Royal Cornwall Hospitals
NHS Trust

Prevention and Management of the Extravasation of Systemic Anti-Cancer Therapy in Adults Clinical Guideline

V7.0

March 2025

1. Aim/Purpose of this Guideline

1.1. This document outlines guidelines for the rapid treatment of Systemic Anti-cancer Therapy (SACT) extravasation injuries within Royal Cornwall Hospital Trust.

1.2. It provides a guideline to assist practitioners in the care of patients who may have experienced an extravasation injury as a result of SACT. In the absence of national guidance on extravasation the information in this policy has been gathered from a thorough review of current available evidence.

1.3. It will provide a basis for all medical staff to recognise ways in which to help prevent and manage 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.

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

2. The Guidance

2.1. Duties for Implementation

2.1.1. The Trust Lead for Systemic Anti-Cancer Therapy (SACT) is responsible for ensuring the implementation and adherence to these guidelines.

2.1.2. These guidelines apply to all personal involved in the administration of intravenous SACT.

2.1.3. Currently the SACT Clinical Nurse Specialists (CNS) alongside the Lead Nurse for SACT are responsible for the education, training, and development of nursing staff in the safe handling, administration, and disposal of cytotoxic drugs.

2.1.4. It is the individual practitioner's responsibility to ensure that they have received appropriate training and that this remains updated and a theoretical and practical assessment is achieved annually.

2.1.5. It is the clinical managers' responsibility to ensure that an extravasation kit is available in areas where cytotoxic drugs are administered. All staff must have knowledge of its location and that its contents remain in date. The box will be replaced by pharmacy if the seal is broken, or the box has been used.

2.2. Definition

2.2.1. Extravasation is the leakage or accidental infiltration of intravenous drugs into the tissues surrounding the vein. This can lead to an immediate inflammatory painful reaction; with some drugs this may result in local tissue destruction (necrosis) and other complications. Prompt management is required in the event of an extravasation; treatment required may depend on the volume of drug, type of drug, location of cannula and other comorbidities. If a large volume of any classification of drug extravasates it has the potential to cause complications and should be carefully managed.

2.2.2. Classification of drug (Appendix 4 for chart).

2.2.2.1. **Neutrals**: do not cause ulceration, inflammation or damage and are unlikely to produce an acute reaction or progress to necrosis (Monoclonal antibodies are in this group).

2.2.2.2. **Inflammitants**: Capable of mild to moderate inflammation and irritation and flare in local tissues, in addition to painless erythema and elevation (Flare reaction) at the extravasation site.

2.2.2.3. **Irritants**: capable of causing inflammation, irritation and pain at site. They rarely proceed to the breakdown of tissues. They do have the potential to cause ulceration only if a large amount has extravasated into the surrounding tissue.

2.2.2.4. **Exfoliants** can cause inflammation and shedding of the skin but are less likely to cause tissue death. They can cause pain and may have a low-level vesicant potential which can cause superficial tissue injury.

2.2.2.5. **Vesicants** are drugs that can result in tissue necrosis and or the formation of blisters/ulceration when accidently infused into the tissues surrounding the vein. If left untreated this may lead to tissue damage and necrosis and or the formation of blisters/ulceration. They are further categorized into DNA binding and non-DNA binding.

2.2.2.6. **Non-SACT infusions with vesicant/irritant properties** are drugs that are not classified as SACT but have the potential to cause the same damage upon extravasation as the vesicants and irritants listed above.

2.2.3. Prevention of extravasation is of great importance particularly when administering SACT. To minimise the risk of extravasation, the following guidance including Appendix 3 should be observed.

2.2.4. There may be other contributing factors that can affect each individual patient's risk of extravasation (see Appendix 3).

2.2.5. It is recommended that bolus doses of anthracyclines should be administered in normal working hours this would usually be between 9-5 except in exceptional, urgent and life-threatening situations (PTSU will not reconstitute Savene out of these times). This decision will be made in agreement with the patient's consultant (or acting consultant) and with the most senior nurse in the unit; reasons will be clearly documented in the patients' medical notes or on Aria. Infusional anthracyclines MUST be given via central line. For pre-planned admissions and administration of anthracyclines (such as AML patients) these patients will require a central line. Administration of anthracyclines out of hours should be discussed at the SACT MDT for review.

2.2.6. There are many non-cytotoxic drugs that can also cause damage if extravasation occurs, but this document relates to SACT only. The general principles can be applied to all drugs but contact pharmacy or the on-call pharmacist for additional advice. Information can also be found on MEDUSA.

2.3. Patient Education

2.3.1. Patients should be made aware of the risk of extravasation when consent for Systemic Anti-Cancer Therapy (SACT) is obtained.

2.3.2. The placement of the cannula is a fundamental factor in the safe delivery and administration of SACT and should only be performed by a competent practitioner. Patient preference can be taken into account, but the decision where to place the cannula will ultimately be made by the practitioner who will be administering the treatment.

2.3.3. Patients should be fully educated and informed to notify the nurses of any adverse sensations during administration including if they have pain, stinging, burning or a change in sensation at the cannulation site from the start of the infusion.

2.3.4. In the event of an extravasation, patients should be provided with both verbal and written information, see Appendix 10 (RCHT Extravasation leaflet). 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.

2.4. Signs and Symptoms

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

- 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.

- 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.

2.4.2. Extreme caution should be taken when no blood return is obtained on aspiration. However, this may not be a sign of extravasation if found in isolation. Equally the presence of blood return does not exclude a possible extravasation. Follow the ‘Guideline for Management of SACT Extravasation’ chart (Appendix 5).

2.4.3. Extreme caution should be observed if increased resistance is felt on the plunger of a syringe on a bolus drug administration. This should be followed by an immediate re-assessment of patency of access.

2.4.4. In the absence of free-flowing fluid or if the rate of flow is remarkably reduced or if the pump is alarming because of increased pressure.

2.4.5. **Chemical phlebitis**

Extravasation injury should always be suspected until proven otherwise.

Definition: Chemical phlebitis is caused by irritation from the drug or fluid being infused. Contributing factors include the level of osmolarity and pH of the drug or fluid.

Signs and symptoms: Pain, skin tightness or swelling, redness and potential for skin puckering of the skin caused by sclerosis of the veins. Phlebitis results from an inflammatory response and so symptoms can often present late.

Risk Reduction: Free flow saline with bolus, free flow IV infusion of vinca alkaloids. Drug specific additional larger flushing volumes to help reduce risk.

Management guidance: Regarding peripheral venous access and administration of SACT, alternating arm administration for each cycle of SACT is recommended to reduce the risk of chemical irritation to the veins and the potential for tissue damage and venous sclerosis.

It is also important to identify individual patient risk for developing these symptoms and advance plan for the placement of a central venous access device.

2.4.6. **Flare Reaction Management**

Extravasation injury should always be suspected until proven otherwise.

It is possible for some non-vesicants and vesicants to cause a **flare reaction**. A flare reaction can be defined as a local allergic reaction without pain that is usually accompanied by red blotches along the vein. Symptoms of flare should subside within 30 minutes with or without treatment. If a flare reaction is suspected, then extravasation MUST first be excluded.

2.5. **Treatment of Peripheral Line Extravasation:**

2.5.1. Initial treatment for all drugs**.** Stay calm; get help from a senior nurse. Explain to the patient what you suspect may have happened and the procedures for dealing with this so you can obtain their co-operation. Get the extravasation kit.

2.5.2. Immediately stop the injection/infusion leaving the cannula in place. Where the abrupt discontinuation of a treatment would be clinically detrimental, the medical team must be informed immediately.

2.5.3. Aspirate any residual drug and blood from the cannula. This will allow the direct removal of as much of the drug as possible at the site of the extravasation thereby minimising progressive local injury and reducing subsequent tissue damage.

2.5.4. Mark any demarcated area with an indelible pen.

2.5.5. Remove the cannula, unless directed otherwise by a senior Oncology/Haematology doctor.

2.5.6. Determine whether the agent that has extravasated requires the application of a hot or cold compress.

2.5.7. Apply the correct compress, following the guidance given on the flow chart (Appendix 5).

2.5.8. Elevate the affected limb, following the guidance given on the flow chart. Document, inform medical team.

2.5.9. Offer patient appropriate analgesia and reassurance.

2.5.10. Obtain photographs of extravasated area using the camera on the Nurse-In-Charge mobile phone.

2.5.11. The details of the extravasation incident together with all the treatment administered must be documented in the patient's medical notes, Datix and a RCHT extravasation data collection form must be completed available in the extravasation kit (to be placed in the extravasation folder on Headland).

2.5.12. Replace extravasation kit.

2.6. **Treatment after Initial First Aid:**

2.6.1. **Vesicants** (prior to treatment with DMSO or Savene the decision must

be made by a consultant) see Appendix 7 for Savene administration.

2.6.2. Confirm all the initial first aid procedures have been completed.

Immediately contact senior doctor.

2.6.3. The most important indicator of the severity of extravasation is pain.

2.6.4. For small amounts (suggested 3 mls) of an extravasated drug follow Appendix 5 'Guideline for Management of SACT Extravasation' flow sheet, apply HOT or COLD compress as recommended. Give an intravenous dose of 100mg Hydrocortisone via a newly inserted cannula and 4mg dose of oral chlorphenamine if systemically unwell.

2.6.5. Treat with appropriate antidote. For anthracycline extravasation (more than 3 mls) this is Savene (dexrazoxane) which can be obtained from the emergency pharmacy cupboard in dedicated drawer for Savene in RCHT (see Appendix 7 for guidance on administration).

2.6.6. DMSO for vesicant DNA binding extravasations can be obtained from the chemotherapy cupboard in the paediatric unit extension 2069/3398. Extravasation injuries treated with specific antidotes should be reviewed 4-hourly for signs of deterioration if an inpatient and reviewed daily if being monitored as an outpatient. The 'Documentation for Suspected Extravasation of Vesicant/Exfoliant Drug' chart must be completed daily at a minimum until patient discharge (Appendix 9).

2.6.7. If any deterioration is noted during this period, the on-call plastic surgeon will need to be contacted by a consultant.

2.6.8. **DO NOT COVER WITH BANDAGING** leave the site clear and continue to observe hourly for 24 hours.

2.6.9. If a larger volume (e.g. greater than 3mls) of a vesicant drug has extravasated refer to Plastic Surgery. There is no plastic surgery team in RCHT. The on-call medical team should therefore contact Derriford hospital for further escalation and referral. Referral within a few hours is essential if active treatment to remove extravasated substance is to be performed. See Appendix 11.

2.6.10. If the skin viability is compromised, dressing advice can be obtained from the tissue viability team.

2.7. Exfoliants

2.7.1. Confirm all the initial first aid procedures have been completed.

2.7.2. For extensive extravasations of exfoliant drugs treat in the same way as a vesicant extravasation. The important indicator of the severity of extravasation is pain.

2.7.3. For small amounts of extravasated drug causing only minor symptoms apply 1% hydrocortisone cream, apply HOT or COLD COMPRESS and consider giving an intravenous dose of 100mg Hydrocortisone and 4mg dose of oral chlorphenamine via a newly inserted cannula on nonaffected arm if systemically unwell.

2.7.4. If more severe symptoms develop after this follow the vesicant treatment instructions.

2.7.5. Continued monitoring for several days may be recommended, arrange follow up in the appropriate clinical area as indicated by the medical team.

2.7.6. If the skin viability is compromised, dressing advice can be obtained from Tissue Viability.

2.8. Irritant / Inflammatory Agents

2.8.1. Confirm all the initial first aid procedures have been completed.

2.8.2. With irritant drugs there exists the possibility of some local inflammation and rarely necrosis, and/or some pain in sensitive individuals.

2.8.3. For small amounts of an extravasated drug causing only minor symptoms apply 1% hydrocortisone cream, apply HOT or COLD compress.

2.8.4. For a large volume extravasation consider the risk of a more significant reaction. Apply 1% hydrocortisone cream and consider giving an intravenous dose of 100mg Hydrocortisone and 4mg dose of oral chlorphenamine if systemically unwell.

2.8.5. Inform the patient that if there appears to be any deterioration in the injury, they must contact the appropriate clinical area immediately and arrange for the injury to be reviewed the following day.

2.8.6. If the skin viability is compromised, dressing advice can be obtained from Tissue Viability.

2.9. Neutral / Non-Vesicants

2.9.1. If an extravasation of a non-irritant occurs, aspirate as much fluid as possible then remove the cannula. No further treatment should be required. Manage the situation symptomatically.

2.9.2. For all extravasations the details of the incident must be documented in the patient's medical notes together with the drug and volumes administered. Completion of the RCHT incident reporting form (Datix) and RCHT Extravasation data collection form is required. This is available in the extravasation kit and should be completed and retained in the Headland extravasation folder.

2.9.3. Provide the patient with verbal information, contact numbers and

complete a follow up extravasation documentation form this should be retained in the extravasation folder.

2.10. Treatment of an Extravasation from Central Venous Access Devices: PICC's, Hickman Lines and Portacaths

2.10.1. Although less likely to occur, an extravasation from an indwelling central line can be particularly problematic because of the depth of the line.

Signs and symptoms may develop more slowly and not be as obvious.

2.10.2. Extravasation can occur in any part of the line.

2.10.3. Extravasation can occur due to fracture of the catheter possibly related to a blocked segment of line, perforation of the superior vena cava on insertion, formation of a fibrin sheath on the catheter are some of the potential reasons.

2.10.4. Patients should be educated of the possibility of this happening and that burning or pain on administration is not normal and should be reported immediately.

2.10.5. Regardless of drug classification stop the administration leave the central line in place. Immediately refer to senior member of staff, registrar and/or patients' consultant. Get advice from vascular access team if in working hours.

2.10.6. Aspirate as much as the drug as possible.

2.10.7. Mark area with pen and take digital pictures of area.

2.10.8. Apply HOT or COLD compress. Consider (depending on classification of drug) administering an intravenous dose of 100mg Hydrocortisone and 4mg dose of oral chlorphenamine, via new cannula. **DO NOT USE THE LINE IF CATHETER FRACTURE IS SUSPECTED.**

2.10.9. Referral to a plastic surgeon should be made in most cases depending on the classification of the drug and in discussion with the patients' consultant (or consultant on call). See Appendix 11.

2.10.10. The line should be x-rayed and removed as soon as clinically appropriate if fractured.

2.10.11. The details of the extravasation incident together with the drugs and volumes administered must be documented in the patient's medical notes, the RCHT incident reporting system (Datix) and RCHT Extravasation data collection form, available in the extravasation kit should all be completed.

2.11. Mixed Extravasations

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

2.11.2. The order of priority is vesicant, exfoliants, irritant unless immunotherapy is specifically prescribed at the start of the regimen.

2.11.3. For drugs of different classifications apply the temperature compress of the drug that takes priority.

2.11.4. For drugs of the same classification a cold compress takes priority over a hot compress.

3. Monitoring compliance and effectiveness

Information Category	Detail of process and methodology for monitoring compliance
Element to be monitored	All SACT Extravasations.
Lead	SACT MDT.
Tool	Extravasation reported on Datix and the local Green SACT Extravasation Data Collection Form. Data also collected each quarter and sent nationally for SSQD - Cancer: Chemotherapy (Adult).
Frequency	Monitor every two months via the SACT Incident Review Meeting.
Reporting arrangements	SACT MDT. Extravasation Datix reported and reviewed by SACT MDT quarterly and a yearly report made. Data also collected each quarter and sent nationally for SSQD - Cancer: Chemotherapy (Adult). If Trends are recognised more frequently in extravasations these will be addressed with further investigation.
Acting on recommendations and Lead(s)	SACT clinical Lead will be responsible for action planning for any or all deficiencies and recommendations.
Change in practice and lessons to be shared	Required changes to practice will be identified and actioned within one month. A lead member of the team will be identified to take each change forward where appropriate. Lessons will be shared with all the relevant stakeholders.

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:	Prevention and Management of the Extravasation of Systemic Anti-Cancer Therapy in Adults Clinical Guideline V7.0
This document replaces (exact title of previous version):	Prevention and Management of the Extravasation of Systemic Anti-Cancer Therapy in Adults Clinical Guideline V6.0
Date Issued/Approved:	December 2024
Date Valid From:	March 2025
Date Valid To:	March 2028
Directorate/Department responsible (author/owner):	Juliet Rickard - Lead SACT Nurse. Claire Tapping – SACT Clinical Nurse Specialist.
Contact details:	01872 258583
Brief summary of contents:	This document outlines guidelines for the prevention and management of extravasation and the rapid treatment of SACT injuries. It provides a guideline to assist practitioners in the care of patients who may have experienced a SACT extravasation injury.
Suggested Keywords:	SACT, Chemotherapy, extravasation, vesicant, irritant.
Target Audience:	**RCHT:** Yes **CFT:** No **CIOS ICB:** No
Executive Director responsible for Policy:	Chief Medical Officer.
Approval route for consultation and ratification:	SACT MDT.
Manager confirming approval processes:	Ian McGowan.
Name of Governance Lead confirming consultation and ratification:	Suzanne Atkinson.
Links to key external standards:	None.

Information Category	Detailed Information
Related Documents:	• Boulanger, J.A. Ducharme, A. Dufour, S. Fortier and K. Almanric (2015) Management of the extravasation of anti-neoplastic agents, Supportive Care in Cancer (Vol. 23, Issue 5.). • Dougherty, L (2008) IV Therapy: Recognizing the Differences between infiltration and Extravasation. British Journal of Nursing. 17(14) 896-901. • Dougherty L and Oakley, C (2011) Advanced Practice in the Management of Extravasation, Cancer Nursing Practice 10 (5). • Perez-Fidalgo, JA; Garcia Fabregat, L; Cervantes, A; Marguiles, A; Vidall, C; Roila, F;(2012) on behalf of the ESMO Guidelines working group, Management of chemotherapy extravasation: ESMO-EONS clinical practice guidelines, European Journal of Oncology • Nursing; 16 (2012) 528-534 (Accessed online January 2022). • Guidelines for the Management of Extravasation of a Systemic Anti-Cancer Therapy including Cytotoxic Agents. West Midlands Expert Advisory Group for SACT. Published Dec 2019. Available at: https://wmcanceralliance.nhs.uk/images/Documents/ SaCT/Mgt_of_Extravasation_of_Systemic_Anti cance r_Therapy_V2_FINAL.doc.pdf. Accessed Jan 2022. • Kreidieh, F. Y., Moukadem, H. A., and El Saghir, N. S. (2016). Overview, prevention and management of chemotherapy extravasation. World journal of clinical oncology, 7(1), 87-97. • Mouridsen, HT, Langer,SW. Buter,J. Eidtmann, H. Rosti,G. deWit,m. Knoblauch,p. Rasmussen, A. Dahlstrom, K. Jensen,PB andGiaccone, G. (2007) Treatment of Anthracycline Extravasation with Savene (dexrazoxane): results from two prospective clinical multicentre studies. Annals of Oncology. (18)3, P546-550. • NHS England (2017) Guidelines for the management of extravasation of systemic anti-cancer therapy including cytotoxic agents.

Information Category	Detailed Information
	• Pattison, J. (2002) Managing Cytoxic Extravasation. Nursing Times; 98(44) 32-33. • Sauerland, C. Engelking, C. Wickham, R. Corbi, D. (2006) Vesicant Extravasation Part 1: Mechanisms, Pathogenesis and Nursing Care to Reduce Risk. Oncology Nurse Forum. • Roberts R et al (2019) Epirubicin chemotherapy in women with breast cancer: Alternating arms for intravenous administration to reduce chemical phlebitis European journal of cancer care, Vol.28 (5), p.e13114-n/a. • Roberts R et al (2021) Identifying Risk Factors for Anthracycline Chemotherapy-induced Phlebitis in Women with Breast Cancer: An Observational Study. Clinical Oncology. 33, 230e240. • Schulmeister, L. (2011) Vesicant Chemotherapy Extravasation management. British Journal of Nursing – intravenous supplement, 20, 19. P 6-12.
Training Need Identified?	No.
Publication Location (refer to Policy on Policies – Approvals and Ratification):	Internet and Intranet.
Document Library Folder/Sub Folder:	Clinical/Cancer Services.

Version Control Table

Date	Version Number	Summary of Changes	Changes Made by
1999	V1.0	Management of Extravasation of cytotoxic drugs.	Unknown.
February 2011	V2.0	Reviewed, written, updated and put into Trust format.	Lisa Nicholls Chemotherapy CNS.
December 2013	V3.0	Reviewed and put into new Trust format.	Lisa Nicholls Chemotherapy CNS.

Date	Version Number	Summary of Changes	Changes Made by
December 2014	V4.0	Updated – new format, flow sheet and Trust.	Lisa Nicholls Chemotherapy CNS.
December 2018	V5.0	Reviewed, re-structured, updated, SACT wording in title incorporated. Non vesicant chart removed. Flow chart corrected and amended. Duty of candor and follow up documentation chart added in.	Rachel Hopper and Niamh Dinneen.
May 2019	V5.1	Watermarks added to the appendix 8 and appendix 9, hyperlink added to Appendix 10 as directed by governance lead and Policy Review Group.	Demi Scott-Ward – Corporate Records Manager.
February 2022	V6.0	Reviewed and updated. Appendix 4 SACT classification chart re-written. Appendix 5 + 6 renewed. Duty of candour Appendix 8 removed. Appendix 9 watermark removed and hyperlink added.	Juliet Rickard - Lead SACT Nurse. Claire Tapping - Clinical Practice Educator.
December 2024	V7.0	General review of policy content. Additional content included regarding chemical phlebitis. Appendix 4. Revised Classification of SACT drugs, Appendix 5 Revised flow chart. Appendix 6 New Treatment Flow Chart, Addition of Appendix 11 (new flow sheet for guidance on escalation for Trauma and Plastics support).	Juliet Rickard Lead SACT Nurse. Claire Tapping – SACT CNS.

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:	Prevention and Management of the Extravasation of Systemic Anti-Cancer Therapy in Adults Clinical Guideline V7.0
Directorate and service area:	Cancer Services.
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):	Juliet Rickard, Lead SACT Nurse and Claire Tapping, SACT CNS.
Contact details:	01872 25 3842

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 with clear guidelines on the care of patients who have experienced an extravasation.
2. Policy Objectives	To provide a basis for nursing care that is required for patients who have experienced an extravasation.
3. Policy Intended Outcomes	Extravasation are treated in a safe manner.
4. How will you measure each outcome?	Monitor Datix's of Systemic Anti-Cancer Therapy Extravasations that occur in the Trust. Collect data with audit tool.
5. Who is intended to benefit from the policy?	All staff involved in the giving of Systemic Anti-Cancer Therapy and patients that may experience an extravasation.

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:** SACT MDT.
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	
Disability (e.g. physical or cognitive impairment, mental health, long term conditions etc.)	No	
Religion or belief	No	

Protected Characteristic	(Yes or No)	Rationale
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: Juliet Rickard, Lead SACT Nurse and Claire Tapping, SACT CNS.

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. Extravasation risk factors and reduction

- Risk assessment of veins should be carried out by an experienced practitioner. A large vein away from joints or tendons should be selected for the insertion of cannulas, for the administration of SACT this should be a 24gauge cannula, the smallest possible cannula in the biggest vein.

- Insertion over joints should be avoided as displacement of the cannula is more likely and tissue damage in this area may have serious consequences. It is recommended that the antecubital fossa or hand should only be used as a last resort and in extreme circumstances where a central line cannot be placed. This is only after discussion and agreement with the most senior SACT nurse and responsible Haematologist/Oncologist.

- Rotation of cannulation site on each treatment may help to minimise vein trauma.

- Some patient groups are at increased risk of extravasation. These include the elderly, paediatric patients, patients on anticoagulants, thrombocytopenic patients, unconscious or sedated patients, patients with lymphedema, patients with peripheral neuropathy or peripheral circulatory diseases and obese patients. Extra care should be taken with these patient groups, and they should be escalated for central venous access at the earliest opportunity if access is becoming problematic.

  THIS IS NOT AN EXHAUSTIVE LIST

  - Elderly patients can be more at risk of extravasation as they may have more fragile skin and veins. They can also be confused or agitated, pull at and dislodge cannulas.

  - Patients with communication difficulties, such as those with learning disabilities, or those unable to speak English may potentially be at more risk of extravasation injuries going unnoticed.

  - Careful consideration should be given to those patients who have recently had venepuncture and the location of this procedure taken into account.

  - Patients with underlying medical conditions, such as diabetes, peripheral circulatory diseases, lymphedema, and previous breast surgery may have more associated risk factors and limited choice for the practitioner with regard to venous access.

  - Patients who have had previous radiation therapy at the site of injection may develop severe local reactions from cytotoxic drugs. This is known as recall injury and has been noted in patients who have received doxorubicin.

  - Patients receiving anticoagulants may be more predisposed to bleeding this may potentially increase the risk of extravasation by increasing local bleeding.

- Wherever possible, vesicant drugs in a chemotherapy regimen should be given before the other cytotoxic agents. Peripheral bolus doses of vesicants should be given via a fast-running infusion of a compatible fluid.

- Patency of the line should be established prior to and during the administration of vesicants, using flash back observation of blood. For bolus administration the

patency should be checked every 3- 5mls, and for infusions, patency should be checked every 5-10 minutes.

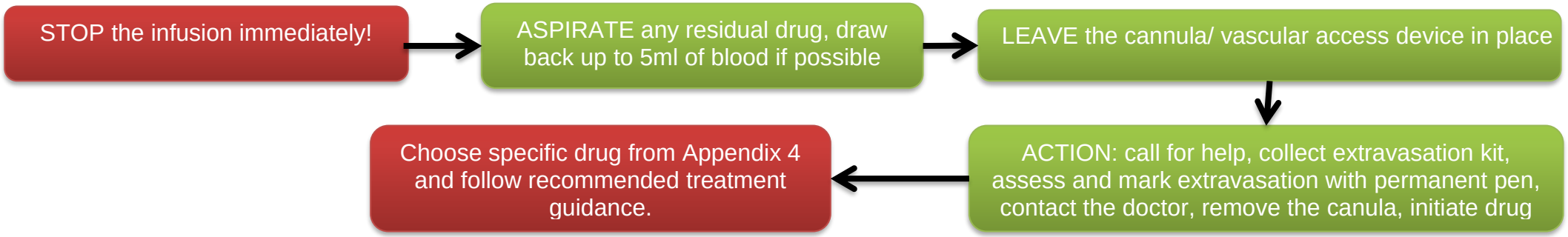
- The infusion site should always be visible during drug administration.

Appendix 4. Classification of SACT drugs

Group 1: Neutrals	Group 2: Inflammitants	Group 3: Irritant	Group 4: Exfoliant	Group 5: Vesicants DNA Binding
Almtuzumab (Mab-Campath)	Flurorouracil	Arsenic Trioxide	Cisplatin	Amsacrine
Asparaginase	Methotrexate	Carboplatin	Liposomal Daunorubicin	Bendamustine
Azacitidine	Pemetrexed	Etoposide	Mitoxantrone	Carmustine
Bleomycin	Raltitrexed	Gemtuzumab Ozogamicin (Mylotarg)	Oxaliplatin	Dacarbazine
Bortezomib		Irinotecan	Topotecan	Dactinomycin
Carfilzomib		Liposomal Doxorubicin (Caelyx)		Mitomycin C
Cladribine		Melphalan		Trabectedin
Cyclophosphamide		Trastuzumab Emtansine (Kadcyla)		**Anthracyclines**
Cytarabine				Daunorubicin
Dexrazoxane				Doxorubicin
Eribulin				Epirubicin
Fludarabine				Idarubicin
Gemcitabine				**Non-DNA Binding**
Ifosfamide				Cabazitaxel
Immunotherapies				Docetaxel
Interferon				Paclitaxel
Monoclonal Antibodies (MABs)				Paclitaxel Albumin (Abraxane)
Targeted Therapies				**Vinca Alkaloids**
Thiotepa				Vinblastine
				Vincristine
				Vindesine
				Vinflunine
				Vinorelbine

Appendix 5. Guideline for Management of SACT Extravasation

Immediate treatment for all extravasations: the guidelines for treatment of an extravasation detailed below are considered ‘first aid’ only. Further medical advice and potential early review by plastic surgeon is recommended.



Localise (COLD pack and DMSO)

- If DMSO indicated follow Appendix 6 and steps below.
- Neutralise the area by applying a thin layer of topical DMSO to the marked area using a cotton bud. Do not use DMSO if blistering present.
- Allow the DMSO to dry and then cover with a non-occlusive gauze dressing. This should be applied within 10-25 minutes.
- Apply a COLD pack for 20 minutes. Repeat every 4 hours for 24 hours to help localise the area.
- 3 hours after the first DMSO application, apply hydrocortisone 1% cream. Repeat every 6 hours for 7 days.

Neutralise (SAVENE)

- If SAVENE indicated follow Appendix 6 and steps below.
- SAVENE is indicated to treat Anthracycline extravasations ONLY for volumes above 3mls.
- Contact Consultant immediately.
- Do NOT apply DMSO if Savene used.
- Cold pack for 20 minutes, 4 times a day for up to 3 days.
- See Appendix 6 for administration details.

Dilute and Disperse (WARM pack and HYALURONIDASE)

- If Hyaluronidase indicated follow Appendix 6 and steps below.
- Give several subcutaneous (or intradermal) injections of 150-1500iu hyaluronidase diluted in 1ml of sterile water as 5 separate 0.2ml injections around the periphery of the extravasated area to dilute the infuscate.
- Use 25-27 – gauge needles and change after each injection.
- Apply hydrocortisone 1% cream every 6 hours for as long as the erythema persists.
- Elevate the limb.
- Apply a WARM pack to the affected area for 20 minutes 4 times daily for 1 to 2 days.
- NB. Administration of hyaluronidase should begin within 1 hour of the extravasation for the best results.

Neutral Drugs

- If you have an extravasation and the drug is not on the flowchart, please assume this is a neutral drug and the management is for symptomatic relief only.
- Elevate the limb.
- Consider a COLD pack if local symptoms develop.
- Apply Hydrocortisone 1% cream 4 times a day if erythema is present.

Any extravasation in a large enough volume may have irritant or exfoliant properties – discuss with senior nurse/doctor for advice. There have been reports of these agents acting as irritants but there is no clear evidence for this.

In all cases:

- Give analgesia as required.
- Arrange follow up at 24 hours as indicated and then as required.
- Datix and complete RCHT audit form.
- Photograph the extravasation site with patient consent using the Nurse-In-Charge mobile phone.

Appendix 6. Medication and Management of Extravasation.

Medication	Disperse and Dilute Warm Compress	Localise and Neutralise Cold Compress	Hyaluronidase	DMSO	Savene	Hydrocortisone Cream
Almtuzumab (Mab-Campath)		X				
Amsacrine		X		X		
Arsenic Trioxide		X				X
Asparaginase		X				
Azacitidine		X				
Bendamustine		X				X
Bleomycin		X				
Bortezomib		X				
Cabazitaxel	X		X			
Carboplatin		X				X
Carfilzomib		X				
Carmustine		X				X
Cladribine		X				
Cisplatin		X				X
Cyclophosphamide		X				
Cytarabine		X				
Dacarbazine		X		X		
Dactinomycin		X		X		
Daunorubicin		X		X	If >3mls	
Dexrazoxane		X				
Docetaxel	X		X			
Doxorubicin		X		X	If >3mls	
Epirubicin		X		X	If >3mls	
Eribulin		X				
Etoposide		X				X
Fludarabine		X				
Flurorouracil		X				X
Gemcitabine		X				

Medication	Disperse and Dilute Warm Compress	Localise and Neutralise Cold Compress	Hyaluronidase	DMSO	Savene	Hydrocortisone Cream
Gemtuzumab Ozogamicin (Mylotarg)		X				X
Idarubicin		X		X	If >3mls	
Ifosfamide		X				X
Immunotherapies		X				
Interferon		X				
Irinotecan		X				X
Liposomal Daunorubicin		X				X
Liposomal Doxorubicin (Caelyx)		X				X
Melphalan		X				X
Methotrexate		X				X
Mitomycin C		X		X		
Mitoxantrone		X				X
Monoclonal Antibodies (MABs)		X				
Oxaliplatin	X					X
Paclitaxel	X		X			
Paclitaxel Albumin (Abraxane)	X		X			
Pemetrexed		X				
Raltitrexed		X				
Targeted Therapies		X				
Thiotepa		X				
Topotecan		X				X
Trabectedin		X		X		
Trastuzumab Emtansine (Kadcyla)		X				X
Vinblastine	X		X			
Vincristine	X		X			
Vindesine	X		X			

Medication	Disperse and Dilute Warm Compress	Localise and Neutralise Cold Compress	Hyaluronidase	DMSO	Savene	Hydrocortisone Cream
Vinflunine	X		X			
Vinorelbine	X		X			

Appendix 7. Antidotes

Dexrazoxane (Savene):

SAVENE IS LOCATED IN THE PHARMACY EMERGENCY CUPBOARD ONLY PREPARED BY PHARMACY IN NORMAL WORKING HOURS

- Used to minimize anthracycline cardiotoxicity. It binds to iron and prevents the formation of free radicals which are thought to play a major role in the development of extravasation induced tissue necrosis.
- Is the only licensed specific antidote to anthracycline extravasation.
- Can be used for both peripheral and central line extravasations.
- To be used either immediately or within 6 hours of a positively identified anthracycline extravasation.
- Remove cold packs from the area to be treated at least 15min before administration.
- Savene must be prescribed by the medical team before giving.

Reconstitution of Savene must take place using safe handling techniques, either in the Pharmacy Technical Services Unit or by using the phaseal system provided (see below). If a decision is made to use Savene, Pharmacy Technical Services Unit (in normal working hours) will prepare this. This is on the understanding that the request is made no later than 15:30 pm and that they are notified at the earliest possible opportunity. RCHT pharmacy will not prepare Savene out of hours a decision will be made by the patients consultant about the most appropriate treatment.

Recommended 3-day course of treatment dosed according to body weight: Dose reduction should occur in patients with creatinine clearance less than 40mls per minutes.

- **Day 1** 1000mg/m^2 IV as soon as possible and no later than 6 hours post extravasation.
- **Day 2** 1000mg/m^2 .
- **Day 3** 500mg/m^2 .

For patients with a body surface area of more than 2.O m2 the single dose should not exceed 2000mg on days 1 and 2 and 1000mg on day 3.

Preparing Savene using the following equipment:

BD / Phaseal Equipment Required:

- BD 20mm BD Smartsite vial shield (1 per vial).
- BD Phaseal N35 injector (1 per 500ml bottle of Savene Solvent).

- BD Phaseal C100 infusion adaptor (1 per 500ml bottle of Savene Solvent).

Other:

- 30 ml closed system syringe (1 per vial).

Procedure Guidelines:

https://www.medicines.org.uk/emc/product/3282/smpc#gref

https://www.youtube.com/watch?v=whKZWkCPbc8

Ensure that the recommended PPE and waste disposal equipment is used for the safe handling of cytotoxics when handling Savene.

1. Place the vial on a steady surface, attach the vial shield using a downward force.
2. Repeat this step for each vial required.
3. Insert infusion adaptor into the top of the Savene Solvent bottle.
4. Attach the injector to the white arm of the infusion adaptor using the push-turn-push technique, ensuring that you have pushed the injector down to completely cover the inner dark blue section.
5. Now attach an empty 30ml closed system syringe to the luer lock end on the injector.
6. Invert the Solvent bottle and withdraw 25mls of Solvent solution into the syringe then disconnect the syringe from the injector (protecting key part once disconnected).
7. Repeat stage 5 and stage 6 for the required number of syringes needed (one syringe per vial).
8. Now attach one syringe to the vial shield and inject the solution into the vial to reconstitute the Savene powder.
9. Invert the vial and withdraw the reconstituted solution into the closed system syringe then attach to the luer lock end of the injector and inject the reconstituted drug back into the Solvent bottle.
10. Repeat stage 8 and stage 9 for the number of syringes required.
11. Dispose of each syringe into a cytotoxic waste bin once it has been disconnected.
12. Once all the reconstituted solution has been injected into the Solvent bottle then remove the injector from the infusion adaptor using a pull-turn-pull technique .
13. To administer the Savene infusion, attach the administration set through the light blue bottom of the infusion adaptor.

Topical Dimethyl sulfoxide (DMSO 99%) (This is located on Fisteral ward and is a shared product).

- This is an option for the treatment of anthracycline extravasations.
- **Must not be used if there is a possibility that Savene may be used.**
- It can help to stop the development of skin ulcers in small volume extravasations (less than 3mls).
- DMSO must be prescribed by the medical team before giving.
    - Prompt treatment within 10-25 minutes is required.
    - After initial first line treatment, wearing gloves apply a thin layer of DMSO topically to the marked area using a cotton bud or sterile gauze.
    - DMSO will arrive in a glass vial of liquid which can be withdrawn using a 10ml luer lock syringe.
    - Allow to dry.
    - Apply a non – occlusive dressing.
    - This should be repeated 4 times a day.
    - Check area for erythema caused by DMSO.

Hyaluronidase

This is a protein enzyme that degrades hyaluronic acid, it promotes drug diffusion and enhances drug absorption.

May be indicated for the suspected or known extravasation of vina alkaloids.

It can also be used in the event of extravasation of solutions containing calcium or potassium, aminophylline or vesicant antibiotics.

Administration of hyaluronidase should be within one hour of the extravasation for best results.

Hyaluronidase must be prescribed by the medical team before giving.

- After initial treatment, dilute 150-1500IU of hyaluronidase in 1ml of sterile water.
- Administer doses subcutaneously around the periphery of the extravasation.
- Inject 1ml (150IU) as 5 separate 0.2ml injections.
- Use a 24g needle and change after each injection.

Apply a warm pack for one hour post treatment, then for 20 minutes every four hours for 24-48 hrs. Replace hot/cold pack as soon as possible.

Appendix 8. Extravasation Kit

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

- 10 x Hyaluronidase ampoules 1500iu.
- 5 x Hydrocortisone IV 100 mg.
- 28 x Chlorphenamine 4mg tablets.
- Hydrocortisone 1% cream.
- x Water for injection ampoules (10 ml).
- Heat Pad/Cold Pad (in freezer on ward and Headland Unit).
- 3mL Syringes x 2.
- 20g needles x 2 (for drawing up).
- 25g needles x 4 (for injection).
- 10 x Alcohol swabs.
- 10mL syringe x 1.
- Indelible pen.
- Extravasation in Adults guideline.
- Data collection form.
- Patient information leaflet.

MINI Extravasation Kit:

- 28 x Chlorphenamine 4mg tablets.
- Hydrocortisone 1% cream 15g.
- Indelible marker pen.
- Extravasation in Adults guideline.
- Data collection form.
- Patient information leaflet.

Appendix 9. Follow up documentation chart for an extravasation

Please use hyperlink below to directly access this from the Forms-To-Print webpage.

CHA4576 Documentation For Suspected Extravasation Of Vesicant Exfoliant Drug

Appendix 10. Extravasation patient information leaflet.

Please use hyperlink below to directly access this from the Forms to Print webpage:

RCHT 1492 Extravasation

Appendix 11. Extravasation of Systemic Anti-Cancer Therapy (SACT) Escalation for Trauma and Plastics Support

In the event of an extravasation involving a vesicant, we may require advice and support from the trauma and plastics team, who are based at Derriford Hospital, Plymouth.

1
- Determine extravasation classification
- Extravasation first aid using extravasation kit
- Extravasation antidote if applicable

2
- Nurse in charge support
- Medical Review (senior)

3
- Escalate to SACT CNS Team

4
- Plastics on call via Derriford Switch Board
- Be prepared with Photographs (with patient consent), measurements, patient details.
- Email contact: plh-tr.plasticstraumateam@nhs.net

5
- Contact patients own Consultant

6
- Plan patient follow up using:
  - SACT chart for suspected extravasation of vesicant / exfoliant drugs
  - Clinical Photography

7
- Extravasation leaflet and advice for self care
- Access to adequate analgesia

8
- Make Acute Oncology Service aware
- If discharged home and follow up planned as outpatient, safety net with triage advice line