British Oncology Pharmacy Association

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Standards for Pharmacy Verification of Prescriptions for Cancer Medicines

British Oncology Pharmacy Association

THIRD EDITION

OCTOBER 2018

Endorsed by:

ROYAL PHARMACEUTICAL SOCIETY

Contents

1. The Purpose of the BOPA Standards

1.1 The Department of Health requires that all chemotherapy prescriptions should be checked and authorised by a pharmacist. NHS England: B15/S/a: 2013/14 NHS STANDARD CONTRACT FOR CANCER: CHEMOTHERAPY (ADULT) 2013 Available at https://www.england.nhs.uk/commissioning/spec-services/npc-crg/group-b/b15/

1.2 The Scottish Government Health Department sets out its guidance in the Chief Executive Letter 30 (2012) – Guidance for the safe delivery of systemic anticancer therapy. It states *"All prescriptions for SACT are verified by a suitably trained pharmacist in accordance with legislative requirements, national standards and local policy prior to dispensing and release frompharmacy".*

1.3 This document describes what key steps a pharmacist must take when checking prescriptions for systemic anticancer therapy (SACT). For the purposes of this document this will be referred to as '**Verification'**. It is recognised that there are other terms in common use to describe this process e.g. 'clinical checking' or 'validation', 'screening' 'approval' etc.

1.4 Verification provides assurance that the prescribed treatment is tailored and correct for the patient and their specific disease. It provides a check on treatment accuracy and is essential to avoid medication errors. Cancer medicines must not be administered to, or taken by patients until an appropriately trained pharmacist has verified the prescription.

2 The scope of the BOPA standards

2.1 This document does not describe any novel clinical practice; it brings together established pharmacy practice and presents it in the form of standards. This will allow all SACT Services to assure themselves that their pharmacy policies, procedures and practices meet the required standard.

2.2 This guidance applies to parenteral and oral administration of SACT. The terms 'SACT' refers to systemic anti-cancer therapy, which includes cytotoxic chemotherapy, monoclonal antibodies/targeted therapies, immunotherapies and other biological therapies used in the treatment of cancer, This includes intravenous, subcutaneous, intrathecal and oral SACT as well as topical treatments for bladder cancer; hormonal treatment is excluded.

2.3 It is noted that SACT medicines dispensed as part of a clinical trial may be classed as investigational medicinal products (IMPs) and additional checks are needed according to the clinical trial protocol and GMP guidelines.

2.4 This document is aimed at SACT for adults and does not contain the additional checks required for paediatric SACT, though the majority of the principles will apply.

2.5 This document must be used in conjunction with local organisation/ Cancer Network/Health Board Policies on Medicines Management and safe use of SACT and the following national guidance documents:

- Royal Pharmaceutical Society Professional Standards for Hospital Pharmacy July 2012
- Chemotherapy Peer Review Measures. NHS England Quality Surveillance Programme Available at https://www.qst.england.nhs.uk/(restricted access)
- Dispensing and Supply of Oral Chemotherapy and SACT in Primary Care. Royal Pharmaceutical Society January 2011
- Updated National Guidance on the Safe Administration of Intrathecal Chemotherapy: DOH 2008
- HSE InformationSheetMISC615-SafeHandlingOfCytotoxicDrugs,9/03
- National Patient Safety Agency (NPSA) Rapid Response Report. 'Risks Of Incorrect Dosing of Oral Anticancer Medicines.' 22Jan08.
- Scottish Government Health Department CEL (2009) 21: Safe Administration of Intrathecal Cytotoxic Chemotherapy and
- Scottish Government Health Department CEL 30 (2012) – Guidance for the safe delivery of systemic anticancer therapy
- Northern Irish Chemotherapy Service Standards.
- Welsh Cancer Standards 2005 WHC (2005)051 Cancer Services in Wales: Publication of National Cancer Standards and the implication for Commissioners and Providers, through the Cancer Networks, 2009 (Sarcoma Services), 2010 (Rehabilitation of Adults with Cancer) and Northern Irish Cancer Standards.
- The National Cancer Action Team report into the 'Quality and Safety of Chemotherapy Services' published in August 2009
- Chemotherapy dose standardisation. NICE Key therapeutic topic: 28 February 2018. Available at https://www.nice.org.uk/advice/ktt22

3 Putting the Standards into Practice

3.1 The BOPA Standards have been updated to reflect the changing nature of SACT use. There are now increasing numbers of fixed dose continuous SACT therapies that may not require the same level of checking as cytotoxics since they may pose a lower risk to patients. Local protocol should be consulted to determine risks/monitoring requirements. The BOPA standards have been simplified to seven core steps with associated secondary steps to be applied as appropriate depending on configuration of local services.

3.2 Local teams should review their pharmacy verification practice and clearly document in local policy where the different levels of verification are required, e.g. for IV SACT all secondary steps may be needed or for fixed dose continuous oral SACT only the core steps are needed.

3.3 Pharmacy staff verifying prescriptions for oral anticancer medicines should operate to the same safety standards used when verifying anticancer medicine prescriptions for all other routes of administration.

3.4 All SACT must be prescribed in the context of an approved protocol and prescribed via electronic prescribing system. NHS England Chemotherapy Peer Review Measures for Chemotherapy (Adult) (available via the NHS England Quality Surveillance Programme) Recommends: Similar directives exist for Scotland and Wales.

Electronic prescribing system

There should be a database driven, electronic prescribing platform in use which at least fulfils the following:

- it enables electronic prescribing using approved protocols;
- it should have replaced manual prescriptions as the default method for the CCS (Clinical Chemotherapy Service);
- it provides an auditable record of chemotherapy, prescribed and administered; the record encompassing the national mandatory chemotherapy dataset (SACT);
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3.5 A rigorous validation process for e-prescribing systems must be in place to ensure accuracy of calculated doses and accuracy of regimen building. These systems must have on-going maintenance and have suitable arrangements for supervision of their use by appropriately qualified staff. *Note* it is beyond the scope of this document to give detailed advice on set up and validation of electronic SACT prescribing systems.

3.6 Where paper copies of electronic prescriptions are printed off in advance for verification, preparation or administration purposes it is essential to have systems in place to ensure that the paper copy still reflects the electronic version and no changes have been made after printing.

3.7 It is considered good practice to document identified pharmaceutical care issues that need to be monitored with SACT as part of the verification process, particularly for IV SACT. This can be in a structured care planning template, as part of the electronic patient records or in the SACT notes.

3.8 Clinical capacity for pharmacists to verify SACT prescriptions and deliver pharmaceutical care to cancer patients must be monitored as part of the SACT service capacity.

3.9 BOPA has defined specific educational competencies outlining the knowledge and understanding that an appropriately trained pharmacist verifying a SACT prescription must have.

3.10 More detailed guidance to assist pharmacists in undertaking each of the steps required for SACT verification is available in ‘Appendix One of this document.

4 Professional Responsibilities

4.1 Overall responsibility for the safe use of SACT and ensuring these Standards are in place should sit with an appropriate senior clinical lead within each organisation, e.g. Head of Pharmacy; Lead Clinician for SACT or Trust/Board Lead for Medicines Management.

4.2 Pharmacists verifying prescriptions are one part of the overall medicine optimisation process for SACT. This document does not describe standards for the clinical monitoring of patients receiving SACT. Pharmacists must define their responsibilities in areas where there is overlap to determine who has primary responsibility.

4.3 SACT services are varied, it is recognised that there will be differences in pharmacists' responsibilities depending on the set up of their service. For example in services where SACT is prescribed and prepared in advance of critical test results being known it may be acceptable for drugs to be released from pharmacy before results are known, provided the organisation has a policy in place clearly defining the process and identifying who is responsible for checking results before administration.

4.4 If a pharmacist prescriber (NMP) initiates a prescription a second pharmacist is still required to verify the prescription. The Royal Pharmaceutical Society of Great Britain state that NMPs must '*ensure separation of prescribing and dispensing whenever possible. Where a pharmacist is both prescribing and dispensing a patient's medication, a second suitably competent person should normally be involved in the checking process.*'

4.5 Pharmacists verifying prescriptions for SACT must be able to recognise situations where they need to seek advice / support from appropriate sources, e.g. senior colleague and respond appropriately; in particular, where the complexity required exceeds their own personal level of competence or where there is reason for concern about the individual's suitability for the prescribed treatment.

4.6 All health care professionals have a duty to their employers to use resources efficiently and effectively. Therefore the verification process should ensure for on-going oral SACT that appropriate quantities are dispensed and longer durations of supply that could potentially lead to waste are avoided unless the patient is stable on long term therapy. Where it is deemed clinically appropriate for a longer duration of supply, pharmacists should ensure that they are working within their own local Trust/Board policies on supply of medicines.

5 Limitations

5.1 The clinical role of pharmacy encompasses more than verification of individual treatment episodes. Pharmacy staff improve the risk management of anticancer medicines by medication review; patient education, clinical monitoring of patients receiving anticancer medicines and direct clinical care to anticancer medicine patients, e.g. prescribing and managing the introduction of new medicines.

5.2 Cytotoxic or biologic medicines may also be used for non-cancer indications, e.g. methotrexate for rheumatoid arthritis, and pose similar risks to the patient. Guidance for verification of prescriptions of these medicines is outside the scope of this document. Pharmacy departments should consider if any of the standards listed can be applied to the verification of these medicines and other high risk medications.

5.3 Due to the existence of a variety of proprietary SACT electronic prescribing systems and different system versions or configurations, BOPA is not able to issue guidance on how to use the electronic systems. Organisations must have in place appropriate procedures for the practical use of the electronic system for verification, which should then be used in conjunction with this document.

6 The BOPA Standards (See Appendix One for full details)

6.1 **Check Prescription Details**: Has the drug or regimen been prescribed in line with legislation and local prescribing policy?

- Check the prescriber's details and signature are present in the appropriate section of the electronic prescription form, and confirm they are authorised to prescribe SACT in your organisation.
- Check that any printed copies of electronic prescriptions are clear, legible, unambiguous and includes all details required for dispensing, labelling and administration
- Ensure that all parts of prescription are verified.

6.2 **Check the Prescription Against the Protocol and Treatment Plan:**

This will include as appropriate/relevant:

- Ensuring the regimen has been through local approval processes e.g. clinical governance and financial approval and/ or is included on a list of locally approved regimens
- Where there is access to either clinical notes, consent form, treatment plan or electronic record, on first cycle check the regimen is the intended treatment and is appropriate for patient's diagnosis, medical history, performance status and SACT history. Ensure the correct regimen has been selected on the electronic prescribing system.
- If pre-approval needed for regimen, e.g. blueteq system in England, check that this has been completed by prescriber at first cycle as appropriate.
- Check if approval via regulatory required scheme is required (e.g. ePAF) and ensure is completed.

6.3 **Check Patient Details**

- Check relevant patient demographics (e.g. name, CHI or NHS number, age, height and weight) have been correctly recorded and entered onto electronic prescription as appropriate.

6.4 **Check Administration Details:** This will include as appropriate/ relevant:

- Checking there are no known drug interactions (including with food) or conflicts with patient allergies and other medication(s)
- Checking the timing of administration is appropriate i.e. interval since last treatment and/or start and stop dates for oral SACT
- Checking appropriate supportive care is prescribed
- Checking route of administration is appropriate

6.5 **Check Calculations:** Are the BSA and dose calculations correct?

- Check all dose calculations and dose units are correct and have been calculated correctly by the electronic system or prescriber according to the protocol and any other relevant local guidance, e.g. dose banding /standardisation as appropriate.
- Check prescribed dose is in line with previous dose reductions
- Check patient's weight and body surface area (BSA) is correctly calculated if needed for dose calculation. There should be local agreement for frequency of monitoring and checking patient's weight.

6.6 **Check laboratory results, critical tests and toxicities as appropriate**:

- Check laboratory values, (e.g. FBC, U&E's, LFT's, TFTs, bone profile etc) are within accepted limits if appropriate
- Check other essential critical tests have been undertaken if appropriate (e.g. BP, urinalysis etc)
- Where appropriate check doses are correct with respect to renal and hepatic function
- Check any experienced toxicities and ensure doses are adjusted accordingly or suitable supportive care has been prescribed

6.7 **Sign and date prescription as a record of verification**

Document Control

Title	BOPA: Standards for Clinical Pharmacy Verification of Prescriptions for Cancer Medicines: Version 3.3 (October 2018)
Author / Editor	Steve Williamson, Consultant Cancer Pharmacist Northumbria Healthcare /NHS England/ Newcastle University
Owner	BOPA.

Change History

Draft	Date	Author/Editor	Summary of Change
1.1	21.09.09	Steve Williamson	Initial draft
1.2	07.10.09	David Thomson	Split document into 2 separate documents. General updates.
1.3 &1.4	07.10.& 20.10.09	Ewan Morrison & Mary Maclean	Editorial comments, updates and changes to reflect UK perspective
1.5	7.11.09	BOPA committee	Incorporation of SFH and editing
1.6	14.11.09	Netty Wood	References & comments
1.7	18.12.09	Steve Williamson	Membership Consultation
2	3.12.12	Steve Williamson	Draft Version 2
2.2	11.03.13	Steve Williamson	Changed following consultation to members
2.3	02.04.13	Steve Williamson/ Helen Flint	Final version reviewed by committee
3.0	06.03.18	Steve Williamson	Draft update of policy for sub committee review. Updated references to electronic systems, added details guidance from previous supporting document as an appendix (revised and updated from previous version)
3.1	13.03.18	BOPA Committee	Reviewed by BOPA Exec. Version for consultation.
3.2	17.07.18	Steve Williamson	Updated following comments from GAP
3.3	09.10.18	GAP Sub group Seonaid McLachlan	Updated following comments from SOPPG

Information Reader Box

Proposed Target Audience	Oncology and Haematology Pharmacists, Provider Trust Chief Pharmacists, NHS Scotland Boards Directors of Pharmacy, Oncologists and Haematologists, PCT Prescribing Advisors, Cancer Networks, SHA, Welsh and NI Health Board(s).
Proposed Circulation List	BOPA Members, FCP Members, Chief Pharmaceutical Officers for each home country, UKONS, Provider Trust Chief Pharmacists, NHS Scotland Boards Directors of Pharmacy**,** RCP, PCT Prescribing Advisors, Heads of Schools Pharmacy , RSPGB/PLB, NES Scotland, Paediatric Oncology Pharmacists
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Appendix One: Practical Guidance to Support BOPA Verification Standards

This appendix is designed to give detailed guidance on applying the BOPA standards to assist pharmacists in undertaking each of the steps required for verification. This section is advisory; it supports good practice but is not mandatory.

1 Check the Prescription Details

Summary: This section describes checking if the drug or regimen been prescribed in line with legislation and local prescribing policy

1.1 All prescriptions for SACT must be prescribed on an approved SACT electronic prescribing system.

1.2 SACT Services that still have non-electronic prescribing system prescriptions must use prescriptions that been computer-generated on tamper proof document controlled forms using regimens from the agreed list.

1.3 Log onto electronic prescribing system and undertake physical process for verification as described in local procedures for using the electronic system.

Note: Due to the existence of a variety of proprietary SACT electronic prescribing systems and different system versions or configurations, BOPA is not able to issue guidance on how to use the electronic systems. Organisations must have in place appropriate procedures for the practical use of the electronic system for verification, which should then be used in conjunction with this document.

1.4 Check that any printed copies of electronic prescriptions are clear, legible, unambiguous and includes all details required for dispensing, labelling and administration if any details are unclear **do not** accept the prescription.

1.5 Check that any printed copies of electronic prescriptions still reflect the electronic version and that no changes have been made after printing.

1.6 Check any paper prescriptions are signed and dated, checking for wet signature (if required by local policy), ensuring it's not a photocopy.

1.7 In the SACT electronic prescribing system check the prescriber's digital signature is present in the 'appropriate section and check they have digitally approved the prescription.

1.8 Check the prescriber is authorised to prescribe SACT in your organisation and their signature is recognised.

1.9 For first cycle, check that consent has been obtained by an appropriate member of the clinical team. Only Consultants, registrars and Staff Associate Specialists (SAS) in Oncology/Haematology are allowed to consent patients for SACT. Staff Grades and Non-Medical Prescribers with adequate training & experience in Oncology/Haematology may be allowed to prescribe SACT from first cycle following the consultants agreed treatment plan depending on local governance policy. Prescribers will only be granted electronic prescribing system access if they meet the above criteria.

1.10 Ensure that all parts of the prescription are verified.

2. Check the Prescription Against the Protocol and Treatment Plan:

2.1 All SACT should be prescribed in the context of a written protocol. These can be paper-based or within the electronic prescribing system. All protocols must be consistent with locally agreed Guidelines/Protocols. All regimens on the electronic prescribing system should go through a local approval process before being accepted for use.

2.2 Check the drugs prescribed comply with a recognised regimen or protocol which is appropriate for the patient's diagnosis and line of therapy, i.e. 1st line 2nd line etc. Record this check in the pharmaceutical care plan (if used). Use the local clinical Network/Alliance SACT regimen protocols as standard reference, or in absence of a regimen protocol the SPC for single agent drugs.

2.3 For NHS patients only new treatments that have been through NICE, SMC, AWMG or the English Cancer Drug Fund (CDF) can routinely be prescribed. There may be additional processes or policies in place for medicines that are not routinely recommended for use (e.g. IPTRs, PACS2 etc). Private healthcare providers will have own agreed processes.

2.4 Occasionally specific SACT regimens may be available through an early access scheme (either formalised MHRA EAMs or manufacturers own scheme) which allows access for a limited period of time. These will generally not have an EU product licence (Marketing Authorisation) or not yet be available (i.e. marketed) in UK and must go through local governance approval. In addition check to see if a regimen has been approved by local commissioners via an individual funding request system.

2.5 Commissioning (NHS England only)

2.5.1 In England all new patients receiving SACT included in the Cancer Drug Fund (CDF) and all new NICE approvals must be registered on BlueTeq by their consultant prior to commencing treatment. See http://www.blueteq.com/cdf. Other pre approvals systems may be in use.

2.5.2 As appropriate to local practices pharmacists may have to log onto the Blueteq CDF registration system and search for patients NHS number to check registration/approval has been completed by prescriber at first cycle. Once checked then annotate local documentation/electronic system to record that registration confirmed as appropriate.

2.5.3 If the verifying pharmacist does not have access to Blueteq then they must register at http://www.blueteq.com/cdf.or ask a colleague to check.

2.5.4 Check that local organisation governance approval has been given to use any drugs that has been through an Early Access Scheme (either formalised NHS England EAMs or manufacturers own scheme) to allow approval for a limited period only may be used. These will generally not have an EU product licence (Marketing Authorisation) or not yet be available (i.e. marketed) in UK.

2.6 Check if patient is on a drug needing approval via regulatory required scheme, e.g. Celgene e PAF for lenalidomide, thalidomide, pomalidomide. See https://ermp-ukire.celgene.com/

2.7 On the first cycle, check the regimen is the intended treatment. Note there are many potential ways to do this which will vary with local organisation but good practice is to check in clinical notes for a referral letter, a consent form, a treatment plan or the electronic record.

2.8 On first cycle check the regimen is appropriate for patient's diagnosis, medical history, performance status and SACT history, ensuring that the correct regimen has been selected on the electronic prescribing system.

3 Check Patient Details

3.1 Check all the required patient details are present:

- Patient name
- Hospital and Ward
- NHS Number or Local Patient Number
- Date of Birth
- Consultant/ Prescribers Name

3.2 Prescriptions must also contain the following details:

- height, weight and surface area
- protocol / regimen name including generic drug names
- intended drug doses as mg/m^2 or per kg or AUC for carboplatin or flat dose
- the final calculated dose to be administered
- frequency of administration
- reason for any dose modifications made (should be documented in an appropriate place. Refer to local policy.)
- the intended start date and exact duration of treatment of that cycle
- relevant critical test results

4 Check Administration Details

4.1 Check the administration details are appropriate i.e. the route and rate of administration. For infusions the drug is compatible with diluent or infusion solutions and the volume of diluent is appropriate.

Note in practice when a regimen has been entered into the electronic prescribing system it will have had this compatibility check undertaken as part of regimen validation.

4.2 It is the responsibility of the Accountable Pharmacist within the aseptic unit providing doses to the SACT service to ensure their worksheets restrict the concentrations/doses available to those combinations that have been assessed as acceptable during the worksheet approval process. The aseptic service verification is carried out at release at which point the formulation is confirmed to be within acceptable limits according to stability data held on file.

4.3 Check that hydration and supportive medicines have been prescribed as per protocol. Hydration is essential for the following cytotoxic regimens;

- Cyclophosphamide (at doses greater than 1000 mg/m^2)
- Cisplatin (double check hydration regimen agrees with agreed protocol)
- Ifosfamide,
- high dose melphalan
- High dose methotrexate

Note this list is not exhaustive, refer to local protocols/policy

4.4 The majority of SACT is administered ether orally or intravenously (IV) as bolus, short or long infusions. Some medicines can be given intramuscularly (IM) or subcutaneously (SC) depending on the formulation. This needs to be confirmed before proceeding.

Note If switching between route of administration, doses may not be interchangeable. Refer to SPC and local protocols/policy.

4.5 If Intrathecal SACT is prescribed refer to local organisation policy.

4.6 Ensure you follow local organisational policy on administration of vinca alkaloids.

5 Check Calculations

Summary: Check BSA and drug doses have been correctly calculated, including double checking calculations undertaken by the electronic prescribing system.

5.1 Electronic prescribing systems calculate BSA automatically, but the verifying pharmacist should double check values are entered correctly.

5.2 Check the patient's body surface area (BSA) using the height and weight specified on the prescription. The two most commonly used formula are the DuBois[1] formula and Mosteller formulae[2] ensure you know which version is used in your electronic prescribing system and use the same version to double check. ***Caution***: Do not use apps or website to check BSA unless have been validated for use in your organisation.

5.3 Check the drug dose calculations using correct BSA or weight if appropriate..

5.4 Check the prescribed dose can be accurately measured, seek advice from local aseptic service if required. Doses may be banded or rounded. Check local protocol/policy

5.5 If the patients' weight changes significantly (as per local policy) during course of treatment BSA drug doses need to be recalculated and rechecked. The staff reviewing patients (usually nursing) should monitor patients' weight and inform prescriber and/ or pharmacy if weight changes significantly. A new weight must be taken at start of each new course of SACT. If a patient is stable and tolerating a dose of SACT the prescriber may use clinical judgement and not amend dose to take into account new weight. Check local protocol/policy and ensure decision is clearly documented in an appropriate place.

5.6 Check dose units are correct, e.g. milligrams, grams, international units.

5.7 Check that all drugs and doses are scheduled correctly in line with local protocol/policy with regard to time and date of administration by reviewing the treatment records in patient's notes or in the treatment summary section of the patient's electronic record. Ensure there has been appropriate time interval since the regimen was last administered.

5.8 Check the calculation of any dose modifications or dose reductions. Unless there is a documented reason for a dose increase any decision to reverse a previous dose reduction should always be queried with the prescriber. Depending on how an electronic prescribing system protocol is built, it will determine if a dose modification is duplicated automatically. When checking a prescription, always review the previous prescription; check any modification history and notes section for information.

5.9 **Caution:** the electronic prescribing system may calculate a percentage dose modification as a percentage of the original dose, so for 2nd or subsequent dose modifications the dose reduction in relation to the original dose needs to have been selected, i.e. for an 80% dose reduction to reduce by a further 20%, this needs to be requested as a 60% dose reduction of original dose. This can lead to errors so ensure you understand your local system.

5.10 Check lifetime cumulative doses of anthracyclines or bleomycin.

5.11 Ensure the reason for any dose adjustments is recorded in an appropriate location e.g. in the notes section of the electronic prescribing system and /or pharmaceutical care plan or other relevant place (refer to local policy/procedures).

6 Check laboratory results, critical tests and toxicities as appropriate:

6.1 It is recognised that pharmacists take responsibility for checking and monitoring laboratory values, critical tests and toxicities but that this is a shared responsibility with medical and nursing staff. Trusts/Boards should agree which staff are ultimately responsible for monitoring described below and ensure pharmacist responsibilities are clearly defined in local policy.

6.2 Check each regimen specific protocol for the critical tests/monitoring that are essential before administering SACT. E.g. A low neutrophil or low platelet counts are often the limiting factor with regard to patients being able to receive their SACT on time.

6.3 Depending on local circumstances SACT may be prepared and delivered to the ward before critical test results are received. Pharmacy departments releasing SACT before critical test results are known must ensure a robust system is in place to ensure the critical tests are checked and acceptable before administration. A local policy should clearly define who is responsible for checking critical test results, including how these will be documented.

6.4 Regimens will have specific critical tests requirements and recommendations for dose modification or treatment delay. Critical tests can include laboratory tests, renal or hepatic function, BP, urinalysis or any test which is required prior to administration of a specific SACT regimen. Critical test parameters in which treatments are delayed or doses modified may vary from regimen to regimen. In general pharmacists should not verify the prescription if critical tests limits are out with agreed parameters without first discussing with prescriber and/or clinician with overall responsibility for the patient.

6.5 Renal function (measurement of GFR) can be assessed by two methods.

Measured

- The most accurate method is determination of radio-isotopic measurement of clearance. This is an accurate determination of GFR obtained by measuring the clearance of chromium 51 EDTA (51Cr-EDTA), usually undertaken by medical physics departments.
- GFR can be corrected for body mass (normalised to a body surface area of 1.73 m^2) or uncorrected. The uncorrected version should be used.

Calculated

- Creatinine clearance can be calculated using the Wright formula or using Cockcroft and Gault formula. Check local policy/protocol for recommendation of which calculation to use.
- Note the Modification of Diet in Renal Disease (MDRD) formula for estimating creatinine clearance is not commonly used in oncology.

6.6 Pharmacists using measured GFR or estimated creatinine clearance measurements to check calculated drugs doses must have access to the relevant results which must be double checked to avoid drug dosing errors resulting from transcription errors. This includes double checking values in the electronic prescribing system.

6.7 Refer to local protocol for specific guidance on renal and hepatic function and dosing. ***Note*** Hepatic and Renal failure documents produced by the University College London. Note these documents are being updated (2018) as dated 2009, when updated a link will be provided from BOPA website. The Renal Drug Handbook / Database may also be used. See https://renaldrugdatabase.com/

6.8 Other biochemical markers may be monitored depending on the specific SACT, for example tumour markers such as CA125, CMV status etc. Check regimen protocols and drug information for details and record monitoring requirements.

6.9 It may be necessary to check if certain pre-treatment tests have been undertaken before starting treatment, for example Hepatitis B status for certain regimens, as per local protocol. It should be clearly defined if this is a medical, nursing or pharmacy responsibility to check these tests have been done and checked.

6.10 Certain drugs are potentially cardiotoxic and require monitoring of cardiac function, e.g. anthracyclines, trastuzumab and 5-fluorouracil. Consult local protocol for information on monitoring requirements. It is the prescribers responsibility to ensure the required tests are undertaken, e.g. 3 or 4 monthly ECHO cardiogram (or MUGA) with adjuvant trastuzumab, however the pharmacist verifying must ensure that appropriate monitoring has been undertaken before treatment is delivered.

6.11 **Toxicity assessments should be undertaken prior to each new cycle and doses adjusted/delayed as per local protocol as well as ensuring the prescription of appropriate supportive care.**

7 Sign and date prescription as a record of verification

7.1 Once all stages of this procedure have been performed and the pharmacist is confident that all of the criteria have been met then the prescription can be signed in accordance with local policy/procedure.

8 References

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