Clinical Guideline
PREScribing, HANDLING AND ADMINISTRATION OF CYTOTOXIC DRUGS FOR STEM CELL TRANSPLANT AND PAEDIATRIC HAEMATOLOGY & ONCOLOGY PATIENTS

SETTING
Bristol Royal Hospital for Children (BRHC), St Michael’s Hospital Neonatal Intensive Care Unit (NICU) Bristol.

FOR STAFF
All staff involved in the care and management of patients receiving chemotherapy treatment

PATIENTS
Children and young people undergoing chemotherapy treatment.

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1. **Introduction**

1. Cytotoxic drugs are also known as cancer chemotherapy or antineoplastic drugs. These names refer to a category of drugs which have the ability to kill or arrest the growth of living cells and include:
   - Conventional cytotoxic drugs, for example Cyclophosphamide and Methotrexate,
   - Monoclonal antibodies, for example Antithymocyte Globulin (ATG), Alemtuzumab (MabCampath) Rituximab.

2. Cytotoxic drugs should only be used within agreed protocols for the treatment of malignant diseases or for the management of metabolic or immune conditions such as Hemophagocytic lymphohistiocytosis (HLH), Aplastic Anaemia, Rheumatoid Arthritis, Crohn’s Disease or Lupus.

3. Cytotoxic treatment should be provided by a multidisciplinary team in which doctors, nurses and pharmacy staff work together with approved written protocols providing integrated and safe care.

4. Cytotoxic drugs and their by-products found in body fluids are potentially hazardous to the patients receiving them, their carers, health care professionals and other visitors to the clinical environment where cytotoxic drugs are used. These risks can be reduced if treatment is delivered:
   - by trained and competent staff
   - in an unhurried atmosphere
   - in normal working hours and
   - with adequate checks on patient safety at every stage.

5. These guidelines have been written using the best available current evidence and practice and aims to minimise risk to both health care professionals and patients.

6. **This Document does not cover any aspect of the prescribing, preparation, transport, administration or care of patients receiving Intrathecal Chemotherapy. National and Trust wide Intrathecal Chemotherapy Guidelines must be referred to** ([UH Bristol Medicines code chapter 14](#) and HSC 2008/001).

**FOR ADDITIONAL INFORMATION AND SUPPORT CONTACT:**

Parenteral Services Unit (PSU): Phone 24465

Paediatric Oncology Pharmacist: Bleep 2731

Practice Development Nurse: Bleep 3961
2. **Education and Training**

1. It is a requirement that nursing and medical staff who are likely to be involved in the prescribing, preparation and/or administration of cytotoxic drugs should undergo a recognised training programme.

2. This training includes knowledge of cytotoxic drug action, specific hazards associated with cytotoxic treatment, standard treatment protocols, Good Clinical Practice in research trials, legal and professional responsibilities and current safe practice guidelines.

3. Any staff member undergoing training must be supervised in their practice by a chemotherapy competent practitioner.

4. Following training, before administering chemotherapy, all staff should be assessed and reviewed for competence. Competence must be re-assessed and reconfirmed annually.

5. Each clinical area should maintain a list or register of named nursing and medical staff who have been reviewed as competent to administer chemotherapy.
3. Health and Safety

1. For healthcare personnel, the risk of exposure to potentially hazardous substances exists during drug reconstitution, preparation, administration and when dealing with the disposal of contaminated equipment or patient waste.

2. Staff working with cytotoxic drugs must be made aware and kept aware of these potential risks and how to avoid exposure and environmental contamination of these drugs (Control of substances hazardous to health COSHH 2002). For further information refer to UHBristol COSHH policy.
   • This applies to clinicians, nursing staff, pharmacy staff, domestic staff in the relevant pharmacy/clinical areas, and hospital porter’s carrying cytotoxic drugs or cytotoxic waste.

3.1 Guidelines for use of Personal Protective Equipment

1. Under the Personal Protective Equipment at Work Regulations 1992 and the Personal Protective Equipment at Work Regulations 1992 (as amended) (HSE 2017) personal protective equipment (PPE) should be provided and used wherever there are risks to health and safety that cannot be adequately controlled in other ways.

2. It is recommended that:
   • Current, local COSHH risk assessment has been carried out for the activity that might result in exposure.
   • Staff should not handle cytotoxic drugs or waste unless they understand the risks and appropriate techniques for avoiding exposure.
   • A no touch approach should be adopted when handling cytotoxic products or wastes i.e. wear appropriate disposable gloves and other PPE suitable for the task.
   • Recommendations for PPE should be adapted appropriately for people receiving cytotoxic drugs and their carers.
   • Personal Protective equipment should be available to all staff and appropriate for purpose. This consists of:
     1. Gloves
     2. Gowns
     3. Eye protection
     4. Respiratory Protection

Disposable gloves

1. Wear disposable gloves at all times when contact with cytotoxic drugs is possible e.g. preparing, handling, administering.

2. However ‘no glove material will provide unlimited protection from cytotoxic drugs’.
   Health and Safety Executive (HSE) Information Sheet MISC615.

3. Change gloves regularly and always between patients.

4. Damaged gloves should be changed immediately.

5. Wash hands properly before and after use of gloves.
6. Use of latex (or nitrile gloves) must be risk assessed due to potential for latex allergy in staff and patients (HSE Health Service Circular 1999/186)
7. There is evidence that nitrile and latex gloves offer good operator protection against cytotoxic contamination.
8. The individual practitioner’s preferences should be considered with regard to sensation and dexterity
9. For spillages, industrial thickness gloves (0.45mm) made of latex and neoprene, nitrile or synthetic rubber is recommended. Alternatively double latex or nitrile gloves can be used.

**Gowns**
1. Disposable gowns are preferred and should have:
   a. Closed front
   b. Long sleeves
   c. Elastic or knit cuffs
2. Disposable gowns should be made of Saranex coated Tyvek™, polyethylene – coated Tyvek™ or another suitable composite material which has been shown to be impermeable to cytotoxic drugs
3. Disposable plastic aprons provide limited immediate protection and prevent absorption into clothing when used where splashing or spraying is possible.

**Eye Protection**
1. Eye protection should fully enclose the eyes, meeting British Standard EN 116.
2. The most suitable form of eye protection for clinical use is safety goggles, giving the eyes protection from dust and splashes.
3. Goggles should be disposable or capable of undergoing decontamination cleaning.

### 3.2 Pregnancy
1. All staff involved in the handling, transportation or administration of chemotherapy should be informed of the potential reproductive hazards by:-
   - Information provided at induction.
   - Having access to relevant up-to-date literature.
   - Providing opportunities for discussion of concerns.
2. The time of greatest risk to the unborn child is during the first three months of pregnancy; the time of most rapid cell division and differentiation.
3. It is important that female employees inform their manager that they are pregnant, have given birth in the previous six months or are breast feeding. Those trying to conceive are encouraged to discuss their plans for pregnancy with their manager.
4. When managers receive notification they must review COSHH risk assessments. This assessment must take into account any advice provided by the pregnant staff members GP or Midwife.
5. Managers should have consideration for their staffs’ perception of the risk and offer
alternative duties if they choose not to work with cytotoxics at this time.

6. As some pregnancies are unplanned, or staff may be unwilling to discuss plans for conception; the emphasis is to reduce exposure to all staff at all times.

7. A comprehensive method of staff education and assessment in safe handling of cytotoxic drugs aims to reduce the risk for all staff.

8. Safe handling procedures must be audited and documented on a regular basis to ensure staff compliance and to reduce risks to as low as is reasonably practicable.

3.3 Breastfeeding

1. There is currently no evidence to suggest that children who are being breastfed are at any greater risk of harm if their mother is involved in handling and manipulating cytotoxic chemotherapy, or if she isn’t.

2. However, expert opinion suggests that the same recommendations for pregnancy should be followed.

4.1 Chemotherapy Treatment and Prescribing

1. The decision to treat a patient with chemotherapy should be made following an open discussion between the patient, their parent or guardian and their consultant.

2. The patient and their carers should be fully informed and understanding of the treatment, its risks and sides effects prior to giving consent.

3. Treatment options should be inline with usual practice and must be discussed at an appropriate Multidisciplinary Team Meeting (MDT). This decision must take into account what is believed to be in the best interest of the patient.

4. Only appropriately trained consultants are able to initiate chemotherapy treatment for children with cancer.

5. Only medical and nursing staff trained and assessed as competent on the chemotherapy prescribing register can prescribe chemotherapy for children with cancer.

4.2 The prescriber is responsible for:

1. Following the correct treatment protocol to ensure the correct sequencing for alternating type regimens.

2. For children with cancer ensure that cytotoxic chemotherapy is prescribed on a standard chemotherapy prescription form giving clear and concise details of the drug administration requirements.

3. Ensuring that the body surface area calculations are correct, and have been made using a recent weight (documented and dated from the previous 28 days) unless otherwise specified by the patient’s protocol.

4. Any dosage modification required due to toxicity, patient weight or age are clearly
5. Prescribing all supportive therapies including antiemetic, mesna and appropriate hydration fluids.

4.3 Individualised Chemotherapy Prescribing for Children with Cancer: Off protocol prescribing SOP

1. Patients who require cytotoxic drugs outside of standard treatment protocols must have clear guidance documented in their notes by the treating consultant.

2. Consent to individualised treatment must be obtained from the patient or guardian by the treating consultant before the start of chemotherapy.

3. Individualised chemotherapy guidance should include:
   i. Patient details; name, hospital number, date of birth.
   ii. The underlying diagnosis and indication for treating outside of standard protocols.
   iii. Reference to any research studies the treatment is based on.
   iv. The chemotherapy to be administered in each cycle including
      a) the dose based on mg per kg or mg per m²,
      b) route of administration,
      c) number of doses per day and
      d) the number of days of treatment
   v. The number and frequency of cycles of chemotherapy (e.g. 8 cycles at 3 weekly intervals).
   vi. Any supportive care requirements for the patient’s individual treatment.
   vii. Pre-treatment safety parameters are identified such as baseline blood counts, renal, cardiac or hepatic function.

4. This documentation must be signed and dated by the treating consultant and counter signed by a second prescriber or Oncology Pharmacist.
4.4 Pharmacist Responsibility

1. A pharmacist trained in screening chemotherapy should review all prescriptions for cytotoxic drugs planned for the treatment of malignant disease. This check may be done retrospectively when emergency chemotherapy is initiated outside of normal working hours.

2. Prior to a cytotoxic drug being prepared the pharmacist should verify the prescription according to the protocol or treatment regimen, clarify and resolve any discrepancies and check that:
   i. The appropriate protocol has been selected, with correct sequencing.
   ii. The body surface area calculations are appropriate, and have been made using a recent weight.
   iii. Dose modifications to previous treatments are maintained if appropriate.
   iv. All cytotoxic drugs and supportive therapies including antiemetics have been prescribed.
   v. The route of administration and duration of infusion have been specified on the prescription.
   vi. The infusion volume and diluent as well as its infusion time are appropriate with respect to the patient, protocol and pharmaceutical stability.
   vii. Ensuring that all relevant safety parameters such as complete blood counts, renal and hepatic function are reviewed and drug doses modified where necessary.
   viii. The prescription has been signed.
   ix. The prescription has the patient’s name, date of birth and unit number documented clearly on the prescription.
   x. Allergies have been documented on the drug chart.
5 Chemotherapy Preparation & Parenteral Services Unit (PSU)

1. The Parenteral Services Unit (PSU) located on Level 8, Bristol Haematology and Oncology Centre prepares and dispenses intravenous (IV) and intrathecal (IT) chemotherapy for UHBristol.

2. PSU Phone: 24465 and Email: PSUdocumentationleadtechs@uhbristol.nhs.uk

3. Oral chemotherapy should be ordered via the Oncology or BMT pharmacist through the main UHBristol pharmacy dispensary or Boots pharmacy.

4. Prescription orders should be sent to PSU at least 48 hours before the drugs are required. This enables all chemotherapy preparation to be scheduled.

5. Before sending the prescription, please ensure that the prescription is complete and includes
   a. Full patient details
   b. Protocol name and the phase of treatment for this prescription (a copy of which should be available to PSU. This enables the PSU pharmacist to do a complete second check of the prescription)
   c. The patient’s weight and surface area,
   d. The time needed (this enables PSU to organize workload and deliveries)
   e. The ward or clinic where the chemotherapy will be administered.

6. Chemotherapy treatment is a planned procedure, initiated during the normal working day (between 9am to 5pm, Monday to Friday) when more experienced staff and resources are available. The preparation of chemotherapy out of hours is not routine practice.

7. In individual cases, weekend or out of hour’s chemotherapy preparation may be required. Agreement for this must be negotiated by the patient’s consultant with the out of hour’s pharmacy service.
6 Transportation and Storage

6.1 Transportation

1. All staff involved in the transportation of cytotoxic drugs must be trained and know what to do in the event of a spillage.

2. Containers of PSU prepared cytotoxic agents must be transported in appropriately labelled, sturdy, leak proof and washable transport containers labelled as Cytotoxic. These must be suitable for the product and robust enough to withstand normal transport and handling conditions. They should also be able to be clearly distinguishable from other containers used for transporting non-chemotherapy agents.

3. Pneumatic tubes must not be used for transporting liquid cytotoxic agents.

4. If damaged or leaking cytotoxic products are received on the wards or day units, follow cytotoxic spillage procedure.

5. At delivery the cytotoxic drugs will be recorded and signed into the ward based Chemotherapy Register by the receiving staff nurse.

6. Intrathecal doses must be transported separately to all other medication. Refer to UH Bristol Medicines code chapter 14. Policy for the Safe Administration of Intrathecal Chemotherapy 2019. V:13 February 2022

M14: Policy for the safe administration of Intrathecal Chemotherapy

6.2 Storage in Clinical Areas

1. The product should be received on the ward/unit by a trained nurse who is responsible for ensuring that the contents are stored safely and appropriately (storage in refrigerator or keep at room temperature) until required for use. A record should be made and signed for in the Ward Chemotherapy Register of the date and time of receipt, the patient’s name, the individual drugs and number of bags, expiry date and where they have been stored in the chemotherapy refrigerator or room temperature cupboard.

2. Cytotoxic drugs must be stored separately from other drugs, in a designated section of a locked chemotherapy refrigerator or cupboard. Storage areas should be clearly labelled with cytotoxic warning labels.

3. If the product(s) requires refrigeration, the cold-chain should be maintained. Any refrigerators used for the storage of chemotherapy doses should be monitored at least daily to ensure that the temperature is maintained between 2 to 8 degrees centigrade (2-8°C). If the temperature deviates out of this range inform the ward pharmacist (if during normal working hours) or contact the out of hour’s pharmacist for advice.

4. Room temperature storage should be temperature monitored daily and MUST not exceed 25°C. If the temperature is showing above this inform the ward pharmacist (if during normal working hours) or contact the out of hour’s pharmacist for advice.

5. All cytotoxic chemotherapy prepared by a pharmacy department will have a shelf-life assigned to it.
6. Each patient treatment should be stored in a separate, washable, rigid containment tray. Each tray should be stored in a single layer within the locked cytotoxic cupboard or fridge. Trays should be washed with detergent, rinsed and dried after each use (BNJ, 2016: S33).

7. When retrieved from the relevant storage area, cytotoxic treatment doses should be left in the dedicated containment tray until administration (BNJ, 2016: S34)
7 Administration of Cytotoxic Chemotherapy

7.1 Patient and Family Preparation

1. The safe administration of medicines is a collaborative process which involves the nurse, doctor and pharmacist and includes making sure that the patient and family understand what medicines they are taking and why, including the likely side effects (NICE 2005 Improving Outcome Guidance (IOG))

2. The patient, parent or guardian should be informed of:
   a. The possible side effects of chemotherapy treatment
   b. How to cope with any side effects
   c. 24 hour contact phone number if their child is unwell,
   d. The types of supportive therapy they may receive,
   e. Where, when and how they are to receive the drugs.
   f. The need to use gloves when changing their child’s nappy or helping to toilet or if cleaning up vomit.
   g. That following use, the toilet should be flushed twice

3. They should receive written information, which should be used to reinforce verbal explanation and enable patients and carers to spend time reading and formulating any questions about treatment.


5. Written consent must be obtained and documented before chemotherapy is commenced and any time the patient’s treatment protocol is changed.

7.2 ‘Go ahead’ with Chemotherapy Assessment

1. Prior to chemotherapy being administered a competent doctor or Advanced Nurse Practitioner must assess and document that the patient is fit for chemotherapy. This should include the assessment and documentation of:
   i. Relevant blood results and a weight check have been taken and reviewed within 2 days of planned chemotherapy administration. However for chemotherapy administration scheduled for Monday, blood levels and weight taken on the preceding Friday are acceptable.
   ii. All blood test results are within protocol limits.
   iii. Checking relevant pre-treatment test results (as per patient treatment protocol) such as GFR, lung function, cardiac function and audiology tests and documenting the results in the patient’s notes.
   iv. For IV chemotherapy treatment, that the patient has patent and safe IV access.
   v. Ensuring that the patient is generally fit enough to receive the prescribed chemotherapy and this is documented within the patient notes and authorised on Chemocare.

2. Prior to checking and administering chemotherapy the allocated chemotherapy nurse
must ensure that there is documentation of assessment by a Doctor or Senior Nurse that the patient can go ahead with Chemotherapy. The nurse should assess that the patient’s condition has not changed, their observations are within normal limits and there is no cause for concern from the nursing assessment.

7.3 Safe Administration of Cytotoxic Drugs

1. Chemotherapy should only be given in specialist clinical areas where it is an agreed part of the ward or clinic normal activity, where appropriate support and expert advice is available. The following clinical areas may administer Chemotherapy to stem cell transplant and paediatric haematology & oncology patients: Starlight Ward, Apollo 35, Ocean Unit, Seahorse Intensive Care Unit, Coastguard Theatres.

2. Safe administration of Cytotoxic Drugs is a priority for all members of the clinical team. If any member of the team recognises factors which may contribute to an unsafe environment or workload the attending consultant and senior nurse on duty must be informed and a review and action plan instigated. Ensuring a safe chemotherapy workload SOP.

3. Chemotherapy should be prescribed to coincide with times when trained staff are available to check and administer the medicines. This should generally be during normal working hours (between 0900-1700 hours). Routine chemotherapy may be administered out of hours when the protocol schedule clearly defines administration times to be outside the scope of normal working hours (e.g. twice daily Cytarabine).

In exceptional circumstances chemotherapy administration may need to be initiated outside of normal working hours, for example

   a. When a patient’s condition or prognosis will be compromised if treatment is delayed, such as at diagnosis, relapse or treatment regimes with proven on time benefit.

   b. For all such patients, early notification of potential urgent chemotherapy administration should be part of daily chemotherapy planning and discussion between the medical staff, oncology pharmacist and the In-Charge ward nurse.

   c. There should be discussion and agreement between the senior nurse on duty and the attending consultant when chemotherapy is initiated outside of normal working hours.

   d. Plans must be in place to ensure there are trained staff to check and administer the chemotherapy and the on call doctor is aware and can support as required.

Delays caused by drug availability from PSU, time of patient’s attendance, late bed allocation or by the timing of consent and prescribing do not constitute exceptional circumstances.

4. Chemotherapy doses will be administered either by a registered nurse or doctor trained and assessed as competent in the administration of cytotoxic drugs.

5. Independent checking of chemotherapy prior to administration is required by a registered nurse or doctor who has been trained to check cytotoxic drugs.

6. Staff undergoing chemotherapy training may only give chemotherapy under direct supervision of trained and experienced staff.
7.4 **Emergency Equipment**

All areas in which cytotoxic drugs are administered must have access to the following equipment:

- Emergency bell
- Resuscitation equipment
- Drugs for the management of emergencies including cardiac arrest and anaphylaxis
- Extravasation kit (see link in section 9)
- Cytotoxic spillage kit (see link in section 11)
- Eye wash and access to running water
- Cytotoxic waste container (purple lid sharps bin).

7.5 **Prevention, recognition and management of allergic reactions including anaphylaxis**

All drugs used within chemotherapy treatment protocols have the potential to cause allergic or hypersensitivity reactions, these may vary from mild to life threatening. Key principles of care to prevent or recognise and manage drug reactions include:

- Prescribers and administrators must check the patient’s drug allergy history.
- The administrator must be aware of the potential reaction profile of each drug and administer any drug with a high risk of reaction with caution (e.g. Asparaginase, Rituximab)
- Ensure emergency equipment and medications are readily available.
- Base line observations should be taken and recorded prior to administration.
- Ensure any pre-medication is given as per patient’s protocol
- Patient and carer should be informed of the potential for drug reactions or allergies and asked to report any unusual symptoms during the infusion such as;
  - Uneasiness or agitation, abdominal cramping, itching, chest tightness, light-headedness, dizziness, confusion, chills, rash, urticaria, severe nausea or vomiting.
- If patient experiences any of the above symptoms;
  - Stop the infusion and notify the doctor urgently
  - Assess the patient as per resuscitation guidelines and monitor and record patient’s observations.
- If patient is collapsed or has the following symptoms; stridor, wheeze, respiratory distress or clinical signs of shock
  - DIAL 2222

7.6 The Nursing Role in Chemotherapy Administration

Administration of chemotherapy SOP

1. Responsibilities of the patient’s allocated nurse:
   a) On admission, prior to initiation of hydration fluids, the patient should be weighed and this recorded in the patient notes and checked against the prescription weight.
   b) Discuss with medical staff if there is a significant change in the current weight and the prescription weight.
   c) Liaison with PSU to ensure cytotoxic drugs are prepared and delivered at the appropriate time.
   d) Ensure trained chemotherapy staff are available to check and administer the prescribed drugs.
   e) The patient is assessed fit for chemotherapy by the designated practitioner.
   f) Providing information, ongoing monitoring and supportive care of the patient before, during and after chemotherapy administration.

2. The chemotherapy giver must only proceed to administer chemotherapy if it is safe to do so. This includes confirming:
   a) Emergency equipment is available (see section 7.4)
   b) The patient is fit and willing to proceed, and has had no previous reactions to the prescribed drugs,
   c) IV access is available and patent,
   d) The correct chemotherapy is available in the clinical area in accordance with the patients named protocol and prescription.

7.7 Verification of prescribed chemotherapy prior to administration by the chemotherapy giver and checker

1. Carry out a full set of observations and weight. Review with medical staff if patient is unwell or you have any concerns.
2. Discuss individual antiemetic requirements with patient and family and ask if antiemetics were given prior to admission.
3. Confirm required anti-emetics have been prescribed on the regular drug chart and have been administered least 30 minutes prior to chemotherapy.
4. Check spill kit and extravasation kits are available
5. Ensure that the patient has been assessed as ‘Fit for Chemotherapy’.
6. Confirm the patient details (name, hospital number, date of birth) correspond with the prescription chart.
7. Confirm the patient and family have consented to treatment protocol.
8. Identify correct treatment protocol and cycle of treatment as per documentation on chemotherapy prescription.
9. Check the prescription drugs, doses, schedule and supportive care with patients allocated clinical trial or treatment guideline.
10. Ensure that the patient weight is correct and up to date (within the last 4 weeks unless specified by the protocol). Discuss with medical staff if there is greater than 5% difference
in required dose and prescribed dose due to patient weight change.

11. Independently verify drugs and calculations used to determine chemotherapy doses e.g. Body Surface Area (dose/m²) or dose/kg. Any dose or protocol modifications are clearly documented and correct.

12. Confirm all tests specified by the protocol have been carried out and the results fall within the agreed protocol parameters.
   - Abnormal values to be checked with medical staff for go ahead or delay and such decisions to be documented in medical notes.

13. When protocol contains pre-medications e.g. cover, hydration fluids, mesna, ensure that these are prescribed and given in line with the protocol.

14. Check start date of the regimen and confirm with the date of the last cycle.

15. The prescription has been signed.

16. Two competent practitioners to check the chemotherapy prescription and chemotherapy drugs to include:
   - patient name and hospital number
   - the correct drug and diluents and dilution volumes
   - confirm that the patient has not had any previous reactions to the prescribed drugs
   - Drug dose, route and rate
   - Cycle number
   - The administration as per the schedule within the cycle
   - Check expiry date has not passed

A full check must then be undertaken at the patient’s bedside to confirm the patient’s details with the prescription and cytotoxic drug including that correct rate is set.

7.8 Route of Administration for Chemotherapy

1. Cytotoxic drugs can be administered by a variety of routes.

2. The correct administration route and schedule is vital to the safety and efficacy of the drug and also in toxicity management.

7.9 Intravenous (IV)

1. Cytotoxic drug administration via a peripheral or central vein is the most commonly used route. IV administration allows rapid and reliable delivery of the cytotoxic drug to the tumour site and rapid drug dilution thus reducing local irritation and tissue damage.

2. Selection of the most appropriate intravenous access for the patient should be made prior to prescribing chemotherapy.

3. A Central Venous Catheter (CVC) may be appropriate if cytotoxic drugs are:
   - to be administered over an extended period of time
   - to be given to a patient who has limited peripheral access sites or is needle phobic.
   - highly irritant/vesicant drugs
Prior to administration of chemotherapy the CVC should be accessed and assessed for blood return and that individual lumens flush without resistance. If there is any difficulty aspirating blood, blood samples are observed to be dilute, increased swelling around the line site, significant pain or the patient’s condition deteriorates, stop using CVC ask for a medical review and discuss with the surgical team if imaging is required.

4. A peripheral cannula can be used for bolus injections and short infusions of both vesicant and non vesicant drugs.

   1. Small gauge cannulas are recommended as they enable good blood flow around the cannula during drug administration and help preserve vein integrity.

   2. The site of cannulation is very important. The site of choice is normally the large veins in the forearm, followed by the dorsum of the hand, then the wrist.

   3. Areas to avoid include the antecubital fossa region, areas on joint flexion, lower limbs and sites distal to recent cannulation, surgery, radiotherapy or venepuncture.

   4. The vein should always be palpated before cannulation is attempted. Bruised or inflamed areas should be avoided. Ideally, the vein should be distal, visible, palpable and superficial.

   5. A competent practitioner should only have two to three attempts to cannulate a patient and then seek assistance from an experienced colleague.

7.10 Administration of Peripheral Vesicant Cytotoxic Drugs

   1. Only senior medical staff and specialist nurses trained and assessed as competent in the administration of peripheral vesicant chemotherapy can cannulate and then administer peripheral vesicant chemotherapy within paediatric services.

   2. Vesicant cytotoxic drugs must only be administered using a newly established and patent cannula or butterfly needle.

   3. Any patient receiving an infusion of vesicant chemotherapy via peripheral access must have continuous monitoring to check for any signs or symptoms of extravasation.

   4. In the event of a suspected or actual extravasation injury, refer to the Extravasation guidelines (Section 9).

7.11 Administration of Non-Vesicant Cytotoxic Drugs

   1. Non-vesicant cytotoxic drugs can be administered using an established peripheral cannula providing the IV access has been assessed as patent.

   2. Bolus or short infusions of non-vesicant cytotoxic drugs can be administered via peripheral access either by a registered nurse or doctor trained and assessed as competent in the administration of cytotoxic drugs.
7.12 Principles for the safe administration of chemotherapy using the ChemoSAFE Spiros System

7.12.1 For intravenous chemotherapy in a bag

The 3 products that make up the system are:

**CLAVE Bag Spike, Product Code CH-14.**
This to be added to a prime/flush bag plus each of the bags of chemotherapy.

**Bag Spike Adaptor with Spiros, Product Code CH3034.** This to be added onto spike of infusion set.

**Spiros Closed Male Luer, Product Code CH2000S-C.** This to be added onto patient end of infusion set.

- Spike the prime/flush bag (usually 0.9% Sodium Chloride) with CLAVE bag spike.
- **Clean CLAVE bag spike for 15 seconds** with a 2% chlorhexidine 70% alcohol wipe and allow drying for a minimum of 30 seconds. Do not touch the key part.
- Remove white protective cap from end of Bag Spike Adaptor with Spiros (Spiros Adaptor) and add onto the spike of the infusion set, making sure the tubing of the Spiros is pushed right to the base of the infusion set. Do not contaminate the top of the Spiros connector, **if you do, clean Spiros** with 2% chlorhexidine70% alcohol wipe and allow to dry.
- Attach Spiros to the CLAVE bag spike and prime the infusion set by first inverting the drip chamber until it is filled to the level of the line (half full). Then return drip chamber to right side up and slowly prime the rest of the infusion set making sure there are no air bubbles.
- Prime Spiros Closed Male Luer (CH2000S-C) with sodium chloride using a slip lock syringe then attach to patient end of the infusion set.
• If Etoposide is to be infused connect an anti-siphon valve to the end of the infusion set.

• Attach date and time sticker to flush bag and infusion set.

• Check chemotherapy as per guidelines and then spike the chemotherapy bag with a new CLAVE bag spike. Do this below eye height and over a plastic tray.

• **Scrub CLAVE bag spike on chemotherapy bag for 15 seconds** with 2% chlorhexidine 70% alcohol wipe and allow to dry for 30 seconds.

• Take prime/flush bag connected to the infusion set down from drip stand. Remove the Spiros from the CLAVE spike. Be aware that the Spiros spins so hold the Spiros connector, not the tubing.

• Again working over a tray, attach CLAVE bag spike of chemotherapy bag to Spiros and infusion set.

• Go to your patient and carry out complete chemotherapy checks as per guidelines. Then connect chemotherapy infusion set to patient.

• Once the correct infusion rate has been set, also set a volume to be infused at 5-10ml less that the chemotherapy bag volume. This is to reduce the risk of air infusing into the infusion set.

• Once the chemotherapy infusion has completed **clean the Clave bag spike of the prime/flush bag** with 2% chlorhexidine 70% alcohol.

• Take down empty chemotherapy bag, disconnect the Spiros and attach to Clave spike in the prime/flush bag, 

• **DO NOT TOP UP THE DRIP CHAMBER AS THIS WILL PUSH CHEMOTHERAPY INTO THE FLUSH BAG.**

• If giving second and additional chemotherapy, following checking procedure spike chemotherapy bag with Clave spike over a plastic tray.

• At the patient’s bedside, **clean chemotherapy Clave spike**, disconnect Spiros infusion set from prime/flush bag and connect to chemotherapy Clave spike. Do this over a tray.

• Now set up chemotherapy infusion remembering to set volume limit at 5-10ml less
than the infusion volume.

7.12.2 For bolus intravenous chemotherapy in a syringe

- Check Chemotherapy as per protocol.
- Connect Syringe Spiros to slip lock sodium chloride syringe, invert so that the Syringe Spiros is at the bottom. Pull back air into syringe, this will prime Syringe Spiros.
- Remove Syringe Spiros from sodium chloride syringe and connect to Chemotherapy syringe ensuring it is on securely, it will lock on permanently (pull horizontally to check).

- Check correct patient & Chemotherapy at the bedside
- Attach the Syringe Spiros to the bung on the end of the patient’s line, pull back to ensure any remaining air locks are removed.
- Administer the bolus Chemotherapy.
- Flush the line afterwards as normal and lock patient’s line
- Dispose of empty chemotherapy syringe into chemotherapy sharps bin.

7.12.3 For infusing Cytotoxic drugs via a syringe driver e.g. Busulfan, Ganciclovir

Syringes should not be used routinely for chemotherapy infusions.

However for small volume infusions i.e. less than 20ml, administration using a syringe and syringe driver is the safest practice.

Never decant the contents of a syringe of chemotherapy into a burette set or infusion bag.

- Check chemotherapy as per protocol.
- Attach a MicroCLAVE bung to the end of the extension set and then prime set (E87-PCA extension set with antisiphon valve, ref: 71.4485. Length 150cm. Volume 1.15ml) with compatible fluid e.g. 0.9% Sodium Chloride.
- Connect Syringe Spiros to slip lock sodium chloride syringe, invert so that the Syringe Spiros is at the bottom. Pull back air into syringe, this will prime Syringe Spiros.
- Remove Syringe Spiros from sodium chloride syringe and connect to Chemotherapy
syringe ensuring it is on securely, it will lock on permanently (pull horizontally to check).

- Connect the chemotherapy syringe to the primed giving set, away from the patient and over a plastic tray.

- Check correct patient & chemotherapy at the bedside and confirm rate as per protocol.

- **DO NOT FAST PRIME.**

- When infusion is complete, remove empty chemotherapy syringe over a blue tray and connect flush (3ml volume) leur lock syringe.

- Dispose of empty chemotherapy syringe into chemotherapy sharps bin.

- Once flush is complete, flush and lock patient’s lumen.

- Dispose of giving set and syringe into purple lidded (chemotherapy) sharps bin.
7.13 Procedure for fast priming small volume drugs

1. A 15mL volume limit has been set for ‘fast priming’ chemotherapy. Due to the turbulence of the infusion within a giving set some of the drug reaches the patient at 15ml even though the actual prime and flush volume for Fresenius Kabi infusion sets is 25ml.
2. Prime infusion set with appropriate solution.
3. Attach chemotherapy bag to giving set as per guidelines.
4. Follow procedure for checking patient and IV access with the chemotherapy checker.
5. **Set a volume limit of 15mL** on the infusion pump.
6. Set an appropriate rate to fast prime the 15mL of chemotherapy.
7. **DO NOT LEAVE THE PATIENT DURING THIS TIME.**
8. Once 15mL volume limit complete, set prescribed rate of infusion and confirm with the chemotherapy checker.

7.14 Oral administration of cytotoxic drugs

1. Only staff who are trained and assessed as competent in the administration of chemotherapy should administer oral chemotherapy.
2. Patients, parents or carers who are required to administer oral chemotherapy must be trained in safe practice. This includes storage, administration and waste disposal measures. [Oral chemotherapy teaching pack](#)
3. Appropriate personal protective equipment must be worn. As a minimum requirement gloves must be worn when checking and administering tablets/capsules.

**Please note that tablets and capsules must NOT be crushed or broken.**

4. As a general rule tablets should not be cut. If the dose prescribed for the patient is not able to be given using whole tablets then a review of the prescription should be made in consultation with the pharmacist. It may be possible to adjust the prescription to give different doses in a split schedule (e.g. 16mg in the morning and 18mg in the evening equals a daily total dose of 34mg). Check with pharmacy that the drug does not already come in a more appropriate (e.g. liquid) form.
5. If there is no alternative found, the oncology pharmacist and a senior chemotherapy nurse must be contacted for advice to identify the most appropriate safe practice.
6. Any spillage should be dealt with as per spillage procedure (section 12).
7. Any equipment used during the checking, preparation and administration of oral chemotherapy must be disposed of in a cytotoxic waste container.

7.15 Intramuscular (IM) and subcutaneous (SC) injection

1. Only staff who are trained and assessed as competent in the administration of chemotherapy should administer IM or SC chemotherapy.
2. Appropriate personal protective equipment must be worn (gloves, apron).
3. Ensure age appropriate preparation and support provided to patient and family.
5. Dispose of all equipment into a cytotoxic waste container.

8 GUIDELINES FOR CHEMOTHERAPY ADMINISTRATION OUTSIDE OF DESIGNATED ONCOLOGY WARDS

It has been agreed that the following clinical areas are designated for Chemotherapy administration to stem cell transplant and paediatric haematology & oncology patients: Starlight Ward, Apollo 35, Ocean Day Unit, Seahorse Intensive Care Unit, Coastguard Theatres.

For patients who are located outside of the designated chemotherapy areas agreement should be reached between the attending consultant, the Senior Oncology, Haematology & SCT Nurse on Duty and the Senior Nurse on Duty for the clinical area where the patient resides. This agreement should take into account that this:

- is the safest place for the patient to receive care,
- that chemotherapy cannot be delayed until the patient moves to a designated chemotherapy area,
- that the parents, carers and nursing staff caring for the patient are made aware of safe handling of bodily fluids and management of a cytotoxic spill along with specific care guidance for the treatment protocol
- that trained chemotherapy nurses are available to check and administer the chemotherapy while the patient resides outside of a designated chemotherapy area.
- The above agreement and those involved should be documented in the patient notes

8.1 Chemotherapy management and administration for Renal, Neurology, Rheumatology and Gastroenterology patients

1. Individual clinical areas are responsible to ensure staff are trained and competent in safe practice and administration of standard chemotherapy regimes. This includes maintaining an up to date register of staff that are competent to administer chemotherapy.

2. Regular Cytotoxic Study Days are facilitated by the Practice Development Nurse for Paediatric Oncology (bleep 3961).

3. Cytotoxic Training includes:
   - Safe handling of cytotoxic drugs
   - Patient information
   - Cytotoxic drugs; how they work and the side effects
   - Protocol and prescription requirements
   - Good Clinical Practice guidelines for research studies
   - Legal and professional issues
   - Safe administration of cytotoxic drugs
   - Adverse reactions
   (RCN Competencies 2005: an integrated competency framework for training programmes in the safe administration of chemotherapy to children and young
4. If there are no chemotherapy competent staff available in the clinical area the patient is being cared for, the senior nurse should liaise (at least 24 hours in advance) with Oncology wards for trained staff members to check and administer the prescribed drugs.

5. Prior to chemotherapy trained staff arriving to check and administer chemotherapy, the following should be available:
   - Protocol for prescribed drug (this needs to include any baseline checks such as blood levels, additional supportive treatment, hydration fluids and dosage of drug)
   - The patient and/or family/carers have been informed about the treatment and the potential side effects and agree to go ahead.
   - Patient notes with clear documentation from senior medical officer or designated nurse specialist that the patient is well enough to receive the drug on the prescribed date
   - Clear and legal prescription (to include patient name, hospital number, date of birth, current weight, drug name, route of administration (if IV: whether infusion or bolus), dose, date required and a signature
   - Any relevant supportive medication prescribed and given e.g. anti emetics, steroids, fluids.
   - A cytotoxic spill kit
   - An extravasation kit if there is a vesicant drug being given.

6. If the patient or a family member is to administer the drug, this should be clearly documented on the prescription chart.

**Intravenous chemotherapy treatment should not be initiated outside of normal working hours (Monday to Friday, 0900 to 1700hrs), unless there are clear and documented indications to do so.**

9  **EXTRAVASATION IN PAEDIATRIC PATIENTS**

Please see Extravasation SOP number 5.43 at the following link: [Extravasation of chemotherapy in paediatric patients](#)

10  **DISPOSAL OF CYTOTOXIC WASTE.**

The recommendations in this section act as a guide, and are supplementary to those detailed in UHBristol Trust Waste Disposal policies.

10.1 Used Equipment

1. While wearing gloves and apron place any needles, syringes, giving sets, empty ampoules/vials or infusion bags into an appropriate rigid sharps disposal box with purple lid.

2. The sharps disposal box with purple lid should be clearly labelled as cytotoxic waste so it can be incinerated at 1000°C to ensure degradation of the cytotoxic agent.
3. Sharps disposal boxes containing cytotoxic waste must be regularly collected.

4. After a cytotoxic spillage arrangements must be made for immediate collection and the incineration of the rigid sharps bin containing all material used for cleaning the contaminated area.

5. Re-usable plastic trays should be rinsed with water and then washed with detergent and hot water.

6. Protective clothing, wipes, aprons and gloves worn during the administration of chemotherapy should be placed in a clinical waste bag.

10.2 Part Used IV Doses

1. While still wearing protective clothing, cap any syringes.

2. If disposing of an infusion bag leave the giving set in place and clamp it off. Place the syringe/bag in a yellow bag and place into a rigid sharps box with purple lid.

3. These should be labelled as cytotoxic waste and sent for incineration.

4. It should be clearly documented how much of the dose was administered and the reasons for discontinuation of treatment.

5. Medical staff and oncology pharmacist/PSU should also be notified.

10.3 Unused Oral Doses

1. Any unused oral doses (e.g. tablets that have been dropped or oral liquids that have been refused etc) should be disposed of in a cytotoxic sharps box.

2. To minimise the risk of damage and potential contamination, they should be discarded as follows:
   a. *Loose tablets/capsules*: Put into a sealable plastic bag (e.g. pathology sample bag) or a medicine bottle / sample pot securing the lid, before placing in a cytotoxic sharps box.
   b. *Oral liquids*: Pour into a medicine bottle / sample pot securing the lid, before placing in a cytotoxic sharps box.

3. Patients should be encouraged to return any unused medicines to the hospital pharmacy for destruction.

10.4 Patient Waste/Body Fluids

1. Personal protective clothing (i.e. plastic apron and gloves) must be worn when dealing with blood, vomit or excreta from all patients.

2. Patient waste/body fluids e.g. urine, faeces, vomit may contain high concentrations of cytotoxic drugs or active metabolites both during administration and up to 7 days after treatment has ceased (Oncology Nursing Society 2011). Particular care should be taken with patients receiving high dose chemotherapy.

3. It has been shown that these unchanged cytotoxic drugs or active metabolites can be irritant to the skin, eyes and mucous membranes. Although evidence of long-term
toxicity is inconclusive and conflicting, all staff and family members handling patient waste should take reasonable precautions to limit exposure and ensure absorption does not occur.

4. Parents or carers should be advised to wear gloves when managing body waste from a child treated with chemotherapy in the last 7 days.
5. All body fluids (urine, faeces, vomit) should be disposed of as soon as possible.
6. Any spillage of body fluids should be managed according to the Chemotherapy Spillage policy.
7. Disposable items, (e.g. bedpans, urinals, vomit bowls, incontinence pads and nappies) are recommended over re-useable one
8. In the hospital staff and carers should utilise different toilet facilities from patients.
9. Male patients should be encouraged to urinate whilst sitting on the toilet, to minimise splashing.
10. The toilet lid should be replaced before flushing to minimise aerosol dispersal and patients should be encouraged to double-flush the toilet. This procedure should be followed for at least 48 hours after any cytotoxic chemotherapy administration.
11. Other users of the patient’s toilet at home should be reassured that there is minimal risk under normal circumstances. No other precautions should be needed.
12. Soiled bedding and linen should be treated and handled as infected linen, double bagged and sent to the hospital laundry according to the procedures described in the UHBristol Infection Control Policy.

10.5 Personal Accidents Involving Cytotoxic Drugs & Contaminated Patient Waste

1. If a patient, member of staff or visitor is involved in a spillage of cytotoxic drugs or potentially contaminated patient waste the following procedures must be followed.

2. All such events/accidents should be reported to a senior member of staff and fully documented via the online UHBristol Incident reporting system.

10.6 Skin

1. Remove any contaminated clothing immediately.
2. The contaminant must be removed as rapidly as possible by flushing the affected area with a large volume of cold water. If running water is not immediately available, bottles or bags of sterile water or normal saline should be kept as an alternative.
3. After initial copious flushing with water, the contaminated skin should be thoroughly washed with liquid soap or antiseptic scrub and water. After rinsing, the process should be repeated.
4. In the event of a needlestick injury, encourage the area to bleed.
5. Ward shower facilities should be used if large areas of skin are contaminated.
6. Do not use hand creams and emollients as these may aid absorption of the drug.
7. Medical attention must be sought from the nearest Accident & Emergency Department and treated accordingly following details listed in COSHH monographs.
8. An adverse incident report form must be completed and the Head of Department &
Occupational Health informed.

9. Generally, systemic absorption from such an injury will be negligible, although local irritation may occur.

10.7 Eyes

1. The contaminant must be removed as rapidly as possible by flushing the eyes and surrounding areas with a large volume of sterile sodium chloride 0.9%. Alternatively cold tap water can be used if necessary.

2. Medical attention must be sought immediately from the nearest Accident & Emergency Department.

3. An adverse incident report form must be completed and the Head of Department & Occupational Health informed.

10.8 Clothing

1. Disposable gloves and appropriate PPE should be worn when handling any cytotoxic spillage. Any contaminated clothing must be removed immediately.

2. Uniforms or hospital linen should be double bagged in an appropriate, leak-proof polythene laundry bags and sent to the hospital laundry according to the procedures described in the UHBristol Trust Infection Control Policy Manual.

3. If the spillage is excessive, dispose of the garments in a cytotoxic sharps bin.

10.9 Needlestick injuries

Follow UHBristol Needle Stick Injury procedure.

Sharp instruments policy
11 CYTOTOXIC SPILLAGE (includes drug and body fluids spills)

11.1 CONTENTS OF CYTOTOXIC SPILLAGE KIT
- Neoprene (Latex-free) protective gloves x 1 pair
- Yellow protective over gloves x 1 pair
- Protective gown x 1
- Respirator facemask x 1
- Safety goggles x 1 pair
- Overshoes x 1 pair
- Chemo Sorb pad x 1
- Cleaning cloths x 3
- Waste bag (grey/blue) x 1
- Cytotoxic waste bag (white) x 1
- Bag lock ties x 2

ADDITIONAL ITEMS
- Bottled sterile water 1000ml x 1
- Laminated copy of procedure x 1

11.2 PROCEDURE

1. Ensure prompt action: inform anyone in the vicinity immediately, clear and isolate area.

2. Obtain nearest Cytotoxic Drug Spillage Kit. Open along perforations on the right hand side, retaining the carton to use as a shovel and sweeper.

3. Put on overshoes, gown, Neoprene (Latex-free) protective gloves (ensure glove cuff cover the gown cuff), facemask (secure by pulling the two ends of the rubber band), goggles and yellow over gloves.

4. Use the shovel and sweeper to remove any contaminated packaging, and place in the grey/blue waste bag.

5. Place the Chemo Sorb pad over the spill. The pad will bond with the liquid to form a gel, within a short time. Use the shovel and sweeper to remove the pad and put in the grey/ blue waste bag along with the shovel and sweeper.

6. Starting with the outer edge of the spillage and working inwards, to minimise spreading, absorb any remaining spillage using cleaning cloths. Place contaminated wipes in the grey/ blue waste bag.

7. Once spillage has been removed, wash contaminated area with large amounts of water, wipe dry with cleaning cloths and place in grey/ blue waste bag.

8. Remove yellow over gloves (only) and place in grey/ blue waste bag. Seal the bag using the lock tie.

9. Place the grey/ blue waste bag into the cytotoxic waste bag (white), followed by the overshoes, goggles, Neoprene (Latex-free) protective gloves, facemask and gown. Close and seal the cytotoxic waste bag with the second lock tie.

10. Inform manager/supervisor that spill has been cleared. Manager to assess any further action.
required.

11. Put sealed cytotoxic waste bag into large cytotoxic sharps bin and seal. Dispose of cytotoxic sharps bin by contacting house porter on bleep 2471 to collect the sharps bin and take it to pharmacy distribution for destruction.

12. If spillage is on skin or clothing, remove clothing immediately, wash area with soap and water. Refer to section 11.5 Personal accidents for further information.

13. Wash hands thoroughly.

14. If contamination of skin, eyes or mucous membranes occurs or is suspected, the area should be rinsed thoroughly with large amounts of water and then washed with soap and water. Any direct skin or tissue contact with cytotoxic agent must be reported to Occupational Health.

15. After any spillage, inform manager and complete a non-clinical incident form. (DO NOT use the forms enclosed in this kit).

16. Contact PSU on ext: 24465 to obtain a new cytotoxic spillage kit.

12 Anti Emetic Guidelines for Paediatric Haematology & Oncology and Stem Cell Transplant Patients

Anti Emetic Guidelines for Paediatric Haematology Oncology and Stem Cell Transplant Patients Clinical guideline

13 Methylene Blue Rescue for Ifosfamide

Methylene Blue clinical guideline
### 14 BSA table for use with chemo care prescriptions only

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