicin
Mechlorethamine (Nitrogen Mustard)	<ul style="list-style-type: none"> • Immediate pain and swelling • Severe and prolonged skin ulcers; lesions heal poorly
Melphalan	<ul style="list-style-type: none"> • Mild pain and/or irritation; resolves within few hours • Skin ulceration at injection site
Mitomycin-C	<ul style="list-style-type: none"> • Initial local erythema, edema, and pain • Progress slowly to non-healing skin ulcerations • Symptoms are sometimes delayed months; lesions can expand over weeks
Streptozocin	<ul style="list-style-type: none"> • Tissue necrosis • Burning sensation at injection site and up the arm
Vinblastine	<ul style="list-style-type: none"> • Produces pain, erythema and localized swelling within minutes • Skin blisters form after several days and resolve slowly over several weeks
Vincristine	<ul style="list-style-type: none"> • Same as vinblastine
Vinorelbine	<ul style="list-style-type: none"> • Produces pain, erythema, localized swelling • Local tissue necrosis and/or thrombophlebitis • Venous discoloration • Possible ulceration

V. LIST OF IRRITANT CANCER CHEMOTHERAPY DRUGS

CANCER-CHEMOTHERAPY IRRITANTS	CLINICAL COMMENT ON EFFECTS OF EXTRAVASATION
Generic Name	
Aldesleukin	<ul style="list-style-type: none"> • Injection site reactions • Nodules or indurations at injection site
Carmustine	<ul style="list-style-type: none"> • Possible phlebitis due to ethanol content (drug reconstituted with ethanol)
Cisplatin	<ul style="list-style-type: none"> • Rarely produces necrosis (vesicant properties) and only when large amount of highly concentrated solution is extravasated
Dacarbazine	<ul style="list-style-type: none"> • Phlebitis is rare • Light induced activation pathway of drug suggests protection of exposed tissues from light during administration
Docetaxel	<ul style="list-style-type: none"> • Localized pain and discoloration of skin • Erythema, desquamation • At higher doses, docetaxel may perform as a vesicant
Etoposide	<ul style="list-style-type: none"> • Phlebitis, urticaria and erythema (due to drug formulation) • Possible skin ulceration
Ifosfamide	<ul style="list-style-type: none"> • Local pain, inflammation, induration, phlebitis
Gemcitabine	<ul style="list-style-type: none"> •
Liposomal Doxorubicin	<ul style="list-style-type: none"> • Should be considered as an irritant • Use same procedures as doxorubicin
Liposomal Doxorubicin Pegylated	<ul style="list-style-type: none"> • Should be considered as an irritant • Use same procedures as doxorubicin
Mitoxantrone	<ul style="list-style-type: none"> • Does not appear to consistently produce necrosis if extravasated • Relatively painless upon immediate extravasation • Blue discoloration of skin • Possible ulceration
Oxaliplatin	<ul style="list-style-type: none"> • Injection site reactions • At higher doses, oxaliplatin may perform as a vesicant
Paclitaxel	<ul style="list-style-type: none"> • Inflammation • Pain, erythema, cellulites • Possible sclerosis, hyperpigmentation, skin ulceration and peeling and blistering of skin • At higher concentrations, paclitaxel may perform as a vesicant
Paclitaxel NAB	<ul style="list-style-type: none"> • Same as paclitaxel
Teniposide	<ul style="list-style-type: none"> • Similar to etoposide

VI. FACTORS INCREASING THE RISK OF EXTRAVASATION

1. Type of Drug Infused

~~Refer to sections IV and V – Lists of vesicant or irritant cancer chemotherapy agents~~

Drug-Related Risk Factors

- ~~a) Vesicant potential of drug~~
- ~~b) Drug concentration and volume extravasated~~
- ~~c) Drug vehicle – solvents used to allow the drug to remain in solution~~
- ~~d) Order of administration – Although a very controversial subject, vesicants are to be administered first.~~
- ~~e) Inadequate flushing of the line before and after each drug.~~

2. General Considerations

- ~~a) Anatomical disruptions that may interfere with venous flow.~~
- ~~b) Alterations in mental status caused by i.e. sedation, antiemetics. Confusion caused by such drugs may cause inability to communicate-discomfort.~~
- ~~c) Sudden movements due to emesis or urgency to void.~~
- ~~d) Patients condition – previous cancer chemotherapy treatment degree of debilitation.~~
- ~~e) Peripheral neuropathy i.e. unable to feel pain.~~
- ~~f) Patient may be obese or dehydrated thereby making it difficult to identify swelling or hardness.~~
- ~~g) Irradiated limbs, areas distal to lymphatic blockage or areas close to recent venipuncture.~~

3. Peripheral Route

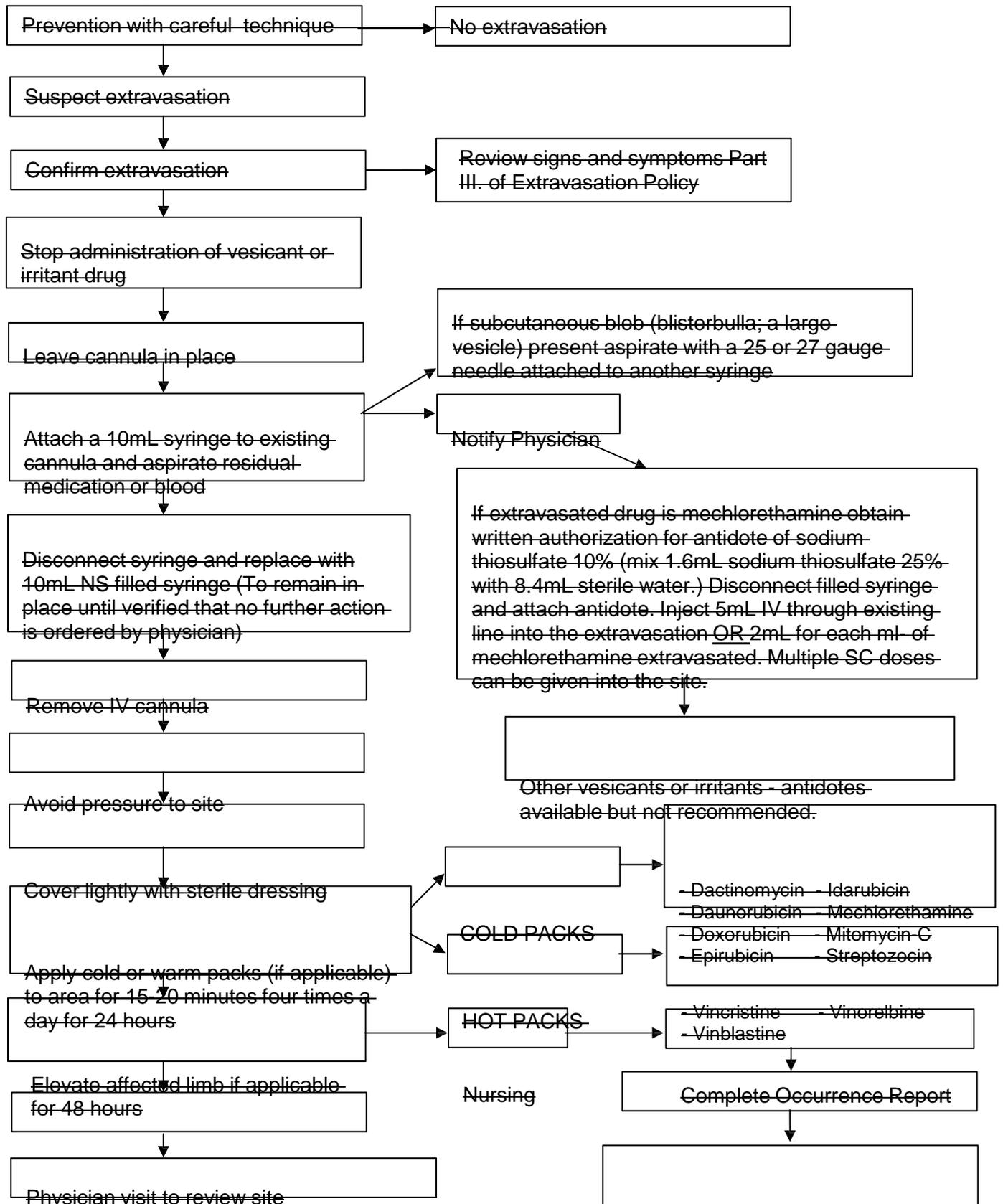
- ~~a) Inappropriate site for venipuncture i.e. puncturing a vein more than once.~~
- ~~b) Previous vascular trauma~~
- ~~c) Dislodgement of needle~~
- ~~d) Infusion sites distal to obstructed venous drainage~~
- ~~e) Poor blood return~~
- ~~f) Increased length of infusion times i.e. continuous infusion~~
- ~~g) IV site > 2hours old or fragile vein (e.g. vein on elderly person)~~

4. Central Route

- ~~a) Poor blood return (sluggish or absent)~~

- ~~b) Improper and insecure Huber needle placement in the port of an implanted infusion port~~
- ~~c) Occluded catheter (partial or complete)~~
- ~~d) Internal catheter being disconnected from port~~

VII. ALGORITHM FOR MANAGING CANCER CHEMOTHERAPY EXTRAVASATION
(Vesicant/Irritant Drugs)



Observe site regularly for pain,
redness, hardness, and/or ulceration

**VIII. DOCUMENTATION OF INFORMATION ON NURSES' NOTES IN
PATIENT'S MEDICAL RECORD**

1. ~~Date~~
2. ~~Time~~
3. ~~Type of venous access (i.e. needle size; peripheral route or central venous access device)~~
4. ~~Insertion site; location (appearance)~~
5. ~~Number of venipuncture attempts and location~~
6. ~~Drug sequence of non-chemotherapy and chemotherapy drugs given immediately prior to extravasation~~
7. ~~Drug(s) that extravasated~~
8. ~~Drug administration techniques, small volume parenteral (SVP); large volume parenteral (LVP); push~~
9. ~~Estimated amount of drug extravasated~~
10. ~~Symptoms reported by patient and patients response~~
11. ~~Nursing intervention~~
12. ~~Appearance of site~~
13. ~~Physician notified~~
14. ~~Plastic surgery consult / photograph (if warranted)~~
15. ~~Follow-up instructions to patient~~
16. ~~Nurse's signature~~
17. ~~Complete Occurrence Report~~

APPENDIX 6

Guidelines for the Management of Hypersensitivity Reactions / Anaphylaxis With Cancer Chemotherapy Agents

Adapted From QEII Health Science Centre
Approved By Oncology Therapy Subcommittee

Anaphylaxis

- Syndrome elicited in a **hypersensitive** individual on subsequent exposure to a sensitizing antigen
- Ranges from **localized response** to **systemic response** which may lead to **anaphylactic shock** and **death**

Hypersensitivity Drug Reactions

Allergic Drug Reactions	Mechanism of Action	Examples
Type 1	Re-exposure to a particular antigen IgE mediated (immediate reaction)	Penicillin allergy; most chemotherapeutic agents
Type 2	Cytotoxic reactions Manifest as hemolytic anemia, thrombocytopenia and granulocytopenia	Transfusion reactions
Type 3	Immune complex-mediated reactions	Systemic lupus erythematosus; serum sickness
Type 4	Cell-mediated (delayed reactions)	Graft rejection; contact dermatitis

Discussion

- May have no correlation with the known pharmacologic properties of the drug
- May occur on first exposure or develop after subsequent administration (i.e. a number of previous cycles)
- Only occurs in a small percentage of patients
- May present with early or late onset of symptoms

Chemotherapeutic agents for which pre-medications are routinely used to prevent adverse reactions

- cetuximab
- docetaxel
- gemtuzumab
- panitumumab
- paclitaxel
- rituximab
- trastuzumab
- temsirolimus
- monoclonal antibodies (in general)

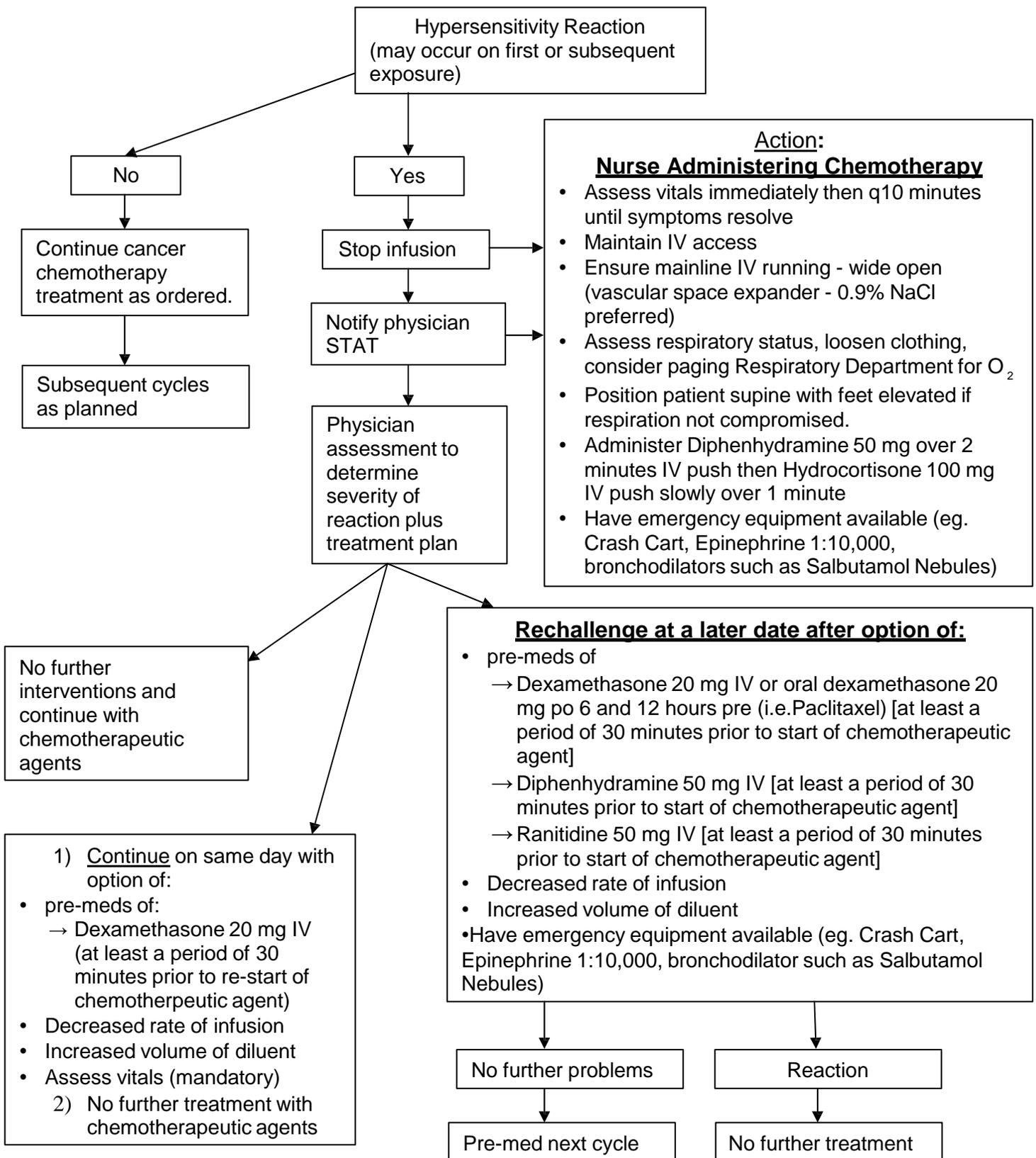
Chemotherapeutic agents for which pre-medications are not routinely used but which may require treatment for allergic reactions that can occur during infusion

- alemtuzumab
 - asparaginase
 - bevacizumab
 - bleomycin
 - carboplatin
 - etoposide
- The patient should be closely monitored when receiving drugs with documented potential for hypersensitivity response. The Registered Nurse (RN) must remain with the patient for the first 15 minutes when administering these drugs. Most reactions become evident early on within seconds or minutes after exposure to an antigen.

Recognition and Clinical Features

Cutaneous	facial flushing; urticaria rash; hives; pruritis; angioedema
Cardiovascular	pain; headache; chills; tachycardia; hypotension; hypertension; arrhythmias; shock; syncope
Gastrointestinal	abdominal bloating; cramps; vomiting; diarrhea
Respiratory	dyspnea; bronchospasm; laryngeal spasm; wheezing; chest tightness; rhinorrhea; nasal congestion
Others	agitation; back pain; diaphoresis; fecal or urinary incontinence; anxiety, feeling of impending doom, "just don't feel right".

Algorithm



Retreatment Discussion

- Careful consideration of the risk versus benefit
- Discussion between patient and physician
- May be successful in certain circumstances: interventions with pre-medications such as H₁ and H₂ antagonists and/or a variety of options including increasing fluid volumes or slowing infusion rates may allow for re-treatment
- Most frequent agents encountered are listed below

Chemotherapeutic Agent	Patients at Greatest Risk of Hypersensitivity Reaction	Re-Treatment Possibilities
Taxanes* (Paclitaxel or Docetaxel)	Patients receiving 1 st or 2 nd dose	Yes, in virtually all patients
Platinum Compounds* (Carboplatin or Cisplatin)	Patients receiving multiple (>6) courses	Occasionally
Epipodophyllotoxins* (Etoposide or Teniposide)	Patients receiving multiple courses. Reactions with the first exposure may occur.	Very little data in the literature
Asparaginases* (Escherichia coli asparaginase, Erwinia asparaginase)	Patients receiving multiple courses; patients receiving re-induction chemotherapy	Possibility
Rituximab	Patients receiving 1 st dose. Patients with a high number (>25,000/mm ³) of circulating malignant cells or high tumor-burden	Yes
Trastuzumab	Symptoms generally occur during an infusion but onset may be after completion of an infusion. Patients with symptomatic intrinsic lung disease or with extensive tumor involvement of the lungs resulting in dyspnea at rest, may be at greatest risk of severe reactions.	Yes

* Adapted from Prevention and Management of antineoplastic-induced hypersensitivity reactions. Drug Safety 2001; 24 (10): 776 (Table VII)

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RELATED DOCUMENTS:

Patient Teaching Materials- Chemo Precautions at Home, Chemo Precautions in the Hospital

Ordering Cancer Chemotherapy Policies

Systemic Therapy Manual for Cancer Treatment

Preparation of Cancer Chemotherapy Policies

Patient Education Standards for Adults, CCNS, 2011

Provincial Cancer Drug Formulary