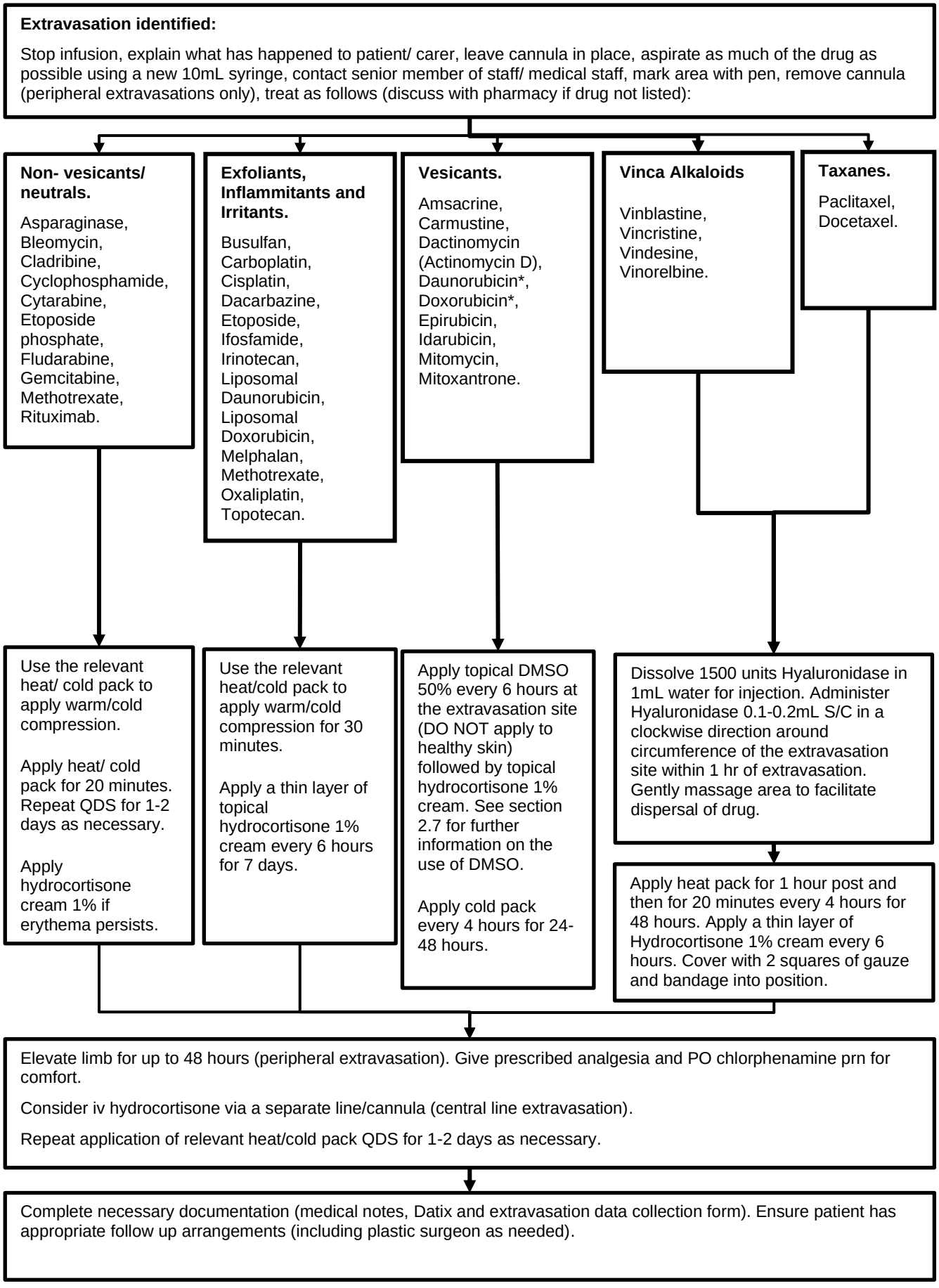
Royal Cornwall Hospitals
NHS Trust

Extravasation of Systemic Anti- Cancer Therapy (SACT) in Children Clinical Guideline

V5.0

May 2025

Summary


Extravasation identified:
Stop infusion, explain what has happened to patient/ carer, leave cannula in place, aspirate as much of the drug as possible using a new 10mL syringe, contact senior member of staff/ medical staff, mark area with pen, remove cannula (peripheral extravasations only), treat as follows (discuss with pharmacy if drug not listed):
Non- vesicants/ neutrals.
Asparaginase, Bleomycin, Cladribine, Cyclophosphamide, Cytarabine, Etoposide phosphate, Fludarabine, Gemcitabine, Methotrexate, Rituximab.
Exfoliants, Inflammitants and Irritants.
Busulfan, Carboplatin, Cisplatin, Dacarbazine, Etoposide, Ifosfamide, Irinotecan, Liposomal Daunorubicin, Liposomal Doxorubicin, Melphalan, Methotrexate, Oxaliplatin, Topotecan.
Vesicants.
Amsacrine, Carmustine, Dactinomycin (Actinomycin D), Daunorubicin*, Doxorubicin*, Epirubicin, Idarubicin, Mitomycin, Mitoxantrone.
Vinca Alkaloids
Vinblastine, Vincristine, Vindesine, Vinorelbine.
Taxanes.
Paclitaxel, Docetaxel.
Use the relevant heat/ cold pack to apply warm/cold compression.
Apply heat/ cold pack for 20 minutes. Repeat QDS for 1-2 days as necessary.
Apply hydrocortisone cream 1% if erythema persists.
Use the relevant heat/cold pack to apply warm/cold compression for 30 minutes.
Apply a thin layer of topical hydrocortisone 1% cream every 6 hours for 7 days.
Apply topical DMSO 50% every 6 hours at the extravasation site (DO NOT apply to healthy skin) followed by topical hydrocortisone 1% cream. See section 2.7 for further information on the use of DMSO.
Apply cold pack every 4 hours for 24-48 hours.
Dissolve 1500 units Hyaluronidase in 1mL water for injection. Administer Hyaluronidase 0.1-0.2mL S/C in a clockwise direction around circumference of the extravasation site within 1 hr of extravasation. Gently massage area to facilitate dispersal of drug.
Apply heat pack for 1 hour post and then for 20 minutes every 4 hours for 48 hours. Apply a thin layer of Hydrocortisone 1% cream every 6 hours. Cover with 2 squares of gauze and bandage into position.
Elevate limb for up to 48 hours (peripheral extravasation). Give prescribed analgesia and PO chlorphenamine prn for comfort.
Consider iv hydrocortisone via a separate line/cannula (central line extravasation).
Repeat application of relevant heat/cold pack QDS for 1-2 days as necessary.
Complete necessary documentation (medical notes, Datix and extravasation data collection form). Ensure patient has appropriate follow up arrangements (including plastic surgeon as needed).

1. Aim/Purpose of this Guideline

1.1. This document outlines guidelines for the rapid treatment of extravasation injuries in paediatric patients within Royal Cornwall Hospital Trust, excluding neonates, for which there is a separate policy.

1.2. It provides a guideline to assist practitioners in the care of patients who may have experienced an extravasation injury.

1.3. It will provide a basis for the nursing staff to recognise ways in which to help prevent extravasation and how to recognise when an extravasation has occurred.

1.4. This version supersedes any previous versions of this document.

Data Protection Act 2018 (UK General Data Protection Regulation – GDPR) Legislation.

The Trust has a duty under the Data Protection Act 2018 and UK General Data Protection Regulations 2016/679 to ensure that there is a valid legal basis to process personal and sensitive data. The legal basis for processing must be identified and documented before the processing begins. In many cases we may need consent; this must be explicit, informed, and documented. We cannot rely on opt out, it must be opt in.

Data Protection Act 2018 and UK General Data Protection Regulations 2016/679 is applicable to all staff; this includes those working as contractors and providers of services.

For more information about your obligations under the Data Protection Act 2018 and UK General Data Protection Regulations 2016/679 please see the Information Use Framework Policy or contact the Information Governance Team.

Royal Cornwall Hospital Trust rch-tr.infogov@nhs.net

2. The Guidance

2.1. **Definitions**

- Extravasation is the leakage or accidental infiltration of intravenous drugs into the surrounding tissues from the vein. This can lead to an immediate inflammatory painful reaction and with some drugs may result in local tissue destruction (necrosis) and other complications.
  - Neutrals do not cause ulceration and are unlikely to produce an acute reaction or progress to necrosis.
  - Irritants are capable of causing inflammation and irritation. They rarely proceed to the breakdown of tissues. They do have the potential to cause ulceration, but only if a large amount has extravasated into the tissue.
  - Exfoliants are capable of causing inflammation and shedding of the skin but are less likely to cause tissue death. They can cause pain

- Vesicants are drugs that have the potential to cause blistering and ulceration, which when left untreated can lead to tissue damage and necrosis.

- It is recognised that prevention of extravasation is of importance and particularly when administering vesicants or irritants the precautions should be taken to minimise the risk of extravasation, see appendix 5.

- It is accepted that there are also other contributing factors that can affect each individual patient's risk of extravasation.

- There are many different drugs that can equally be as destructive in the damage that they can cause if extravasation occurs, the main bulk of this document relates to Systemic Anti-Cancer Therapy (SACT), but the procedure outlined can be used for all vesicant drugs. Please note that there is a separate guideline for the extravasation of non-SACT drugs in the neonate.

- SACT has been grouped into 5 categories based on potential to cause tissue damage, see appendix 3.

2.2. Ward requirements

2.2.1. Each clinical area where vesicant SACT are administered must have a paediatric extravasation kit available (i.e., paediatric oncology unit and Gwithian Unit).

2.2.1.1. Weekly checks of the extravasation kit are the responsibility of the ward manager/ Paediatric Oncology Outreach Nurses (POONs)/ Lead chemotherapy nurse. This requires a check of the contents and the expiry date and includes checking Dimethyl Sulfoxide (DMSO) which is stored outside of the extravasation kit. It is the responsibility of the staff listed above to delegate this task to a suitably trained member of staff if required.

2.2.1.2. Gwithian: POONs check weekly.

2.2.2. Paediatric Oncology Unit: Ward manager delegates to identified Senior Staff nurse for weekly checks who delegates to other member of staff when on leave.

2.2.3. Replacement paediatric extravasation kits are available from pharmacy

2.3. Monitoring

During administration of intravenous medication, the injection site should be clearly visible and monitored for redness and swelling regularly (see Appendix 5: "Guidelines for best practice" for more detailed information on monitoring requirements).

2.4. Patient Education

2.4.1. Patients/ parents/ guardians should be educated to the fact that extravasation is a potential risk of receiving SACT when consent is

obtained.

2.4.2. Patient preference to cannulation site (if required) should be considered, but education given as to why good placement and rotation of site is required.

2.4.3. Education should encourage patients and their carers to inform nursing staff if they have pain, stinging, burning or a change in sensation at cannulation site from start of the infusion.

2.4.4. In the event of an extravasation patients (if appropriate) and their carers should be provided with both verbal and written information. If moderate harm occurs due to an extravasation this will require verbal and written duty of candour to be completed and documented followed by an incident review by the care group governance team.

2.5. Signs and Symptoms

An extravasation should be suspected if one or more of the following symptoms have occurred:

2.5.1. The patient complains of burning, stinging, pain or any discomfort at the injection site. This should be distinguished from a feeling of cold that may occur with some drugs. The patient is often the first person to become aware that something is wrong with the IV therapy, so instruct them (or their carer) at the beginning of treatment to inform staff of any acute change during treatment.

2.5.2. Observation of swelling, redness, mottling or blistering at the injection site. This should be distinguished from the ‘nettle rash’ or ‘flare’ effect seen with some drugs.

2.5.3. Care should be taken when no ‘flash back’ or blood return is obtained on aspiration. However, this is not a sign of extravasation if found in isolation and the presence of blood does not exclude extravasation. If this occurs re-assessment of patency should be carried out.

2.5.4. There is increased resistance felt on the plunger of the syringe of a bolus drug administration, this however, could be due to possible changes in the position of the body.

2.5.5. There is absence of free flow or the rate of flow is remarkably reduced. This may not be recognisable when using an infusion pump.

2.5.6. Extravasation from central venous access devices: PICC’s, Hickman Lines and portacaths.

2.5.6.1. Although less likely to occur an extravasation occurring from an indwelling central line can be particularly problematic because of the depth of the line and the potential of slower development of signs and symptoms.

2.5.6.2. Extravasation can either occur in the tunnelled section or in the deep section of the implanted line.

2.5.6.3. Extravasation can occur due to fracture of the catheter, perforation of the superior vena cava, formation of a fibrin sheath on catheter or incomplete placement or dislodgement of the needle.

2.6. Treatment of Extravasation – Peripheral and Central lines

See table below and summary page at beginning of this guideline.

Action.	Rationale.
Stop the administration of the cytotoxic drug immediately, leaving the cannula/line in place.	To prevent further infiltration and to allow aspiration of the drug to be attempted (see below).
Explain what has been suspected of happening and next procedure to the patient/ parent/ guardian.	To obtain patient's and/ or carer's co-operation and consent.
Disconnect any IV tubing from the intravenous cannula/ CVC (central venous catheter). **DO NOT** remove the cannula. Attempt to aspirate as much drug as possible with a new syringe by withdrawing 3-4mL of blood from the IV access.	To prevent further infusion through the line. To remove any residual drug.
Contact a senior member of the nursing team and inform medical staff. In the case of a central line extravasation a senior member of the medical staff should be contacted immediately, with urgent referral to a surgeon. Obtain paediatric extravasation kit.	Obtain the experience of other colleagues.
Mark the area with a pen and take digital pictures if possible (after patient consent).	To enable the size of the area to be evaluated and recalled at first presentation.
Remove the cannula (peripheral extravasation only). Administer pain relief and chlorphenamine as required.	Ensure patient comfort.
Use flow sheet (see SUMMARY page) and/or table (Appendix 3) to identify agent and determine action to be taken. NOTE in central line extravasations such antidotes may have limited effect.	To identify specific relevant instructions.
Document incident in patient notes and explain what has happened to the patient/ carers. Report the incident on DATIX and complete data collection form in the extravasation kit. In the case of a central line extravasation a referral to a surgeon should be made and removal of the line should be considered once treatment of the extravasation has been completed. Consideration should be given to administration of IV hydrocortisone via a new cannula. DO NOT use the affected central venous catheter.	
Ongoing monitoring of the extravasation site should be carried out. A "Documentation for suspected extravasation of vesicant/ exfoliant drug" form (CHA 4576), which is available on "forms to print" can be used to aid this process.	
ORDER REPLACEMENT EXTRAVASATION KIT.	

2.7. **DMSO (Dimethyl Sulphoxide):**

2.7.1. DMSO is stored in the chemotherapy cupboard on the paediatric oncology unit. When used or going out of date, please ensure the ward pharmacist is made aware so replacement supplies can be arranged.

2.7.2. DMSO may be supplied either as a 50% cream or as a 50% bladder instillation which must be used topically to the skin as described below.

2.7.3. DMSO is an unlicensed medication, and as such records of its use need to be kept. When using DMSO please ensure that the record form is completed and returned to the ward pharmacist.

2.7.4. DMSO should be prescribed by the medical team before giving and is for EXTERNAL use only.

2.7.5. Gloves must be worn when applying DMSO – it may harm healthy skin.

2.7.6. Apply a thin layer of DMSO using a cotton bud every 6 hours on the affected skin only. The area should be covered with gauze once dry if required (DO NOT use an occlusive dressing). A cold pack should be applied every 4 hours.

2.7.7. Alternate DMSO with topical hydrocortisone 1% cream every 6 hours (a preparation applied every 3 hours on an alternate basis), checking the area for erythema regularly. If blistering occurs, stop treatment with DMSO.

2.8. **Mixed Extravasations**

In the event of an extravasation where different agents may have been given the following applies:

- The order of priority is vesicant, exfoliant, irritant.
- For drugs of different classifications apply the temperature compress of the drug that takes priority.
- For drugs of the same classification a cold compress takes priority over a hot compress.

2.9. **Documentation**

Each incident of extravasation must be carefully recorded, with an accurate account of the event and signed by the reporting nurse.

2.9.1. Demographic:

- Patient demographic details (name, address, and hospital number).
- Date and time of incident.
- Clinical area.
- Chemotherapy protocol and drug sequence.

- Patient's symptoms and appearance of site.

2.9.2. Description of IV access:

- Needle size and type.
- Insertion site and number of attempts.
- Flash back present.
- Drug administration technique i.e., 'bolus or infusion'.

2.9.3. Extravasation area:

- Approximate amount of drug extravasated.
- Appearance of area.
- Diameter, length and width of area effected.
- Photograph, if taken.

2.9.4. Step by step of action taken:

- Amount aspirated.
- Cold/ hot applied.
- Antidote given.
- Nursing team and medical person notified.
- Patient's comments, complaints and statements.
- Referrals made.
- Follow up arranged.

2.10. **Reducing the risk of extravasation**

2.10.1. Wherever possible vesicant drugs should be given before other SACT agents.

2.10.2. Peripheral bolus drugs of vesicants should be given via a fast running infusion of a compatible fluid and should only be administered by a doctor experienced in peripheral SACT administration (see SACT Prescribing, Dispensing and Administration for Children and Young People Clinical Guideline).

2.10.3. The patency of the line should be established prior to and during administration of vesicants, using flash back observation of blood.

2.10.4. The infusion site should always be visible during administration.

3. Monitoring compliance and effectiveness

Information Category	Detail of process and methodology for monitoring compliance
Element to be monitored	All chemotherapy extravasations within child health.
Lead	Sabrina Tierney, Lead Pharmacist for Women and Children.
Tool	Audit observing type of drug that extravasated, cannula position, length of time cannula in, antidote.
Frequency	Audit completed yearly.
Reporting arrangements	Presented to Paediatric Multi-Disciplinary Team.
Acting on recommendations and Lead(s)	Paediatric Chemotherapy MDT lead.
Change in practice and lessons to be shared	Extravasations education to be provided and staff to be kept up to date with new developments in this area. All nursing staff to maintain training, including annual update day.

4. Equality and Diversity

4.1. This document complies with the Royal Cornwall Hospitals NHS Trust service Equality and Diversity statement which can be found in the Equality Diversity And Inclusion Policy or the Equality and Diversity website.

4.2. Equality Impact Assessment

The Initial Equality Impact Assessment Screening Form is at Appendix 2.

Appendix 1. Governance Information

Information Category	Detailed Information
Document Title:	Extravasation of Systemic Anti- Cancer Therapy (SACT) in Children Clinical Guideline V5.0
This document replaces (exact title of previous version):	Extravasation of Cytotoxic Drugs in Children Clinical Guideline V4.0
Date Issued/Approved:	May 2025
Date Valid From:	May 2025
Date Valid To:	May 2028
Directorate / Department responsible (author/owner):	Sabrina Tierney; Lead Pharmacist for Women and Children
Contact details:	01872 253531
Brief summary of contents:	Guidance on the management of extravasation in children.
Suggested Keywords:	Systemic Anti- Cancer Therapy, SACT, extravasation, chemotherapy.
Target Audience:	**RCHT:** Yes **CFT:** No **CIOS ICB:** No
Executive Director responsible for Policy:	Chief Medical Officer
Approval route for consultation and ratification:	Child Health Audit and Guidelines Group
Manager confirming approval processes:	Caroline Chappell; Care Group General Manager
Name of Governance Lead confirming consultation and ratification:	Michael Cross
Links to key external standards:	None required
Related Documents:	Paediatric haematology, oncology and BMT department Standard Operating Procedure: Extravasation of chemotherapy in paediatric patients, University Hospitals Bristol NHS Foundation Trust. V2.2 Dec 2022.

Information Category	Detailed Information
	Extravasation Injury from Chemotherapy and other non-antineoplastic vesicants; UpToDate Website: Accessed May 2022. Management of Chemotherapy Extravasation: ESMO – EONS Clinical Practice Guidelines. Fidalgo et al; Annals of Oncology 23 (Supplement 7) vii 167-vii 173; 2012.
Training Need Identified?	No
Publication Location (refer to Policy on Policies – Approvals and Ratification):	Internet and Intranet
Document Library Folder/Sub Folder:	Clinician/ Paediatrics/ Chemotherapy

Version Control Table

Date	Version Number	Summary of Changes	Changes Made by
October 2011	V1.0	Initial issue.	S. Tierney, Paediatric Pharmacist.
December 2015	V2.0	Update of ward names and template. Review of evidence.	S. Tierney, Paediatric Pharmacist.
March 2019	V3.0	Review of evidence and update to reflect tertiary centre guidance. Flow diagram reviewed to make easier to read.	S. Tierney, Paediatric Pharmacist.
May 2022	V4.0	Review of evidence. Removal of reference to CLIC.	S. Tierney, Paediatric Pharmacist.
May 2025	V5.0	Replacement of “chemotherapy” with SACT. Additional information added on risk reduction. Full review.	S. Tierney, Paediatric Pharmacist.

All or part of this document can be released under the Freedom of Information Act 2000.

All Policies, Strategies and Operating Procedures, including Business Plans, are to be kept for the lifetime of the organisation plus 6 years.

This document is only valid on the day of printing.

Controlled Document.

This document has been created following the Royal Cornwall Hospitals NHS Trust The Policy on Policies (Development and Management of Knowledge Procedural and Web Documents Policy). It should not be altered in any way without the express permission of the author or their Line Manager.

Appendix 2. Equality Impact Assessment

Section 1: Equality Impact Assessment (EIA) Form

The EIA process allows the Trust to identify where a policy or service may have a negative impact on an individual or particular group of people.

For guidance please refer to the Equality Impact Assessment Policy (available from the document library) or contact the Equality, Diversity, and Inclusion Team rcht.inclusion@nhs.net

Information Category	Detailed Information
Name of the strategy / policy / proposal / service function to be assessed:	Extravasation of Systemic Anti- Cancer Therapy (SACT) in Children Clinical Guideline V5.0
Directorate and service area:	Paediatrics
Is this a new or existing Policy?	Existing
Name of individual completing EIA (Should be completed by an individual with a good understanding of the Service/Policy):	Child Health Audit and Guidelines Group
Contact details:	01872 253531

Information Category	Detailed Information
1. Policy Aim - Who is the Policy aimed at? (The Policy is the Strategy, Policy, Proposal or Service Change to be assessed)	To provide clinical staff clear guidance on the management of extravasation of cytotoxic drugs in paediatric patients.
2. Policy Objectives	To provide a basis for nursing care of patients who have experienced an extravasation.
3. Policy Intended Outcomes	Extravasation is treated in a safe manner.
4. How will you measure each outcome?	Monitor/ review instances of extravasation to ensure policy followed.
5. Who is intended to benefit from the policy?	All staff involved in the administration of chemotherapy to children.

Information Category	Detailed Information
6a. Who did you consult with? (Please select Yes or No for each category)	• Workforce: Yes • Patients/ visitors: No • Local groups/ system partners: No • External organisations: No • Other: No
6b. Please list the individuals/groups who have been consulted about this policy.	**Please record specific names of individuals/ groups:** Child Health Audit and Guidelines Group.
6c. What was the outcome of the consultation?	Approved.
6d. Have you used any of the following to assist your assessment?	**National or local statistics, audits, activity reports, process maps, complaints, staff, or patient surveys:** No.

7. The Impact

Following consultation with key groups, has a negative impact been identified for any protected characteristic? Please note that a rationale is required for each one.

Where a negative impact is identified without rationale, the key groups will need to be consulted again.

Protected Characteristic	(Yes or No)	Rationale
Age	No	
Sex (male or female)	No	
Gender reassignment (Transgender, non-binary, gender fluid etc.)	No	
Race	No	Any information provided should be in an accessible format for the parent/ carer/ patient's needs- i.e., available in different languages if required/ access to an interpreter if required.

Protected Characteristic	(Yes or No)	Rationale
Disability (e.g. physical or cognitive impairment, mental health, long term conditions etc.)	No	Those parent/ carer/ patients with any identified additional needs will be referred for additional support as appropriate- i.e. to the Liaison Team or for specialised equipment. Written information will be provided in a format to meet the family's needs e.g. easy read, audio etc.
Religion or belief	No	All staff should be aware of any marital arrangements that may have an impact on care (for example: separated parents, domestic abuse).
Marriage and civil partnership	No	
Pregnancy and maternity	No	
Sexual orientation (e.g. gay, straight, bisexual, lesbian etc.)	No	

A robust rationale must be in place for all protected characteristics. If a negative impact has been identified, please complete section 2. If no negative impact has been identified and if this is not a major service change, you can end the assessment here.

I am confident that section 2 of this EIA does not need completing as there are no highlighted risks of negative impact occurring because of this policy.

Name of person confirming result of initial impact assessment: Child Health Audit and Guidelines Group.

If a negative impact has been identified above OR this is a major service change, you will need to complete section 2 of the EIA form available here:
Section 2. Full Equality Analysis

Appendix 3. Drugs Commonly Used in Paediatric Oncology and their Classification

(If drug not listed below discuss with pharmacy).

Chemotherapy Agent	Broad Category
Amsacrine	Vesicant
Asparaginase	Neutral
Bevacizumab	Non-vesicant/ neutral
Bleomycin	Non-vesicant/ neutral
Busulfan	Irritant/ inflammatant
Campath (Alemtuzumab)	Non-vesicant/ neutral
Carboplatin	Irritants/ inflammatants
Carmustine	Irritants/ inflammatants
Cisplatin	Exfoliant. Treat as irritants/ inflammatants
Cladribine	Non-vesicant/ neutral
Clofarabine	Non-vesicant/ neutral
Cyclophosphamide	Non-vesicant/ neutral
Cytarabine	Non-vesicant/ neutral
Dacarbazine	Irritants/ inflammatants
Dactinomycin/actinomycin D	Vesicant
Daunorubicin	Vesicant
Docetaxel	Vesicant
Doxorubicin	Vesicant
Epirubicin	Vesicant
Etoposide	Irritants/ inflammatants
Etoposide Phosphate	Non-vesicant/ neutral
Fludarabine	Non-vesicant/ neutral
Fluorouracil	Irritants/ inflammatants
Gemcitabine	Non-vesicant/ neutral
Gemtuzumab (Mylotarg)	Non-vesicant/ neutral
Idarubicin	Vesicant
Ifosfamide	Irritants /inflammatants

Chemotherapy Agent	Broad Category
Irinotecan	Irritants/ inflammatants
Liposomal Daunorubicin	Exfoliants/ irritants/ inflammatants.
Liposomal Doxorubicin	Exfoliants/ irritants/ inflammatants.
Melphalan	Irritants/ inflammatants
Methotrexate	Non-vesicant/ neutral
Mitomycin C	Vesicant
Mitozantrone	Exfoliants/ irritants/ inflammatants treat as vesicant
Oxaliplatin	Irritants/ inflammatants
Paclitaxel	Vesicant
Rituximab	Non-vesicant/ neutral
Thiotepa	Non-vesicant/ neutral
Topotecan	Exfoliants
Treosulfan	Vesicant
Vinblastine	Vesicant/ vinca-alkaloids
Vincristine	Vesicant/ vinca-alkaloids
Vindesine	Vesicant/ vinca-alkaloids
Vinorelbine	Vesicant/ vinca-alkaloids

Appendix 4. Extravasation Kit Contents

An extravasation kit is to be stored in all areas where the administration of SACT occurs. The kit contains all the drugs and equipment that may be needed in the event of an extravasation. The kit should be checked regularly and re-supplied from pharmacy as required.

- Hyaluronidase 1500 units injection.
- Chlorphenamine 4mg tablets.
- Hydrocortisone Sodium Succinate injection 100mg.
- Hydrocortisone 1% cream.
- Water for injection (10ml).
- Heat pad – instant.
- Cold pad (in freezer on ward).
- 3mL Syringes x 2.
- 20G needles x 2 (for drawing up).
- 25G needles x 4 (for injection).
- Alcohol swabs.
- 10mL syringe x 1.
- Indelible pen.
- Extravasation policy.
- Extravasation report card (Green Card).
- Extravasation patient information leaflet.

DMSO is not contained in the kit but is available on the Paediatric Oncology Unit, in the chemotherapy cupboard.

Appendix 5. Guidelines for Best Practice When Administering Intravenous Infusions