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

V5.1

June 2019
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 recognize ways in which to help prevent and manage extravasation and how to recognize when an extravasation has occurred.

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

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

The Trust has a duty under the DPA18 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 can’t rely on Opt out, it must be Opt in.

DPA18 is applicable to all staff; this includes those working as contractors and providers of services.

For more information about your obligations under the DPA18 please see the ‘information use framework policy’, or contact the Information Governance Team 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 clinical practice educators 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** are capable of causing 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.

2.2.3. 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 8 and 10 (RCHT extravasation leaflet and Duty of candour).

2.4. Signs and Symptoms

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

2.4.1.1. 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.

2.4.2. 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.

2.4.3. 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 administration of chemotherapy policy flow chart (Appendix 5).

2.4.4. 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.,”

2.4.5.  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.

2.5.  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 inform the medical team 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 (page 12 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 digital photographs of extravasated area using camera found in Headland Sisters office. Images must be stored in extravasation injury folder.

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 6 for Savene administration.
2.6.2. Confirm all the initial first aid procedures have been completed. Immediately contact senior doctor.

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

2.6.4. For small amounts (suggested 3 mls) of an extravasated drug follow extravasation flow sheet, apply HOT or COLD compress as recommended. Give an intravenous dose of 100mg IV Hydrocortisone and 4mg dose of oral chlorphenamine via a newly inserted cannula.

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 A in dedicated drawer for Savene in RCHT (see appendix 6 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 hourly over the first 12 hours for signs of deterioration and 4 hourly thereafter. Patients must be admitted to Lowen Ward and a SACT documentation form must be completed (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 consultant on call 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.

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 non-affected arm.

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 Headland unit 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

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.

2.8.5. Inform the patient that if there appears to be any deterioration in the injury they must contact the unit immediately. Arrange for the injury to be reviewed the following day in the Headland Unit.

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

2.9. Inflammatory Agents

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

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

2.9.3. 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.

2.9.4. Inform the patient that if there appears to be any deterioration in the injury they must contact the unit immediately. Arrange for the injury to be reviewed the following day in the Headland Unit.

2.10. Neutral

2.10.1. 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.
2.10.2. 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.

2.10.3. Provide the patient with verbal information, contact numbers and complete a follow up extravasation documentation form this should be retained in the extravasation folder.

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

2.11.1. 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.

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

2.11.3. 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.

2.11.4. 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.

2.11.5. 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.

2.11.6. Aspirate as much as the drug as possible.

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

2.11.8. 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.**

2.11.9. 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).

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

2.11.11. 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 and a duty of candor letter provided.
2.12. Mixed Extravasations

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

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

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

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

3. Monitoring compliance and effectiveness

<table>
<thead>
<tr>
<th>Element to be monitored</th>
<th>All SACT Extravasations</th>
</tr>
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<tbody>
<tr>
<td>Lead</td>
<td>SACT MDT</td>
</tr>
<tr>
<td>Tool</td>
<td>Extravasation reported on DATIX and those reported on the national green card reporting system</td>
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<tr>
<td>Frequency</td>
<td>Monitor Yearly</td>
</tr>
<tr>
<td>Reporting arrangements</td>
<td>SACT MDT</td>
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<tr>
<td></td>
<td>Extravasation DATIX reported and reviewed by MDT each month and a yearly report made. If Trends are recognised more frequently in extravagations these will be addressed with further investigation</td>
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<tr>
<td>Acting on recommendations and Lead(s)</td>
<td>SACT clinical Lead will be responsible for action planning for any or all deficiencies and recommendations.</td>
</tr>
<tr>
<td>Change in practice and lessons to be shared</td>
<td>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</td>
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</table>

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, Inclusion & Human Rights Policy’ or the Equality and Diversity website.

4.2. Equality Impact Assessment

The Initial Equality Impact Assessment Screening Form is at Appendix 2.
<table>
<thead>
<tr>
<th><strong>Document Title</strong></th>
<th>Prevention and Management of the Extravasation of Systemic Anti-Cancer Therapy in Adults Clinical Guideline V5.1</th>
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<tbody>
<tr>
<td><strong>Date Issued/Approved:</strong></td>
<td>December 2018</td>
</tr>
<tr>
<td><strong>Date Valid From:</strong></td>
<td>February 2019</td>
</tr>
<tr>
<td><strong>Date Valid To:</strong></td>
<td>February 2022</td>
</tr>
<tr>
<td><strong>Directorate / Department responsible (author/owner):</strong></td>
<td>Rachel Hopper Clinical Matron Cancer Services</td>
</tr>
<tr>
<td><strong>Contact details:</strong></td>
<td>01872 253842</td>
</tr>
<tr>
<td><strong>Brief summary of contents</strong></td>
<td>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.</td>
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<tr>
<td><strong>Suggested Keywords:</strong></td>
<td>SACT, Chemotherapy, extravasation,</td>
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<tr>
<td><strong>Target Audience</strong></td>
<td>RCHT</td>
</tr>
<tr>
<td><strong>Executive Director responsible for Policy:</strong></td>
<td>Medical Director</td>
</tr>
<tr>
<td><strong>Date revised:</strong></td>
<td>December 2018</td>
</tr>
<tr>
<td><strong>This document replaces (exact title of previous version):</strong></td>
<td>Clinical Guideline for the Management of Extravasation of Cytotoxic Drugs in Adults Version 4.0</td>
</tr>
<tr>
<td><strong>Approval route (names of committees)/consultation:</strong></td>
<td>Chemotherapy MDT (03.12.14) CSSC Governance DMB (16.12.14)</td>
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<tr>
<td><strong>Care Group General Manager confirming approval processes</strong></td>
<td>Charlotte Timmins</td>
</tr>
<tr>
<td><strong>Name and Post Title of additional signatories</strong></td>
<td>Not required</td>
</tr>
<tr>
<td><strong>Name and Signature of Care Group/Directorate Governance Lead confirming approval by specialty and care group management meetings</strong></td>
<td>{Original Copy Signed}</td>
</tr>
<tr>
<td><strong>Name:</strong> Suzanne Atkinson</td>
<td></td>
</tr>
<tr>
<td><strong>Signature of Executive Director giving approval</strong></td>
<td>{Original Copy Signed}</td>
</tr>
<tr>
<td>Related Documents:</td>
<td></td>
</tr>
<tr>
<td>--------------------</td>
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<tr>
<td>• Dougherty, L (2008) IV Therapy: Recognizing the Differences between infiltration and Extravasation. <em>British Journal of Nursing</em>. 17(14) 896-901</td>
<td></td>
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<tr>
<td>• EONS Extravasation guidelines toolkit (2007)</td>
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Version Control Table

<table>
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<th>Date</th>
<th>Version No</th>
<th>Summary of Changes</th>
<th>Changes Made by (Name and Job Title)</th>
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<td>1.0</td>
<td>Management of Extravasation of cytotoxic drugs</td>
<td>unknown</td>
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<tr>
<td>Feb 2011</td>
<td>2.0</td>
<td>Reviewed, written, updated and put into Trust format</td>
<td>Lisa Nicholls Chemotherapy CNS</td>
</tr>
<tr>
<td>Dec 2013</td>
<td>3.0</td>
<td>Reviewed and put into new Trust format</td>
<td>Lisa Nicholls Chemotherapy CNS</td>
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<tr>
<td>Dec 2014</td>
<td>4.0</td>
<td>Updated – new format, flow sheet and Trust</td>
<td>Lisa Nicholls Chemotherapy CNS</td>
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<tr>
<td>December 2018</td>
<td>5.0</td>
<td>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.</td>
<td>Rachel Hopper and Niamh Dinneen</td>
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<tr>
<td>May 2019</td>
<td>5.1</td>
<td>Watermarks added to the appendix 8 and appendix 9, hyperlink added to Appendix 10 as directed by governance lead and Policy Review Group.</td>
<td>Demi Scott-Ward – Corporate Records Manager.</td>
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## Appendix 2. Initial Equality Impact Assessment Form

| 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 V5.1 |

| Directorate and service area: | New or existing document: |
| Cancer Services | Existing |

| Name of individual completing assessment: | Telephone: |
| Rachel Hopper | 01872 255148 |

| 1. Policy Aim* |
| Who is the strategy / policy / proposal / service function aimed at? |
| 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 the outcome? |
| Monitor DATIX’s of chemotherapy 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 |

| 6a Who did you consult with |
| Workforce | Patients | Local groups | External organisations | Other |
| X |

| b). Please identify the groups who have been consulted about this procedure. |
| **Please record specific names of groups** |
| Systemic Anti-Cancer Therapy Group (SACT) |

| What was the outcome of the consultation? |
| Document e-mailed for comments to all clinicians in SACT MDT and senior nursing team, comments included. Discussed at SACT MDT. |
7. The Impact
Please complete the following table. If you are unsure/don't know if there is a negative impact you need to repeat the consultation step.

Are there concerns that the policy could have differential impact on:

<table>
<thead>
<tr>
<th>Equality Strands:</th>
<th>Yes</th>
<th>No</th>
<th>Unsure</th>
<th>Rationale for Assessment / Existing Evidence</th>
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<tr>
<td>Age</td>
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<td>All patients that have experienced an extravasation will be treated in the same manner</td>
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<tr>
<td>Sex (male, female, trans-gender / gender reassignment)</td>
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<td>All patients that have experienced an extravasation will be treated in the same manner</td>
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<tr>
<td>Race / Ethnic communities /groups</td>
<td>X</td>
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<td>All patients that have experienced an extravasation will be treated in the same manner</td>
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<tr>
<td>Disability - Learning disability, physical impairment, sensory impairment, mental health conditions and some long term health conditions.</td>
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<td>All patients that have experienced an extravasation will be treated in the same manner</td>
</tr>
<tr>
<td>Religion / other beliefs</td>
<td>X</td>
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<tr>
<td>Marriage and Civil partnership</td>
<td>X</td>
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<td>All patients that have experienced an extravasation will be treated in the same manner</td>
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<tr>
<td>Pregnancy and maternity</td>
<td>X</td>
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<td>All patients that have experienced an extravasation will be treated in the same manner</td>
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<tr>
<td>Sexual Orientation, Bisexual, Gay, heterosexual, Lesbian</td>
<td>X</td>
<td></td>
<td></td>
<td>All patients that have experienced an extravasation will be treated in the same manner</td>
</tr>
</tbody>
</table>

You will need to continue to a full Equality Impact Assessment if the following have been highlighted:

- You have ticked “Yes” in any column above and
- No consultation or evidence of there being consultation- this excludes any policies which have been identified as not requiring consultation. or
- Major this relates to service redesign or development

8. Please indicate if a full equality analysis is recommended.  

| Yes | No | X |

9. If you are not recommending a Full Impact assessment please explain why.

None of the above apply
This EIA will not be uploaded to the Trust website without the approval of the Policy Review Group.

A summary of the results will be published on the Trust’s web site.
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 Nexiva 24 gauge 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

<table>
<thead>
<tr>
<th>Neutrals Group 1</th>
<th>Inflammitants Group 2</th>
<th>Irritants Group 3</th>
<th>Exfoliants Group 2</th>
<th>Vesicants Group 1</th>
</tr>
</thead>
<tbody>
<tr>
<td>Asparaginase</td>
<td>Fluourouracil</td>
<td>Arsenic Trioxide</td>
<td>Docetaxol</td>
<td>Amsacrine</td>
</tr>
<tr>
<td>Azacitidine</td>
<td>Methotrexate</td>
<td>Carboplatin</td>
<td>Liposomal Daunorubicin</td>
<td>Bendamustine</td>
</tr>
<tr>
<td>Bevacizumab</td>
<td>Cisplatin</td>
<td>Liposomal Doxorubicin</td>
<td>Cabazitaxel</td>
<td></td>
</tr>
<tr>
<td>Bleomycin</td>
<td>Etoposide</td>
<td>Mitoxantrone</td>
<td>Carmustine</td>
<td></td>
</tr>
<tr>
<td>Bortezomib</td>
<td>Ifosfamide</td>
<td>Oxaliplatin</td>
<td>Dacarbazine</td>
<td></td>
</tr>
<tr>
<td>Brentuximab</td>
<td>Irinotecan</td>
<td>Topotecan</td>
<td>Dactinomycin</td>
<td></td>
</tr>
<tr>
<td>Carfilzomib</td>
<td>Streptozocin</td>
<td></td>
<td>Daunorubicin</td>
<td></td>
</tr>
<tr>
<td>Cetuximab</td>
<td></td>
<td></td>
<td>Doxorubicin</td>
<td></td>
</tr>
<tr>
<td>Cladribine</td>
<td></td>
<td></td>
<td>Epirubicin</td>
<td></td>
</tr>
<tr>
<td>Clofarabine</td>
<td></td>
<td></td>
<td>Idarubicin</td>
<td></td>
</tr>
<tr>
<td>Cyclophosphamid</td>
<td></td>
<td></td>
<td>Mitomycin C</td>
<td></td>
</tr>
<tr>
<td>Cytarabine</td>
<td></td>
<td></td>
<td>Mustine</td>
<td></td>
</tr>
<tr>
<td>Erubulin</td>
<td></td>
<td></td>
<td>*Nab – Paclitaxel</td>
<td></td>
</tr>
<tr>
<td>Fludarabine</td>
<td></td>
<td></td>
<td>*Paclitaxel</td>
<td></td>
</tr>
<tr>
<td>Gemcitabine</td>
<td></td>
<td></td>
<td>**Trabectedin</td>
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<tr>
<td>Gemtuzumab</td>
<td></td>
<td></td>
<td>Treosulfan</td>
<td></td>
</tr>
<tr>
<td>Interferon</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ipilimumab (Immunotherapy)</td>
<td></td>
<td></td>
<td>Vinblastine</td>
<td></td>
</tr>
<tr>
<td>Melphalan</td>
<td></td>
<td></td>
<td>Vincristine</td>
<td></td>
</tr>
<tr>
<td>Mifamurtide</td>
<td></td>
<td></td>
<td>Vindesine</td>
<td></td>
</tr>
<tr>
<td>Panitumumab</td>
<td></td>
<td></td>
<td>Vinflunine</td>
<td></td>
</tr>
<tr>
<td>Pemetrexed</td>
<td></td>
<td></td>
<td>Vinorelbine</td>
<td></td>
</tr>
<tr>
<td>Pentostatin</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pertuzumab</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pixantrone</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Raltitrexed</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rituximab</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Thiotepa</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Trastuzumab</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**The patient may develop a severe site reaction, use caution when administered peripherally, strong consideration should be given for a central line**

*Please note different treatment recommendations for the different types of Paclitaxel*

Prevention and Management of the Extravasation of Systemic Anti-Cancer Therapy in Adults
Clinical Guideline V5.1
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Appendix 5. Guideline For Management Of SACT Extravasation

Immediate treatment for all extravasation: Most immunotherapy and monoclonal antibodies are non-vesicant this will need to be confirmed prior to extravasation management

1. STOP the infusion, but leave cannula in place
2. Identify agent using table below and obtain and apply correct warm/cold pack (as indicated by colour of drug on the flowchart) then list action advice from pharmacy
3. Collect extravasation kit
4. Aspirate as much fluid as possible through the cannula: if possible draw back 3-5mls of blood
5. Mark extravasation with permanent pen
6. Contact the doctor,
7. Remove cannula
8. Complete DATIX, RCHT Audit form and follow up documentation form

**AIM: DISPERSE & DILUTE**
- Give several subcutaneous (or intradermal) injections of 150 – 1500 IU of hyaluronidase diluted in 1 mL sterile water as 5 separate 0.2ml injections around the periphery of extravasated area to dilute the infusate.
- Use 25 to 27 gauge needle and change after each injection
- Apply hydrocortisone 1% cream every 6 hours for as long as 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 extravasation for best results Consider referral to Hand/Plastic Surgeon

**AIM: LOCALISE & NEUTRALISE**
- Neutralise the area by applying a thin layer topical DMSO to the marked area using a cotton bud. Do not use DMSO if blisters 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 every 4 hours for 24 hours to help localise the area
- 3 hours after first DMSO application apply hydrocortisone 1% cream. Repeat every 6 hours for 7 days
- Elevate the limb
- Consider referral to Hand/Plastic Surgeon

**AIM: LOCALISE**
Apply a cold/warm pack for 20 minutes every 4 hours for 24 hours
Apply hydrocortisone cream 1% every 6 hours for 7 days or as long as erythema persists

**AIM: SYMPTOMATIC RELIEF**
- Elevate the limb
- Consider applying a cold pack if local symptoms occur
- Apply hydrocortisone cream 1% four times each day if erythema is present

Consider referral to Hand/Plastic Surgeon within 1 hour of extravasation for best results

- Contact the doctor,
- Remove cannula
- Complete DATIX, RCHT Audit form and follow up documentation form

**Non-vesicants¹**
- Asparaginase
- Ascolvine
- Bevacizumab
- Beomycin
- Bortezomib
- Brentuximab vedotin
- Carboplatin
- Cetuximab
- Chlorambucil
- Cisplatin
- Dichloro
- Diflurane
- Cyclophosphamide
- Cytrabine
- Eribulin
- Fludarabine
- Gemcitabine
- Immunotherapy
- Gemtuzumab (Mylotarg)
- Interferons
- Ipilimumab
- Melphan
- Mifamurtide
- Panitumumab
- Pentaxent
- Pentostatin
- Pertuzumab
- Pexastine
- Rabbitweed
- Rituximab
- Thalidomide
- Trastuzumab-entansime

**Vesicants Non-DNA binding**
- Carboplatin
- Daunorubicin
- Vinblastine
- Vincristine
- Vinflunine
- Vindesine
- Vinorelbine

**Vesicants DNA Binding**
- Alkeran
- Dacarbazine
- Doxorubicin
- Etoposide
- Idarubicin
- Mitomycin C
- Mitoxantrone
- Streptozosin

**Possible irritants²**
- Thiotepa
- Cisplatin
- Gemcitabine
- Paclitaxel
- Carboplatin
- Cetuximab
- Eribulin
- Fludarabine
- Gemcitabine
- Immunotherapy
- Gemtuzumab (Mylotarg)
- Interferons
- Ipilimumab
- Melphan
- Mifamurtide
- Panitumumab
- Pentaxent
- Pentostatin
- Pertuzumab
- Paexastine
- Rabbitweed
- Rituximab
- Thalidomide
- Trastuzumab-entansime

**Exfoliants/Irritants ¹**
- Omepcetin
- 5-fluorouracil
- Vinorelbine
- Vinflunine
- Vindesine
- Vinorelbine
- Eribulin
- Fludarabine
- Gemcitabine
- Immunotherapy
- Gemtuzumab (Mylotarg)
- Interferons
- Ipilimumab
- Melphan
- Mifamurtide
- Panitumumab
- Pentaxent
- Pentostatin
- Pertuzumab
- Paexastine
- Rabbitweed
- Rituximab
- Thalidomide
- Trastuzumab-entansime

**Vesicants Non-DNA binding**
- Paclitaxel
- Vincristine
- Vinflunine
- Vindesine
- Vinorelbine

**Vesicants DNA Binding**
- Alkeran
- Dacarbazine
- Doxorubicin
- Etoposide
- Idarubicin
- Mitomycin C
- Mitoxantrone
- Streptozosin

**Possible irritants²**
- Thiotepa
- Cisplatin
- Gemcitabine
- Paclitaxel
- Carboplatin
- Cetuximab
- Eribulin
- Fludarabine
- Gemcitabine
- Immunotherapy
- Gemtuzumab (Mylotarg)
- Interferons
- Ipilimumab
- Melphan
- Mifamurtide
- Panitumumab
- Pentaxent
- Pentostatin
- Pertuzumab
- Paexastine
- Rabbitweed
- Rituximab
- Thalidomide
- Trastuzumab-entansime

**Non-Vesicants¹**
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- Bevacizumab
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- Brentuximab vedotin
- Carboplatin
- Cetuximab
- Chlorambucil
- Cisplatin
- Dichloro
- Diflurane
- Cyclophosphamide
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- Fludarabine
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- Panitumumab
- Pentaxent
- Pentostatin
- Pertuzumab
- Paexastine
- Rabbitweed
- Rituximab
- Thalidomide
- Trastuzumab-entansime

**AIM: LOCALISE**
Apply a cold/warm pack for 20 minutes every 4 hours for 24 hours
Apply hydrocortisone cream 1% every 6 hours for 7 days or as long as erythema persists

**AIM: SYMPTOMATIC RELIEF**
- Elevate the limb
- Consider applying a cold pack if local symptoms occur
- Apply hydrocortisone cream 1% four times each day if erythema is present

**Non-Vesicants¹**
- Asparaginase
- Ascolvine
- Bevacizumab
- Beomycin
- Bortezomib
- Brentuximab vedotin
- Carboplatin
- Cetuximab
- Chlorambucil
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**AIM: LOCALISE**
Apply a cold/warm pack for 20 minutes every 4 hours for 24 hours
Apply hydrocortisone cream 1% every 6 hours for 7 days or as long as erythema persists

**AIM: SYMPTOMATIC RELIEF**
- Elevate the limb
- Consider applying a cold pack if local symptoms occur
- Apply hydrocortisone cream 1% four times each day if erythema is present
Appendix 6. Antidotes

**Dexrazoxane (Savene):**

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

Used to minimize anthracycline cardio-toxicity. 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, a specialist Cancer Pharmacist (in normal working hours) will prepare this. This is on the understanding that the request is made no later than 4pm 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 2.0 m\(^2\) the single dose should not exceed 2000mg on days 1 & 2 and 1000mg on day 3

Preparing Savene using

**Phaseal Equipment Required:**
Phaseal:
P50 protector (1 per vial) N35 injector (1 per
vial)
C100 infusion adaptor (1 per bag)

Other:
Syringe (1 per vial)
Needle (1 per vial)
Water (25ml per vial)

Procedure Guidelines:

1. Placing the vial on a steady surface, attach the protector to each vial (number required for one patient dose) using a downward force.

2. Draw up 25ml of sterile water into each syringe (using regular needle).

3. Remove needle and attach injector to the end of each syringe.
   a. NB. Once injector is attached to syringe DO NOT REMOVE.

4. Using Push-Turn-Push technique (handling the white part of the injector only), connect the injector (with syringe attached) to the protector on the vial.

5. Keeping the vial and syringe upright, push the water into the vial. The expansion chamber will inflate.

6. Once the Savene is fully reconstituted, draw back the required amount from the vial.

7. Using Pull-Turn-Pull technique, remove the injector from the protector.

8. Spike the provided diluent bag with the Phaseal infusion adaptor.

9. Using Push-Turn-Push technique, connect the injector (with syringe attached) to the infusion adaptor and push the Savene into the bag.

10. Using Pull-Turn-Pull technique, remove the injector from the infusion adaptor. Do not detach injector from syringe.

11. Dispose of syringe (with injector attached) and vial (with protector attached) according to facility protocol.

12. To administer Savene, attach administration set through bottom of 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 3 mls).

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 but or sterile gauze.
- 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 1 ml 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 7. 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.

Hyaluronidase 1500 units.
Hydrocortisone IV 1000mg
Piriton tablets
Hydrocortisone 1% cream
Water for injection (5ml).

Heat Pad/Cold Pad (in freezer on ward and Headland Unit)

2mL Syringes x 2
19G needles x 2 (for drawing up) 25G needles x 4 (for injection) Alcohol swabs
10mL syringe x 1
Indelible pen

Extravasation guideline
Colored copy of flow sheet
RCHT Extravasation audit form
Patient information leaflet
Appendix 8. Duty of Candor

Date:

Royal Cornwall Hospital
Truro
Cornwall TR1 3LJ
Tel: 01872 252000

Patients Name and address

Dear

I am writing to apologise that you have experienced an incident whereby the treatment you were receiving has extravasated.

At the Royal Cornwall Hospital, we are committed to doing the best for our patients. Despite our best efforts however, there are occasions when things do not go as planned, which has happened in your case.

Unfortunately, as explained in the patient information leaflet, when receiving intravenous treatment there is a risk of extravasation, despite all measures being put in place to minimise this.

We are committed to being open with patients, families and carers when these events occur. We have taken the appropriate action to treat your extravasation and have reported this as per trust policy. We will identify anything that went wrong in order to determine whether it is possible to prevent similar things happening in the future, and to take action accordingly.

If you have any further concerns please contact the Headland Unit or Lowen Ward for support and further information.

Once again we are sorry that your treatment did not proceed without event, and for any distress this may have caused.

Yours sincerely

Sarah Caskey
Clinical Matron Cancer Services
Appendix 9. Follow up documentation chart for an extravasation

SACT chart for suspected extravasation of vesicant / exfoliant drugs

<table>
<thead>
<tr>
<th>Patient Name:</th>
<th>Hospital Number:</th>
<th>Ward:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Date and Time of Extravasation:</td>
<td>Name of Drug Extravasated:</td>
<td></td>
</tr>
</tbody>
</table>

**Follow Up** (To score, refer to grading table below) To complete alternate days or as required. May be discontinued if signs and symptoms have resolved. Please retain this form in the Headland extravasation folder.

<table>
<thead>
<tr>
<th>Day</th>
<th>Date/Time</th>
<th>Unit Location</th>
<th>Skin Colour</th>
<th>Skin Temperature</th>
<th>Skin Integrity</th>
<th>Oedema</th>
<th>Mobility</th>
<th>Pain</th>
<th>Fever</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Grade</th>
<th>0</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Skin Colour</td>
<td>Normal</td>
<td>Pink</td>
<td>Red</td>
<td>Blanched area surrounded by red</td>
<td>Blackened</td>
</tr>
<tr>
<td>Skin Integrity</td>
<td>Unbroken</td>
<td>Blistered</td>
<td>Superficial Skin loss</td>
<td>Tissue lost and exposed subcut tissue</td>
<td>Tissue loss and exposed bone/muscle necrosis crater</td>
</tr>
<tr>
<td>Skin Temperature</td>
<td>Normal</td>
<td>Warm</td>
<td>Hot</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Oedema</td>
<td>Absent</td>
<td>Non-pitting</td>
<td>Pitting</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mobility</td>
<td>Full</td>
<td>Slightly limited</td>
<td>Very limited</td>
<td>Immobile</td>
<td></td>
</tr>
<tr>
<td>Pain</td>
<td>Grade using a scale of 0-10; 0 = no pain and 10 = worst pain</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fever</td>
<td>Normal</td>
<td>Elevated</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Appendix 10. Extravasation patient information leaflet.

Available on RCHT intranet using link below: