
Oral Systemic Anti- Cancer Therapies (SACT) Counselling Handbook for Pharmacy and Nursing staff

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Adaptation from:

The Royal Marsden NHS Foundation Trust Oral Chemotherapy Accreditation

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North of England Cancer Network Standard for the safe use of oral anti-cancer medicine published December 2007

Updates:

New monographs will be updated by the Specialist Pharmacists at The Royal Marsden Hospital in conjunction with DTC approvals in year.

The aim of this document is to standardise counselling of oral SACT provision of information by Pharmacy and Nursing staff across LCA Trusts.

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Introduction

Individual adherence to self administered medications is a common clinical problem and it is even more critical when oral systemic anti-cancer therapies (SACT) are involved. There are significant safety issues surrounding these medications and patient education is paramount.

The aim of this handbook is to standardise counselling/education and information to patients to improve patient adherence and the safe handling of oral SACT. This handbook is intended as a reference source for pharmacy and nursing staff to enable them to support patients receiving oral SACT. This handbook is to be used in conjunction with the LCA accreditation programme for counselling patients on oral SACT.

Objectives:

- To achieve a standard level of competency in counselling patients on oral SACT.
- To be able to confidently discuss oral SACT with patients and health-care professionals.
- To identify, address and resolve key issues relating to oral SACT.
- To have a working knowledge of the indications of the most commonly used oral SACT regimens.
- To contribute towards the continuing professional development of pharmacy and nursing staff.
- To help staff recognise those oral SACT medicines which are expensive, so that the pharmacy team can work with patients to minimise wastage with these medicines.

The increasing emphasis on developing oral agents is an important factor when considering the care of cancer patients. When given a choice, most cancer patients prefer oral therapy citing increased convenience, less distress over repeated IV access and more control over their own treatment being the major factors. Oral anti-cancer therapy enables patients to maintain a more normal lifestyle during treatment and is likely to have a positive effect on quality of life. Other benefits to the Trust include time and resources saving with reduced throughput in busy out-patient and chemotherapy treatment areas.

However, it is critical that patient education is thorough so that the patient understands:

- Why they are taking their tablets
- How many tablets to take, how often and for how long
- The potential side effects of the treatment
- How to recognise toxicity
- What to do if they feel unwell

For home based therapy to be successful, it is vital that patients take an active part in their care. Most oral SACT is taken over a long period of time, the responsibility to recognise and report any side effects rests with the patient. Therefore, patient education must emphasize recognition of early signs and symptoms and when to report problems.

Normally, an oncology clinician will see the patient and give an overview of the treatment. A chemotherapy trained nurse will also see the patient and discuss the above points. But the role of the pharmacy and nursing staff in educating the patient is paramount to ensure the safe handling and concordance to get the maximum benefit from their oral SACT. It is important pharmacy staff check the patients are aware of the side effects of the treatment **but are not required to routinely to discuss toxicities.**

How to use this handbook

All information given on the use of medicines in this handbook is for reference purposes only. Whilst every care has been taken to ensure accuracy of the information, it is not intended to be a comprehensive guide to using these medicines. The individual monographs focus on the key counselling points including instructions for taking, medicine interactions and the main side effects to aid education of the patient. For full information on the possible adverse effects of the medicines and medicine interactions we recommend that the manufacturer's data sheets (SPC) and patient information leaflets (PILS) be consulted.

www.medicines.org.uk.

Patients should be advised not to buy any medications over the counter including herbal medicines and complimentary therapies without checking with the doctor or pharmacist.

Oral SACT

The term oral SACT refers to medicines with 'anti-cancer' activity including cytotoxic medicines, targeted treatments and teratogenic drugs orally administered to cancer patients, including traditional cytotoxic chemotherapy such as capecitabine, hydroxycarbamide, chlorambucil and small molecule/ antibody treatments such as imatinib, erlotinib, sunitinib and teratogenic agents such as thalidomide or lenalidomide.

Oral SACT included in this handbook can be counselled using the oral anti-cancer patient and carer education checklist.

High cost oral SACT

Many oral SACT medicines are very expensive (up to £200 per dose) and it is important that wastage is kept to a minimum. Pharmacy staff can work with patients in order to minimise wastage. For example, where oral SACT is a continuous treatment and the medicines are supplied in a 30 day pack and the patient returns to clinic every 4 weeks, the patient may accumulate supplies at home. Pharmacy staff can ask patients about the supplies they have at home and either arrange amend supply quantities at this visit or reschedule the next visit for five weeks instead of four.

Clinical trial oral SACT

Patients receiving medicines in a clinical trial may be counselled using this oral SACT checklist. Any trial specific advice must be checked against the treatment specific clinical trial protocol. Any queries arising from the use of the checklist must be referred back to the research team involved with the patient's care. The counsellor must be aware that many drugs under investigation may not be used in the same indication that they would normally be used in. Therefore, no assumptions should be made as to the patient's clinical condition when providing advice. If unsure, contact the research team involved with the patient's care or your clinical trials pharmacist(s).

Teratogenic oral SACT

Patients or carers should be informed that "the medicine is harmful to an unborn child".

Patients with swallowing difficulties

Before advising patients to dissolve/open capsules or prepare for administration via feeding tubes, the patient must be assessed for the suitability of self-administering oral SACT. Swallowing difficulties or the inability to manipulate medicines described in the appendices of this document, may contribute to the decision whether to treat with SACT via the oral route.

Alternatively, if the patient can't swallow solids or liquids, they may have a feeding tube. Examples of feeding tubes include:

- **Short-term:** Nasogastric (NG), Nasoduodenal (ND), Nasojejunal (NJ)
- **Long-term:** Gastrostomy and Jejunostomy (surgically placed) and PEG – Percutaneous endoscopic gastrostomy and PEJ – percutaneous endoscopic jejunostomy (endoscopically placed)

A table of medicines that can be dissolved or opened and liquids/foods that can be used to mask the taste can be found in this document. All patients with swallowing difficulties should be provided with the relevant patient information factsheet (if applicable for the medicine), and an oral anti-cancer pack only after the pharmacist, pharmacy technician or nurse has talked through the procedure with the patient. There is a space on the relevant patient information factsheet to specify the suitable liquid/flavouring or food.

If carers will be performing the tasks listed in the appendices, extra caution must be advised to ensure spillage and exposure are minimised. It is at the discretion of the patient whether they wear gloves, apron, mask for dissolving/opening capsules as they are taking the medicine, unless they want to protect others at home or are worried about spillage. Carers, however, should wear gloves, apron and mask to follow the procedure in the appendices. Please note the use of a mask is limited to the opening capsules factsheet to reduce the risk of inhalation of any powder.

Glossary of terms

Oral SACT	Medicines with 'anti-cancer' activity including cytotoxic medicines, targeted treatments and teratogenic drugs orally administered to cancer patients
Oral anti-cancer pack	Pack for patients with swallowing difficulties containing: <ul style="list-style-type: none">• 10 pairs of disposable gloves• 10 aprons• 10 masks• 1 yellow clinical waste bag
Nasogastric tube	Placement of a feeding tube through the nostril into oesophagus directly into the stomach
Nasoduodenal tube	A tube inserted through the nostril, down the throat and through the stomach, into the duodenum (first part of the small intestine)
Nasojejunal tube	Similar to an NG tube except threaded through stomach into jejunum (middle section of small intestine)
Percutaneous endoscopic jejunostomy tube	Placement of a feeding tube through the skin and abdominal wall, directly into the jejunum (small intestine) either endoscopically or surgically
Percutaneous endoscopic gastrostomy tube	Placement of a feeding tube through the abdominal wall, directly into the stomach, by an endoscopic medical procedure

AFATINIB*

Available as 20mg, 30mg, 40mg and 50mg tablets

Used for Non-Small Cell Lung Cancer with EGFR mutations

Drug interactions

P-glycoprotein inhibitors e.g. ritonavir, ketoconazole, itraconazole, erythromycin, verapamil, tacrolimus, amiodarone, ciclosporin, nelfinavir, saquinavir, quinidine

P-glycoprotein inducers e.g. rifampicin, carbamazepine, phenytoin, phenobarbital, St John's Wort

BCRP substrates e.g. rosuvastatin, sulfasalazine

Patient counselling points

- Swallow whole with water on an empty stomach, one hour before or three hours after food.
- Avoid strong sun light or use sun block cream SPF15 or higher
- Counsel the patient on how to manage the most common side effects – skin rash and diarrhoea.
- Ability to drive or operate heavy machinery may potentially be affected if the patient experiences any side effects related to vision (e.g. irritation, light sensitivity, dry eye or tearing)
- Contains lactose

Side effects

Skin rash – Use a simple moisturiser regularly to reduce itchiness and drying of the skin.

Diarrhoea – Drink plenty of fluids. Your doctor may prescribe anti-diarrhoeals. If diarrhoea is persistent or severe, you doctor may interrupt or reduce your dose

Inflammation of the lungs – Tell your doctor immediately if you develop new or sudden worsening of shortness of breath, possibly with a cough or fever.

Eye irritation or inflammation – Tell your doctor if you have sudden or worsening of eye symptoms such as pain or redness or dry eye.

Ref. Afatinib SPC. Accessed via eMC www.medicines.org.uk on 24 October 2014

BNF October 2014

* Indicates where the cost of the medicine will be greater than £1000 per cycle (may be up to £5000 per cycle) of treatment

AXITINIB*

Available as 1mg and 5mg tablets

Used for advanced renal cell carcinoma

Drug interactions

The following may increase the risk of side effects with axitinib: ketoconazole, itraconazole, clarithromycin, erythromycin, atazanavir, indinavir, nefazodone, nelfinavir, ritonavir, saquinavir, and telithromycin.

The following may reduce the effectiveness of axitinib e.g. rifampicin, dexamethasone, phenytoin, carbamazepine, rifabutin, rifapentin, phenobarbital, and Hypericum perforatum (St John's Wort).

A dose adjustment of axitinib may be recommended.

Patient counselling points

- Swallow whole with a glass of water.
- Take twice daily approximately 12 hours apart with or without food.
- Caution with driving/operating machinery (possibility of blurred vision/dizziness).
- Avoid grapefruit or grapefruit juice.

Side effects

Diarrhoea – Your doctor can prescribe anti-diarrhoeal medication, drink plenty of fluids and increase dietary fibre.

Hypertension – BP should be checked regularly. This may be done by the GP or practice nurse. If high, the doctor may prescribe medication for high BP.

Fatigue – Rest as you need to, eat a balanced nutritious diet and drink plenty of fluids.

Hoarseness – Try to keep hydrated, and avoid irritants, such as smoking.

Nausea and decreased appetite – If this occurs this can be managed with anti-sickness medication.

Hand-foot syndrome – Soreness and redness of the palms of the hands and soles of the feet. A simple moisturiser will help prevent dryness.

Thyroid dysfunction – This will be monitored in your blood tests.

Ref. Axitinib SPC accessed via www.medicines.org.uk on 13 May 2013

Optimising Care for Patients on Inlyta in Advanced Renal Cell Carcinoma booklet produced by Pfizer Oncology September 2012

* Indicates where the cost of the medicine will be greater than £1000 per cycle (may be up to £5000 per cycle) of treatment.

BOSUTINIB*

Available as 100mg and 500mg film-coated tablets

Used for all phases of Philadelphia chromosome positive chronic myelogenous leukaemia (Ph+ CML) in patients previous treatment with one or more tyrosine kinase inhibitor(s) and for whom imatinib, nilotinib and dasatinib are not considered appropriate treatment options

Drug interactions

Concomitant use of bosutinib and medications that **induce CYP3A4** may significantly reduce exposure to bosutinib (e.g. dexamethasone, phenytoin, carbamazepine, rifampicin, phenobarbitone and St John's Wort).

Concomitant use of bosutinib and medications that **inhibit CYP3A4** may significantly increase exposure to bosutinib (e.g. ketoconazole, itraconazole, erythromycin, clarithromycin, ritonavir and telithromycin).

Antacids, H2 antagonists, proton pump inhibitors reduce bosutinib exposure. Antacids may be taken up to 2 hours before or 2 hours after bosutinib dose.

Caution with medications that can prolong the QT interval - anti-arrhythmic drugs amiodarone, disopyramide, procainamide and sotalol or other medicinal products that may lead to QT prolongation such as chloroquine, haloperidol, methadone and moxifloxacin.

Patient counselling points

- Swallow the tablet(s) in the morning with water and with or after food.
- Grapefruit and grapefruit juice should be avoided.
- Women of childbearing potential should be advised to use effective contraception and avoid becoming pregnant while receiving bosutinib.
- Caution with driving/ operating machinery (possibility of blurred vision/dizziness).

Side effects

Possible side effects include:

Fever, sore throat, cough, or any other signs of infection.

A fall in the number of red blood cells which may cause anaemia leading to tiredness and weakness or bleeding or bruising without a cause.

- Diarrhoea, vomiting, stomach pain, nausea
- Fever, swelling of hands, feet or face, fatigue, weakness
- Decrease of appetite, joint pain, headache, skin rash, which may be itchy and/or generalised
- Defect in cardiac rhythm that predisposes to fainting, dizziness and palpitation.

Ref. Bosutinib, SPC last updated on the eMC 20 February 2014

* Indicates where the cost of the medicine will be greater than £1000 per cycle (may be up to £5000 per cycle) of treatment.

BUSULFAN

Available in 2mg tablets

Used for Chronic myeloid leukaemia (CML), Haematopoietic stem cell transplant, Polycythaemia vera, Myelofibrosis, Essential thrombocythaemia

Drug interactions

Itraconazole and metronidazole – avoid concomitant use.

Phenytoin lowers the level of busulfan.

Patient counselling points

- Swallow the tablets whole with a whole glass of water.
- Tell your doctor if notice any unusual bruising or bleeding.
- Tell your doctor if you suddenly feel unwell or have a temperature.

Side effects

Bone marrow suppression – Increased risk of infections- contact your hospital doctor if your temperature goes above 38°C.

Nausea and vomiting – If this occurs this can be managed with anti-sickness medication

Diarrhoea – Drink plenty of fluids. Your doctor may prescribe anti-diarrhoeals

Stomatitis (soreness of the mouth)-drinking plenty of fluid and cleaning the teeth regularly, gently brush with soft toothbrush can help minimise the risk.

Yellowing of the whites of the eyes or skin (jaundice)

Appearance of dark patches on the skin (hyperpigmentation)

Ref. Summary of Product Characteristics last updated on the eMC: 14/05/2013

CABOZANTINIB*

Available as 20mg and 80mg capsules

Used for progressive, unresectable locally advanced or metastatic medullary thyroid carcinoma

Drug interactions

Ketoconazole, ritonavir, itraconazole, erythromycin, clarithromycin, anti-arrhythmics, fexofenadine, aliskiren, ambrisentan, dabigatran etexilate, digoxin, colchicine, maraviroc, posaconazole, ranolazine, saxagliptin, sitagliptin, talinolol, tolvaptan, dexamethasone, phenytoin, carbamazepine, rifampicin, phenobarbital, proton pump inhibitors, warfarin and herbal preparations containing St John's Wort.

Patient counselling points

- Do not take with food. Instruct patients not to eat for at least 2 hours before and at least 1 hour after taking.
- Capsules should not be opened/crushed but taken with a full glass of water.
- Do not consume grapefruits or grapefruit juice while on treatment.
- If a dose is missed, the missed dose should not be taken if it is less than 12 hours before the next dose.
- Patients of childbearing potential must use effective contraception during therapy and for at least four months following their last dose.

Side effects

Inform the patient to contact a doctor immediately if any of the following side effects arise as urgent medical treatment may be needed:

- Abdominal pain/nausea/vomiting/constipation/fever
- Swelling, pain in the hands and feet, or shortness of breath
- A wound that does not heal
- Vomiting or coughing up blood
- Pain in the mouth, teeth and/or jaw, swelling or sores inside the mouth
- Seizures, headaches, confusion, or finding it difficult to concentrate

Other side effects:

Hand and foot syndrome – Soreness and redness of the palms of the hands and soles of the feet. A simple moisturiser will help prevent dryness.

Tiredness (fatigue) – Rest as you need to, eat a balanced nutritious diet and plenty of fluids.

Change in hair colour (not hair loss).

Change in taste and weight loss.

Ref. Cabozantinib (Cometriq) SPC and PIL (Updated Sep 14), www.medicines.org.uk (accessed 13 October 2014).

* Indicates where the cost of the medicine will be greater than £1000 per cycle (may be up to £5000 per cycle) of treatment

CAPECITABINE

Available as 150mg and 500mg tablets

Used for Colorectal, Breast and Head and Neck cancers

Drug interactions

Allopurinol, cimetidine, metronidazole, phenytoin, warfarin.

Patient counselling points

- Swallow whole with a glass of water **within half an hour of finishing a meal** (just after breakfast and then again just after evening meal) so that doses are spaced at least 8 hours apart or if possible 10 to 12 hours apart.
- Taking with food reduces side effects.

Side effects

Nausea and vomiting – If this occurs this can be managed with anti-sickness medication

Diarrhoea – Drink plenty of fluids. Your doctor may prescribe anti-diarrhoeals. If this occurs more than 4 times a day contact your hospital key worker

Stomatitis (soreness of the mouth) – Drinking plenty of fluid and cleaning the teeth regularly, gently brush with soft toothbrush can help minimise the risk.

Hand and foot syndrome – Soreness and redness of the palms of the hands and soles of the feet. A simple moisturiser will help prevent dryness.

Change in the way heart works (rarely) – If chest pain or tightening across the centre of the chest occurs during treatment call the emergency number or attend your local A&E

Contact the hospital key worker if your temperature goes above 38°C

Ref. Capecitabine SPC. Accessed via eMC www.medicines.org.uk (accessed on 7 September 2012)

CHLORAMBUCIL

Available in 2mg tablets

Store in the refrigerator between 2 to 8°C

Used for Chronic Lymphocytic Leukaemia (CLL) and Lymphomas

Drug interactions

None significant

Patient counselling points

- Swallow the tablets whole with water on an empty stomach (1 hour before or 2 hours after a meal).
- Tell your doctor if notice any unusual bruising or bleeding.
- Tell your doctor if you develop a skin rash.
- Tell your doctor if you have a persistent cough.

Side effects

Bone marrow suppression – Increased risk of infections- contact your hospital doctor if your temperature goes above 38°C

Nausea and vomiting – If this occurs this can be managed with anti-sickness medication

Diarrhoea – Drink plenty of fluids. Your doctor may prescribe anti-diarrhoeals

Mouth ulcer

Loss of appetite

Ref. GMCN Oral SACT hand book

CRIZOTINIB*

Available as 200mg and 250mg hard capsules

Used for adults with previously treated ALK-positive advanced non-small cell lung cancer (NSCLC)

Drug interactions

Systemic antifungals e.g. ketoconazole, voriconazole, itraconazole

Antibiotics – rifampicin and macrolides e.g. erythromycin, clarithromycin

Carbamazepine, phenobarbitone, phenytoin and St John's Wort

Oestrogens and progestogens – effectiveness of oral contraceptive pill may be reduced

Immunosuppressant drugs e.g. ciclosporin, tacrolimus, sirolimus

Cardiac medicines e.g. digoxin, verapamil, amiodarone, diltiazem, beta blockers

Fentanyl

Patient counselling points

- Swallow capsules whole preferably with water at about the same time each day with or without food.
- Avoid grapefruit juice as it may affect drug levels.
- If a dose is missed, then it should be taken as soon as the patient remembers if it is more than 6 hours before the next dose.
- Caution should be exercised when driving or operating machines as patients may experience vision disorder, dizziness, or fatigue while taking crizotinib.

Side effects

Patients should be counselled to report immediately to their doctor any signs that might indicate a serious side effect to crizotinib has occurred including:

- Feeling more tired than usual, skin and whites of eyes turning yellow, urine turns dark or brown (tea like) colour, pain on the right side of the stomach, itching or bruising more easily than usual (**signs of liver dysfunction**).
- Difficulty in breathing, especially if associated with cough or fever (**signs of lung inflammation**).
- Light-headedness, fainting, or chest discomfort (**signs of electrical changes or abnormal heart beat**).

Other very common side effects include:

Vision disorder – reversible. Contact your hospital if this occurs.

GI systems: nausea, vomiting, diarrhoea, constipation, decreased appetite and taste disturbances

Oedema (water retention); Neuropathy; Dizziness

Fatigue – Rest as you need to, eat a balanced nutritious diet and plenty of fluids

Bone marrow suppression (fever/infections) – contact your hospital.

Ref. Crizotinib SPC. Accessed via eMC www.medicines.org.uk (accessed on 4 June 2013)

* Indicates where the cost of the medicine will be greater than £1000 per cycle (may be up to £5000 per cycle) of treatment

CYCLOPHOSPHAMIDE

Available in 50mg tablets

Used for Myeloma, Chronic leukaemias, Lymphoma, Paediatric malignancies, Sarcoma, Breast cancer

Drug interactions

Phenytoin, chloramphenicol, metronidazole, oral hypoglycaemic agents

Patient counselling points

- Swallow whole with glass of water preferably on an empty stomach, but if gastric irritation occurs take with or after food
- Take early in the day and drink plenty of fluid to avoid cystitis.
- Report any signs of cystitis to your doctor

Side effects

Bone marrow suppression – increased risk of infections- contact your hospital doctor if your temperature goes above 38°C

Haematuria – blood in the urine.

Hair loss (reversible on discontinuing treatment)

Mouth ulcers

Nausea and vomiting – If this occurs this can be managed with anti-sickness medication

Ref. GMCN Oral SACT hand book

DABRAFENIB*

Available as 50mg and 75mg capsules

Used for metastatic melanoma with a BRAF V600 mutation

Drug interactions

Concomitant use of dabrafenib and medications that **induce CYP3A4 /CYP2C8** may significantly reduce dabrafenib exposure (e.g. phenytoin, carbamazepine, rifampicin, phenobarbitone and St John's Wort)

Concomitant use of dabrafenib and medications that **inhibit CYP3A4 /CYP2C8** may significantly increase dabrafenib exposure (e.g. ketoconazole, itraconazole, erythromycin, clarithromycin, ritonavir and telithromycin)

Avoid antacids, H2 antagonists, proton pump inhibitors as reduce dabrafenib exposure.

Patient counselling points

- The capsules must be swallowed whole with water, one hour before or two hours after a meal, approximately twelve hours apart. Capsules should be taken at the same time each day.
- Capsules should not be mixed with food or liquids (due to chemical instability of dabrafenib).

Side effects

Fever – Contact your hospital doctor if your temperature goes above 38°C

Skin changes – Tell your doctor if you notice any changes in your skin while taking this medicine.

Eye changes – Tell your doctor if you notice any eye redness, irritation, blurred vision, eye pain, increased sensitivity to light or floating spots before your eyes.

Feeling sick (nausea) and **being sick** (vomiting) - if this occurs this can be managed with anti-sickness medication.

Joint or muscle pain – your doctor may prescribe painkillers.

Feeling tired (fatigue) – Rest as you need to, eat a balanced nutritious diet and drink plenty of fluids.

Ref. Dabrafenib SPC. Accessed via eMC www.medicines.org.uk updated on 6 August 2014

Dabrafenib PIL. Accessed via eMC www.medicines.org.uk updated on 4 September 2014.

* Indicates where the cost of the medicine will be greater than £1000 per cycle (may be up to £5000 per cycle) of treatment

DASATINIB*

Available as 20mg, 50mg, 80mg, 100mg and 140mg tablets. Tablets contain lactose.

Used for:

- Newly diagnosed Philadelphia chromosome positive (Ph+) chronic myelogenous leukaemia (CML) in the chronic phase.
- Chronic, accelerated or blast phase CML with resistance or intolerance to prior therapy including imatinib mesilate.
- Ph+ acute lymphoblastic leukaemia (ALL) and lymphoid blast CML with resistance or intolerance to prior therapy.

Drug interactions

Substrate of CYP3A4, caution with use of other agents that induce or inhibit CYP3A4.

Concomitant use of dasatinib and medications that **induce CYP3A4** may significantly reduce exposure to dasatinib (e.g. dexamethasone, phenytoin, carbamazepine, rifampicin, phenobarbitone and St John's Wort)

Concomitant use of dasatinib and medications that **inhibit CYP3A4** may significantly increase exposure to dasatinib (e.g. ketaconazole, itraconazole, erythromycin, clarithromycin, ritonavir and telithromycin)

Requires acidic environment, care with patients on acid suppressors. Antacids, H2 antagonists, proton pump inhibitors reduce dasatinib exposure. Antacids may be taken up to 2 hours before or 2 hours after dasatinib dose

Interacts with grapefruit juice

Patient counselling points

- Swallow whole with or without a meal
- Caution with driving/operating machinery (possibility of blurred vision/dizziness)
- Avoid H2 antagonist and proton pump inhibitors
- Avoid grapefruit or grapefruit juice
- Inform doctor immediately if you experience any unexplained bruising or bleeding

Side effects

Infection/fever

Headache

GI disturbance (diarrhoea/vomiting/nausea/abdominal pain)

Skin rash

Musculoskeletal pain

Fluid retention/shortness of breath/superficial oedema

Fatigue

Ref. GMCN Oral SACT hand book

* Indicates where the cost of the medicine will be greater than £1000 per cycle (may be up to £5000 per cycle) of treatment

ERLOTINIB*

Available as 25mg, 100mg and 150mg tablets

Used for Non-Small Cell Lung cancer with EGFR mutations, Pancreatic cancer

Drug interactions

CYP3A4 inhibitors increase level of erlotinib eg. itraconazole, clarithromycin, St John's Wort. Dose may need to be reduced

CYP3A4 inducers decrease level of erlotinib eg. phenytoin, carbamazepine, rifampicin.

Warfarin increases INR – monitor regularly

Smoking shown to reduce erlotinib exposure by 50-60%

Proton pump inhibitors (PPIs) will reduce absorption by 50%, if PPIs cannot be avoided these should be taken 4 hours after erlotinib.

Patient counselling points

- Swallow whole with glass of water on an empty stomach (1 hour before or 2 hours after food)
- Avoid strong sun light or use sun block cream SPF 15 or higher
- Counsel the patient how to manage most common side effects – **skin rash and diarrhoea**

Side effects

Skin rash – Use a simple moisturiser regularly to reduce itchiness and drying of the skin.

Diarrhoea – Drink plenty of fluids. Your doctor may prescribe anti-diarrhoeals. If diarrhoea is persistent or severe, you doctor may interrupt or reduce your dose

Nausea and vomiting – If this occurs this can be managed with anti-sickness medication

Tiredness (fatigue) – Rest as you need to, eat a balanced nutritious diet and plenty of fluids

Ref. GMCN Oral SACT hand book

* Indicates where the cost of the medicine will be greater than £1000 per cycle (may be up to £5000 per cycle) of treatment

ETOPOSIDE

Available as 50mg capsules

Used for Small Cell Lung cancer and Testicular cancer

Drug interactions

Care needs to be taken when giving etoposide with high dose of ciclosporin as this can lead to a decrease in etoposide clearance.

St John's Wort may increase the metabolism of etoposide

Warfarin- monitor INR

Glucosamine-decreases effect of etoposide

Atovaquone-increases etoposide levels

Patient counselling points

- Take on an empty stomach
- Avoid grapefruit juice

Side effects

Nausea and vomiting – If this occurs this can be managed with anti-sickness medication

Alopecia (hair loss) – reversible when treatment discontinued

Altered taste

Hand foot syndrome – Soreness and redness of the palms of the hands and soles of the feet. A simple moisturiser will help prevent dryness.

Ref. GMCN Oral SACT hand book

EVEROLIMUS*

Available as 5mg and 10mg tablets

Used for second line treatment in advanced Renal cell carcinoma and Pancreatic metastatic Neuroendocrine tumours

Drug interactions

The following may increase the risk of side effects with everolimus:

- ketaconazole, itraconazole, voriconazole and other antifungals, clarithromycin, erythromycin, verapamil, diltiazem

The following may reduce the effectiveness of everolimus:

- rifampicin, St John's Wort, corticosteroids (e.g. dexamethasone, prednisolone)
- phenytoin, carbamazepine and phenobarbitone

Patient counselling points

- Swallow whole with glass of water at the same time each day either with or without food.
- Avoid strong sun light or use sun block cream SPF 15 or higher
- Avoid grapefruit juice

Side effects

Stomatitis (Sore or sensitive tongue or mouth) – Drinking plenty of fluids and cleaning the teeth regularly and gently brushing with soft toothbrush would help minimise the risk

Skin rash (including acne) – Use moisturising creams regularly to help prevent dryness

Diarrhoea or abdominal cramping – Your doctor can prescribe anti-diarrhoeal medication, drink plenty of fluids and increase dietary fibre

Tiredness (fatigue) – Rest as you need to, eat a balanced nutritious diet and drink plenty of fluids

Infections – Contact your hospital doctor if your temperature goes above 38°C

Lung problems which in rare cases can be serious. If you have an irritating cough or are regularly short of breath, you should contact your doctor

Ref. Everolimus SPC. Accessed via eMC www.medicines.org.uk on 24/10/12

Patient information factsheet – Everolimus (Afinitor) for pancreatic neuroendocrine tumours published 5/3/12 (RMH intranet)

* Indicates where the cost of the medicine will be greater than £1000 per cycle (may be up to £5000 per cycle) of treatment

FLUDARABINE

Available as 10mg tablets

Used for B cell Chronic Lymphocytic Leukaemia (CLL), Lymphomas

Drug Interactions

Pentostatin – there was an unacceptably high incidence of fatal pulmonary toxicity. Therefore, the use of fludarabine in combination with pentostatin is not recommended.

Dipyridamole – may reduce the therapeutic efficacy of fludarabine.

Patient counselling points

- Swallow whole with water either on an empty stomach or with food
- Missed doses – should be taken at the same time each treatment day. Missed tablets should be taken at the earliest opportunity and a compromise reached for subsequent doses. No other dose should be taken within 12 hours of taking the drug. A gap of 18 to 24 hours should ideally be left between doses.

Side effects

Bone marrow suppression (infection / fever / chills) – Contact your hospital doctor if your temperature goes above 38°C

GI disturbances (nausea/ vomiting/ diarrhoea/ anorexia/ stomatitis)

Peripheral neuropathy – Tingling or ‘pins and needles’ in the hands/feet

Visual disturbances

Skin rashes – Use moisturising creams regularly to help prevent dryness

Diarrhoea or tiredness (fatigue) – Rest as you need to, eat a balanced nutritious diet and drink plenty of fluids

Ref. GMCN Oral SACT hand book

GEFITINIB*

Available as 250mg tablets

Used for Non Small cell Lung Cancer (NSCL) with EGFR mutations

Drug Interactions

Substances that are **inducers of CYP3A4** activity increase the metabolism of gefitinib and decrease its plasma concentrations in patients receiving a potent CYP3A4 inducer such as rifampicin or phenytoin.

- International Normalized Ratio (INR) elevations and/or bleeding events have been reported in some patients taking warfarin while on gefitinib therapy. Patients taking warfarin should be monitored regularly for changes in prothrombin time or INR
- Substances that are potent **inhibitors of CYP3A4** activity (eg, ketoconazole and itraconazole) decrease gefitinib metabolism and increase gefitinib plasma concentrations. This increase may be clinically relevant as adverse experiences are related to dose and exposure; therefore, caution should be used when administering CYP3A4 inhibitors with gefitinib
- Drugs that cause significant sustained elevation in gastric pH (histamine H₂-receptor antagonists such as ranitidine or cimetidine) may reduce plasma concentrations of gefitinib and therefore potentially may reduce efficacy. Avoid antacids for 2 hours before or 1 hour after taking

It may also interact with the herbal remedy St John's Wort.

Patient counselling points

- Swallow whole with water about the same time each day, with or after food.
- If you forget to take a tablet, take it as soon as you remember, as long as it is more than 12 hours before your next scheduled dose. If it is less than 12 hours, do not take the missed dose.

Side effects

Nausea and vomiting – If this occurs this can be managed with anti-sickness medication

Diarrhoea – Your doctor can prescribe anti-diarrhoeal medication, drink plenty of fluids and increase dietary fibre

Skin rash (including acne) – Use moisturising creams regularly to help prevent dryness.

Ref. Patient information leaflet Astra Zeneca

* Indicates where the cost of the medicine will be greater than £1000 per cycle (may be up to £5000 per cycle) of treatment

HYDROXYCARBAMIDE

Available as 500mg capsules

Used for Chronic Myeloid Leukaemia (CML), Acute Myeloid Leukaemia (AML) , Cervical cancer

Drug interactions

Antiretrovirals (Nucleoside reverse transcriptase inhibitors, NRTIs) - hydroxycarbamide appears to increase the antiviral activity of NRTIs, particularly didanosine. However, the concurrent use of hydroxycarbamide and didanosine may carry a higher risk of adverse effects including neuropathy and pancreatitis, especially if stavudine is also given.

Patient counselling points

- Take an empty stomach or with food

Side effects

Bone marrow suppression – Increased risk of infection. Contact your hospital doctor if your temperature goes above 38°C

GI disturbances (diarrhoea or constipation/loss of appetite/mucositis (sore mouth))

Tiredness (fatigue) – Rest as you need to, eat a balanced nutritious diet and drink plenty of fluids

Ref. GMCN Oral SACT hand book

IBRUTINIB*

Available as 140mg hard capsules

Used for adult patients with relapsed or refractory mantle cell lymphoma (MCL), and chronic lymphocytic leukaemia (CLL).

Drug interactions

Concomitant use of Ibrutinib and medications that **induce CYP3A4** should be avoided due to the risk of treatment failure (e.g. dexamethasone, phenytoin, carbamazepine, rifampicin, and St John's Wort).

If patients are initiated on medications that inhibit CYP3A4 the dose of Ibrutinib may need to be reduced or avoided due to the risk of increased exposure and increased risk of toxicity with Ibrutinib (eg. ketoconazole, itraconazole, voriconazole, fluconazole, clarithromycin, erythromycin, telithromycin, ciprofloxacin, indinavir, nelfinavir, ritonavir, saquinavir, amiodarone, nefazodone).

Ibrutinib solubility is pH dependent – theoretical risk increase in stomach pH with proton pump inhibitors may reduce exposure with risk of treatment failure.

Patient counselling points

- Capsules should be swallowed whole once daily, at approximately the same time of day.
- Grapefruit juice and Seville oranges should be avoided while on Ibrutinib.
- St John's Wort should be avoided while on Ibrutinib.

Side effects:

Bone marrow suppression (fever, sore throat, cough) – Increased risk of infection. Contact the hospital or key worker if your temperature goes above 38°C.

Bruising without a cause (due to effects on blood cells called 'platelets').

Nausea or vomiting – If this occurs this can be managed with anti-sickness medication.

Diarrhoea – Your doctor can prescribe anti diarrhoeal medication. Drink plenty of fluids and increase dietary fibre. If diarrhoea occurs more than 4 times a day, contact the hospital key worker.

Constipation – Take plenty of fluids, a high fibre diet and take gentle exercise.

Musculo-skeletal pain – muscle cramps or aches (back pain, joint pain, painful arms or legs)

Rash – Use moisturising creams regularly to help prevent dryness

Ref. Ibrutinib, SPC last updated on the eMC 28 October 2014

* Indicates where the cost of the medicine will be greater than £1000 per cycle (may be up to £5000 per cycle) of treatment

IDARUBICIN

Available as 5mg, 10mg capsules

Used for Myeloma, refractory Acute Myeloid Leukaemia (AML)

Drug Interactions

None significant

Patient counselling points

- Swallow whole with water
- Take with a light meal
- Powder in capsules is red and urine may appear red for 1-2 days post treatment

Side effects

Bone marrow suppression (fever/chills) – Contact your hospital doctor if your temperature goes above 38°C

GI disturbance (nausea/vomiting/diarrhoea/sore mouth)

Cardiac toxicity

Rash – Use moisturising creams regularly to help prevent dryness.

Alopecia (hair loss) – Reversible

Ref. GMCN Oral SACT hand book

IMATINIB*

Available as 100mg and 400mg tablets

Used for Philadelphia chromosome (bcr-abl) positive (Ph+) chronic myeloid leukaemia (CML), GIST (Gastro Intestinal Stoma Tumour) and management of Sclerotic Skin or Lung GvHD

Drug interactions

Potent inhibitor of CYP3A4, CYP2C19, CYP2D6

Concomitant use of imatinib and medication induce CYP3A4 may significantly reduce exposure to imatinib and therefore may reduce efficacy (e.g. dexamethasone, phenytoin, carbamazepine, rifampicin, phenobarbitone and St John's Wort)

Concomitant use of imatinib and that inhibit CYP3A4 may significantly increase exposure to imatinib and therefore may increase risk of toxicity (e.g. ketoconazole, itraconazole, erythromycin, clarithromycin)

Warfarin increases INR

Patient counselling points

- Take with large glass of water with food to minimise the risk of GI irritation
- Caution with driving/operating machinery (possibility of blurred vision/dizziness)
- This medication interacts with many other medication including paracetamol therefore, if you are commencing any new medicines either prescribed or purchased over the counter please check with the pharmacist.
- Caution with paracetamol – monitor liver function prior to initiation and monthly or as clinically indicated thereafter. Withhold paracetamol if raised liver function tests.

Side effects

Bone marrow suppression (more common in CML than GIST) – increased risk of infection. Contact your hospital doctor if your temperature goes above 38°C

GI disturbance (nausea/vomiting/diarrhoea/dyspepsia/abdominal pain),

Muscle cramp

Rash – Use moisturising creams regularly to help prevent dryness.

Blurred vision

Headache

Ref. GMCN Oral SACT hand book

* Indicates where the cost of the medicine will be greater than £1000 per cycle (may be up to £5000 per cycle) of treatment

ISOTRETINOIN

Available as 5mg and 20mg capsules

Used for acute Neuroblastoma.

Drug interactions

Vitamin A preparations, tetracyclines

Patient counselling points

- Swallow whole with or after food.
- Protect your skin from sunlight – even on a bright but cloudy day. Do not use sunbeds. Use a sunscreen.
- Women of child bearing potential should use extra contraceptive precaution.

Side effects

Bone marrow suppression – Increased risk of infection. Contact the hospital key worker if your temperature goes above 38°C.

Dry skin, dry mouth, dry eyes – Your doctor can prescribe soothing creams (eg. vitamin E) and eye drops.

Rash, itchiness – Use moisturising creams regularly to help prevent dryness.

Bone pain.

Headache.

Ref. BNF 65 March-September 2013

LAPATINIB*

Available as 250mg tablets

Used for advanced or metastatic breast cancer with HER2 over expression in combination with Capecitabine after prior therapies

Drug interactions

CYP3A4 metabolism

If possible concomitant use of strong **CYP3A4 inhibitors** should be avoided (e.g. ketaconazole, itraconazole, clarithromycin, protease inhibitors, telithromycin, voriconazole)

If possible concomitant use of strong **CYP3A4 inducers** should be avoided (e.g. dexamethasone, phenytoin, carbamazepine, rifampicin, phenobarbitone and St John's Wort)

Patient counselling points

- Lapatinib tablets should be taken on an empty stomach (at least 1 before and 1 hour after meals) and should not be divided into multiple doses
- Avoid grapefruit or grapefruit juice during treatment

Side effects

Diarrhoea – treat promptly. Drink plenty of fluids. Your doctor may prescribe anti-diarrhoeals. If this occurs more than 4 times a day contact your hospital key worker

Nausea/vomiting – If this occurs this can be managed with anti-sickness medication

Stomatitis (Sore or sensitive tongue or mouth) – Drinking plenty of fluids and cleaning the teeth regularly and gently brush with soft toothbrush would minimise the risk.

Bone marrow suppression – Increased risk of infection. Contact your hospital key worker if your temperature goes above 38°C

Pain in the back, arms and neck

Cough/shortness of breath

Skin rash of palms and soles of feet (palmar plantar erythema) – A simple moisturiser will help prevent dryness.

Tiredness (fatigue) – Rest as you need to, eat a balanced nutritious diet and plenty of fluids

Ref. GMCN Oral SACT hand book

* Indicates where the cost of the medicine will be greater than £1000 per cycle (may be up to £5000 per cycle) of treatment

LENALIDOMIDE*

Available as 5mg, 10mg, 15mg and 25mg capsules

Used for Myeloma

Drug interactions

Digoxin, warfarin, clozapine

Patient counselling points

- Swallow capsules whole with water either with or without food
- Should be taken at about the same time each day
- Missed dose-Less than 12 hours have passed take the capsule immediately. If more than 12 hours passed do not take. Take the next capsule at the usual time next day.
- Patients must contact hospital team urgently if they feel unwell or develop fever, shivering episodes or flu like symptoms
- Patients must contact hospital team if they develop gum/nose bleeds or unusual bruising
- Patients must contact hospital team if they develop chest pain or difficulty in breathing
- Patients must contact hospital team if they develop pain or swelling in the arms or legs
- This **drug is harmful to an unborn child** – Patients should use extra contraceptive methods to avoid pregnancy while on lenalidomide treatment.

Side effects

Bone marrow suppression (fever/infections) – Contact your hospital key worker if your temperature goes above 38°C

Clots (deep vein thrombosis, DVT) – Tell your doctor if you have a pain or swelling in the leg or you are short of breath

GI disturbances (nausea/vomiting/diarrhoea/constipation/loss of appetite)

Muscle cramps

Tiredness (fatigue) – Rest as you need to, eat a balanced nutritious diet and plenty of fluids

Ref. GMCN Oral SACT hand book

* Indicates where the cost of the medicine will be greater than £1000 per cycle (may be up to £5000 per cycle) of treatment

LOMUSTINE

Available as 10mg and 40mg capsules

Used for brain tumours, lung tumours, Hodgkin's disease (resistant to conventional combination chemotherapy), malignant Melanoma

Drug interactions

Theophylline, cimetidine – lomustine use in combination with theophylline or with the H₂-receptor antagonist cimetidine may potentiate bone marrow toxicity.

Phenobarbital – Pre-treatment with phenobarbital may lead to a reduced antitumour effect of lomustine

Patient counselling points

- Swallow whole with glass of water.
- Taking at night on an empty stomach can help reduce nausea

Side effects

Nausea/vomiting – If this occurs this can be managed with anti-sickness medication

Bone marrow suppression – Increased risk of infection. Contact the hospital key worker if your temperature goes above 38°C

Ref. GMCN Oral SACT hand book

MELPHALAN

Available as 2mg tablets

Refrigerate at 2-8°C

Used for multiple Myeloma, Ovarian cancer

Drug interactions

Nalidixic acid, ciclosporin, phenobarbitone, clozapine

Patient counselling points

- Swallow tablets whole with water before food (on an empty stomach)

Side effects

Bone marrow suppression – Increased risk of infection. Contact the hospital key worker if your temperature goes above 38°C

Diarrhoea – Drink plenty of fluids. Your doctor may prescribe anti-diarrhoeals.

Nausea/vomiting – If this occurs this can be managed with anti-sickness medication

Bruising and bleeding

Tiredness (fatigue) – Rest as you need to, eat a balanced nutritious diet and plenty of fluids

Ref. GMCN Oral SACT hand book

MERCAPTOPURINE

Available as 10mg and 50mg tablets

Used for Acute Leukaemias (Acute Myeloid Leukaemia + Acute Lymphocytic Leukaemia), chronic granulocytic leukaemia

Drug interactions

Allopurinol, azathioprine, warfarin

Patient counselling points

- Swallow whole with water at least 1 hour after food
- Do not take with milk or dairy products

Side effects

Bone marrow suppression – Increased risk of infection. Contact the hospital key worker if your temperature goes above 38°C

Stomatitis (Sore or sensitive tongue or mouth) – Drinking plenty of fluids and cleaning the teeth regularly and gently brush with soft toothbrush would minimise the risk.

Nausea – Low potential (may take with food if causing a lot of nausea)

Hepatotoxicity – Jaundice and hyperbilirubnaemia

Ref. GMCN Oral SACT hand book

METHOTREXATE

Available as 2.5mg tablets

Used for acute Leukaemias, non-Hodgkin's lymphoma, soft-tissue and osteogenic Sarcomas, and solid tumours particularly Breast, Lung, Head and neck, Bladder, Cervical, Ovarian, and Testicular carcinoma.

Drug interactions

Alcohol, NSAIDS, aspirin, phenytoin, corticosteroids, cisplatin, theophylline, trimethoprim, co-trimoxazole, ciprofloxacin, tetracyclines, penicillins, vitamin preparations containing folic acid

Patient counselling points

- Tablets should be swallowed whole with plenty of water
- Take **ONCE** a week as a single dose on the same day each week
- Missed doses – Take dose as soon as remember if this is within 2 days. Contact your key worker if missed dose is more than 2 days
- Do not take co-trimoxazole on the same day as methotrexate dose
- Folic acid tablets (or vitamins containing folic acid) should not be taken on the same day as methotrexate

Side effects

Bone marrow suppression – Increased risk of infection. Contact the hospital key worker if your temperature goes above 38°C

Nausea and vomiting – If this occurs this can be managed with anti-sickness medication

Stomatitis (sore or sensitive tongue or mouth) – Drinking plenty of fluids and cleaning the teeth regularly and gently brush with soft toothbrush would minimise the risk.

Diarrhoea – Drink plenty of fluids. Your doctor may prescribe anti-diarrhoeals.

Skin changes – Pigmentation changes, rash

Ref. GMCN Oral SACT hand book

MITOTANE

Available in 500mg tablets

Used for treatment of inoperable adrenal cortical carcinoma of both functional and non functional types

Drug interactions

Drugs metabolised by CYP3A4 (eg barbiturates, phenytoin), CNS depressants, spironolactone, warfarin, St John's Wort

Patient counselling points

- Tablets should be taken with a glass of water during meals containing fat rich food (such as milk, chocolate, oil).
- You have been given steroids to take while you are taking Mitotane. This helps to prevent side effects caused by changes in your body's ability to produce steroids.
- **Ensure Mitotane Patient card provided, with package leaflet, for patient to carry with them in case of emergency.**
- Patient should be advised to wear a medic alert tag or contact your doctor if shock, severe trauma or infection occurs (because of risk of acute adrenal insufficiency). Mitotane should be temporarily discontinued and steroids given immediately.
- Mitotane may make you sleepy. If this happens, do not drive or use tool machinery.
- Alcohol may increase the side effects of Mitotane.

Side effects

Tell your doctor immediately if you experience any of the following side effects:

Adrenal insufficiency: fatigue, abdominal pain, nausea, vomiting, diarrhoea, confusion

Anaemia: cutaneous pallor, muscular fatigability, feeling breathless, vertigo especially when standing up

Liver damage: yellowing of the skin and eyes, itching, nausea, diarrhoea, fatigue, dark coloured urine

Neurological disorders: movement and coordination disorders, abnormal sensations like pins and needles, memory loss, concentration difficulty, difficulty to talk, vertigo

Ref. GMCN Oral SACT hand book

SPC last updated on the eMC 4 July 2013

PIL last updated on the eMC 3 July 2013

NILOTINIB*

Available as 150mg and 200mg capsules. Capsules contain lactose.

Used for chronic myeloid leukaemia (CML) and gastrointestinal stromal tumours (GIST).

Drug interactions

Substrate of CYP3A4 – caution with use of other agents that inhibit or induce CYP3A4.

Systemic antifungals: ketoconazole, voriconazole, itraconazole.

Antibiotics: rifampicin and macrolides e.g. erythromycin, clarithromycin, telithromycin,

Carbamazepine, phenobarbitone, phenytoin and St John's Wort.

Caution with medications that can prolong the QT interval - anti-arrhythmic drugs amiodarone, disopyramide, procainamide and sotalol or other medicinal products that may lead to QT prolongation such as chloroquine, haloperidol, methadone and moxifloxacin.

Requires acid environment. Avoid proton pump inhibitors or H2 antagonists. Antacids may be taken approximately 2 hours before or after.

Patient counselling points

- The hard capsules should be swallowed whole with water on an empty stomach.
- Take at least 2 hours after any food and leave 1 hour before eating again.
- Do not drink grapefruit juice or eat grapefruit.
- Caution should be exercised when driving or operating machines as patients may experience vision disorder, dizziness, or fatigue while taking nilotinib

Side effects

Patients should be counselled to report immediately to their doctor any signs that might indicate a serious side effect to nilotinib has occurred including light-headedness, fainting, or chest discomfort (**signs of electrical changes or abnormal heart beat**).

Very common side effects include:

Bone marrow suppression – Increased risk of infections- contact your hospital doctor if your temperature goes above 38°C

Nausea – If this occurs this can be managed with anti-sickness medication

Skin changes – rash, pruritus (itching), alopecia (hair loss) muscle pain

Fatigue – Rest as you need to, eat a balanced nutritious diet and plenty of fluids

Ref. Nilotinib SPC. Accessed via eMC www.medicines.org.uk on 19/08/13

* Indicates where the cost of the medicine will be greater than £1000 per cycle (may be up to £5000 per cycle) of treatment

PAZOPANIB*

Available as 200mg and 400mg tablets

Used for advanced Renal cell carcinoma and soft tissue Sarcomas

Drug Interactions

Herbal medicines, clarithromycin, ketoconazole, itraconazole, voriconazole, rifampicin, telithromycin, antivirals (atazanavir, indinavir, nelfinavir, ritonavir, saquinavir)

If proton-pump inhibitors (PPI) can't be avoided, pazopanib should be taken without food once daily in the evening concomitantly with the PPI. If H2-receptor antagonists can't be avoided pazopanib should be taken without food at least 2 hours before or at least 10 hours after a dose of an H2-receptor antagonist.

Pazopanib should be administered at least 1 hour before or 2 hours after administration of short-acting antacids.

Patient counselling points

- Take **without food** one hour before a meal or at least two hours after a meal
- Do not drink grapefruit juice while being treated with pazopanib

Side effects

Diarrhoea – Your doctor can prescribe anti-diarrhoeal medication. Drink plenty of fluids and increase dietary fibre.

High blood pressure – BP should be checked regularly. This may be done by the GP or practice nurse. If high, the doctor may prescribe medication for high BP.

Nausea vomiting – If this occurs this can be managed with anti-sickness medication

Stomach pain

Tiredness (fatigue) – Rest as you need to, eat a balanced nutritious diet and plenty of fluids

Change in hair colour (not hair loss)

Taste disturbance or loss of taste

Loss of appetite

Ref. Patient information leaflet Glaxo Smithkline

* Indicates where the cost of the medicine will be greater than £1000 per cycle (may be up to £5000 per cycle) of treatment

POMALIDOMIDE

Available as 1mg, 2mg, 3mg and 4mg capsules

Used for relapsed refractory multiple myeloma post bortezomib, lenalidomide and alkylating agents

Drug interactions

If possible concomitant use of strong **CYP3A4 inhibitors** should be avoided (e.g. ketaconazole, itraconazole, voriconazole and clarithromycin)

If possible concomitant use of strong **CYP3A4 inducers** should be avoided (e.g. dexamethasone, phenytoin, carbamazepine, rifampicin, phenobarbitone and St John's Wort)

Patient counselling points

- The daily dose should be swallowed whole with water, with or without food, at the same time of day each day.
- Dexamethasone to be taken in the morning with or after food.
- Patients should be advised that smoking may reduce the efficacy of pomalidomide.
- **This drug is harmful to an unborn child** – Patients should use extra contraceptive methods to avoid pregnancy while on pomalidomide treatment.

Side effects

Fever, sore throat, cough, or any other signs of infection (due to reduced number of white blood cells, which fight infection)

A fall in the number of red blood cells which may cause anaemia leading to tiredness and weakness.

Bleeding or bruising without a cause (due to effects on blood cells called 'platelets').

Chest pain, or leg pain and swelling, especially in your lower leg or calves (caused by blood clots).

Shortness of breath (from serious chest infection or blood clot).

Other side effects:

Infections of the lungs, Loss of appetite, Shortness of breath (dyspnoea), Constipation, diarrhoea or nausea and Muscle spasm, bone pain.

Ref. Summary of Product Characteristics last updated on the eMC. 16-Sep-2014

PONATINIB*

Available as 15mg and 45mg film coated tablets

Used for adult patients with chronic, accelerated or blast phase chronic myeloid leukaemia (CML) or Philadelphia chromosome positive acute lymphoblastic leukaemia (Ph+ ALL) who are resistant or intolerant to dasatinib and nilotinib or who have the T315I mutation.

Drug interactions

Concomitant use of Ponatinib and medications that **induce CYP3A4** should be avoided due to the risk of treatment failure (e.g. dexamethasone, phenytoin, carbamazepine, rifampicin, phenobarbitone and St John's Wort)

If patients are initiated on medications that **inhibit CYP3A4** the dose of ponatinib may need to be reduced due to the risk of increased exposure to ponatinib.

Patient counselling points

- Tablets should be swallowed whole, with or without a meal, at the same time of day each day.
- Grapefruit and grapefruit juice should be avoided while on ponatinib
- Patients with hypertension should be medically controlled during treatment
- Ponatinib is associated with vascular events patients with a history of MI or stroke. These patients should not be initiated on ponatinib without discussion with the clinical team

Side effects

Fever, sore throat, cough, or any other signs of infection (myelosuppression), rash; vascular occlusion events (central and peripheral), pancreatitis, abdominal pain, hypertension, raised transaminases, headache, oedema, diarrhoea and arthralgia/myalgia

Ref. Ponatinib, SPC last updated on the eMC 14 October 2014

* Indicates where the cost of the medicine will be greater than £1000 per cycle (may be up to £5000 per cycle) of treatment

PROCARBAZINE

Available as 50mg capsules

Used for Hodgkin's disease

Drug interactions

Alcohol (disulfiram-like reaction eg. flushing), clozapine, opiates (particularly pethidine), medication with anticholinergic side effects (phenothiazines and tricyclic antidepressants) cardiac glycosides such as digoxin and anti-hypertensives. Use with enzyme inducing anti-epileptics (phenytoin) is associated with increased hypersensitivity reactions to procarbazine.

Procarbazine is a weak monoamine oxidase inhibitor (MAOI) therefore can possibly potentiate the pressor effect of tyramine. This may cause an increase in blood pressure. A reaction is most likely to occur from 7 days after starting procarbazine therapy until 14 days after finishing the course of procarbazine. If the reaction is going to occur it can occur up to 20 minutes after having the food or drink. A mild reaction includes facial flushing or a rash that may be itchy. A severe reaction includes sudden onset of headache, pounding heart, neck stiffness, sweating, shivering, chills, nausea or vomiting, sensitivity to light.

Patient counselling points

- Counsel patient on possible interaction with tyramine containing foods and drinks.
- Foods and drinks known to contain high levels of tyramine must be avoided:
 - Mature or aged cheese, for example: cheddar, stilton, blue cheese, brie
 - Pickled fish
 - Concentrated yeast or meat extracts, for example: Marmite, Bovril, gravy, stock-cubes (for example: OXO)
 - Broad-bean pods
- Foods that may be eaten in moderation (with a small amount first to ensure they still agree with you, avoiding large quantities) e.g. soy sauce, soya products (tofu, miso), fermented soya beans, wine, lager and beer (including non-alcoholic), sour cream, yoghurt, avocado, over ripe fruit, hung game, salami/pepperoni, cured meat, liver, caviar, smoked fish
- Procarbazine can also interact with alcohol. You may become intolerant of alcohol and it may also cause you to feel sick. It is best to avoid alcohol.

Side effects

Bone marrow suppression – Increased risk of infection. Contact the hospital key worker if your temperature goes above 38°C

Nausea – If this occurs this can be managed with anti-sickness medication

Loss of appetite for first few days of treatment

Hypersensitivity rash (mild reaction) – may cause itchiness

Ref. GMCN Oral SACT hand book; RMH Pharmacy Medicines Information

REGORAFENIB*

Available as a 40mg tablet

Used for colorectal cancer

Drug interactions

Carbamazepine, phenytoin, phenobarbital, clarithromycin, ketoconazole, itraconazole, rifampicin.

St John's Wort, grapefruit or grapefruit juice.

If you are taking warfarin or other anticoagulants, your INR should be monitored regularly, especially when you start taking regorafenib.

Patient counselling points

- Regorafenib is taken after a light breakfast (low fat).

Side effects

Hand-foot skin reaction – This causes redness, pain, swelling, or blisters on the palms of your hands or soles of your feet.

High blood pressure (hypertension) – Your blood pressure will be checked regularly. If you develop high blood pressure, we will treat it with the appropriate medication. High blood pressure usually settles down regorafenib is stopped. If you already have high blood pressure before starting treatment, your doctor may need to increase your existing blood pressure medications.

Increased risk of bleeding – Especially if you are taking warfarin or other blood-thinning medicines (such as aspirin and ibuprofen).

Perforation of the bowel – A few patients on this treatment have experienced perforation of the bowel or a hole in the stomach, food pipe, gut or bowel. Please tell your doctor if you experience stomach pain, being sick (vomiting), feveer or chills.

Ref. Regorafenib SPC. Accessed via eMC www.medicines.org.uk on 24 January 2014

Patient information factsheet- Regorafenib for Colorectal cancer (RMH intranet)

* Indicates where the cost of the medicine will be greater than £1000 per cycle (may be up to £5000 per cycle) of treatment

RUXOLITINIB*

Available as 5mg, 10mg, 15mg and 20mg tablets

Used for the treatment of myelofibrosis to manage symptoms or splenomegaly

Drug interactions

Ruxolitinib interacts with medications that **induce CYP3A4** (e.g. clarithromycin, itraconazole, posaconazole, ketoconazole carbamazepine, phenobarbital, phenytoin, rifabutin, and rifampicin)

If patients are initiated on medications that **induce or inhibit CYP3A4** they must be referred back to the clinical team as their dose of Ruxolitinib may need dose reducing.

Patient counselling points

- The daily dose should be swallowed whole with water, with or without food.
- Patient should be warned about the risk of symptom rebound after discontinuation. Upon discontinuation doses should be tapered or the patient covered with steroids where appropriate

Side effects

A fall in the number of red blood cells which may cause anaemia leading to tiredness and weakness.

Bleeding or bruising without a cause (due to effects on blood cells called 'platelets').

Dizziness, headache, diarrhoea, abdominal pain, headache, weight gain and high cholesterol

Increased risk of infection e.g. urinary tract infection and shingles.

Ref. Ruxolitinib, SPC last updated on the eMC 20 October 2014

* Indicates where the cost of the medicine will be greater than £1000 per cycle (may be up to £5000 per cycle) of treatment

SORAFENIB*

Available as 200mg tablets

Used for advanced Renal cell carcinoma and Hepatocellular carcinoma

Drug interactions

Substrate for CYP3A4, inhibitor of CYP2C9.

CYP3A4 inducers reduce sorafenib concentration (e.g ,rifampicin, St John's Wort, phenytoin, carbamazepine, phenobarbitone , dexamethasone)

Coumarin anti-coagulants e.g warfarin, clozapine

Patient counselling points

- Swallow whole with a glass of water on an empty stomach (1 hour before or 2 hours after a meal) at the same time each day.

Side effects

Hand foot syndrome – Soreness and redness of the palms of the hands and soles of the feet. A simple moisturiser will help prevent dryness

Itching or rash – Use moisturising creams regularly to help prevent dryness. Avoid direct sunlight and use a sun cream with a sun protection factor (SPF) at least 15

Hypertension – BP should be checked regularly. This may be done by the GP or practice nurse. If high, the doctor may prescribe medication for high BP.

Diarrhoea or abdominal cramping – Your doctor can prescribe anti-diarrhoeal medication. Drink plenty of fluids and increase dietary fibre.

Tiredness (fatigue) – Rest as you need to, eat a balanced nutritious diet and drink plenty of fluids

Ref. Sorafenib SPC. Accessed via eMC www.medicines.org.uk on 24/10/12

Patient information factsheet- Sorafenib for Hepatocellular cancer published 5 March 2012 (RMH intranet)

* Indicates where the cost of the medicine will be greater than £1000 per cycle (may be up to £5000 per cycle) of treatment

SUNITINIB*

Strengths available 12.5mg, 25mg, 37.5mg and 50mg capsules

Used for first line treatment of metastatic Renal cell carcinoma and 2nd line treatment of GIST and pancreatic Neuroendocrine tumour

Drug interactions

CYP3A4 metabolism.

CYP3A4 inhibitors that may increase sunitinib plasma concentration e.g ritonavir, itraconazole, erythromycin, clarithromycin, grapefruit juice.

CYP3A4 inducers that may decrease sunitinib plasma concentration e.g dexamethasone, phenytoin, Phenobarbital, rifampicin, carbamazepine or herbal medicines e.g St John's Wort.

Patient counselling points

- Swallow whole with glass of water, with or without food, at the same time each day
- Avoid grapefruit juice
- Avoid direct sunlight and use a suncream with a sun protector (SPF) of at least 15
- Patients should be counselled on how to manage most common side effects of **skin rash and diarrhoea**.

Side effects

Diarrhoea – Your doctor can prescribe anti-diarrhoeal medication, drink plenty of fluids and increase dietary fibre

Nausea/vomiting – If this occurs this can be managed with anti-sickness medication

Fatigue – Rest as you need to, eat a balanced nutritious diet and drink plenty of fluids

Rash – Use moisturising creams regularly to help prevent dryness.

Hypertension – BP should be checked regularly. This may be done by the GP or practice nurse. If high, the doctor may prescribe medication for high BP

Hand and foot syndrome – Soreness and redness of the palms of the hands and soles of the feet. A simple moisturiser will help prevent dryness.

Arrhythmias – You will be closely monitored by the doctors, especially if you have cardiac history or risk factors

Ref: Sunitinib SPC. Accessed via eMC www.medicines.org.uk on 24 October 2012

Patient information factsheet – Sunitinib for pancreatic neuroendocrine tumours published 5 March 2012 (RMH intranet)

* Indicates where the cost of the medicine will be greater than £1000 per cycle (may be up to £5000 per cycle) of treatment

TEMOZOLOMIDE

Available as 5mg, 20mg, 100mg, 140mg, 180mg or 250mg capsules

Used for –Brain Tumours (Adjuvant use of newly diagnosed glioblastoma multiforme concomitantly with radiotherapy or second line use of recurrent/progressive malignant glioma), Melanoma

Drug interactions

Carbamazepine, H2 antagonists, dexamethasone, phenytoin, prochlorperazine, ondansetron.

Valproic acid can increase systemic levels of temozolomide

Patient counselling points

- Swallowed whole with glass of water on an empty stomach (1 hour before or 2 hours after a meal)

Side effects

Bone marrow suppression – Increased risk of infection. Contact the hospital key worker if your temperature goes above 38°C

GI disturbances (nausea/vomiting/constipation/weight loss)

Hair loss

Tiredness (fatigue) – Rest as you need to, eat a balanced nutritious diet and drink plenty of fluids

Headaches

Ref. GMCN Oral SACT hand book

TEYSUNO (S1) (Tegafur, gimeracil + oteracil)

Strength available 15mg and 20mg capsules

Used for Gastric cancer

Drug interactions

Caution with clozapine, cimetidine, phenytoin, folinic acid, methotrexate

Avoid allopurinol, sorivudine, brividine and CYP2A6 inhibitors

Patients on warfarin will need regular INR checks as Teysono may increase the risk of bleeding

Patient counselling points

- Swallow with glass of water at least 1 hour before or 1 hour after a meal

Side effects

Nausea/vomiting – If this occurs this can be managed with anti-sickness medication

Diarrhoea – Your doctor can prescribe anti diarrhoeal medication. Drink plenty of fluids and increase dietary fibre. If diarrhoea occurs more than 4 times a day contact the hospital key worker

Constipation, abdominal pain – Take plenty of fluids, a high fibre diet and take gentle exercise

Hand and foot syndrome – Soreness and redness of the palms of the hands and soles of the feet. A simple moisturiser will help prevent dryness.

Dry eyes/watery eyes – Your doctor can prescribe soothing eye drops

Tiredness (fatigue) – Rest as you need to, eat a balanced nutritious diet and drink plenty of fluids. Contact the hospital key worker if your temperature goes above 38°C

Ref. BNF 64 and Information leaflet Nordic Pharma

THALIDOMIDE*

Available as 50mg capsules

Used for Myeloma

Drug Interactions

Warfarin – close monitoring of INR required

Caution with drugs that slow the heart e.g. beta blockers

Caution with drugs that cause drowsiness e.g. anxiolytics, hypnotics, anti-psychotics, H1 antagonists, opiates, barbiturates, alcohol

Patient counselling points

- Swallowed whole with full glass of water at night
- Take at night to prevent drowsiness during the day
- This medicine may cause drowsiness. Drowsiness may affect driving ability
- **This drug is harmful to an unborn child** – Patients should use extra contraceptive methods to avoid pregnancy while on thalidomide treatment

Side effects

Bone marrow suppression – Increased risk of infection. Contact the hospital key worker if your temperature goes above 38°C

Clots (deep vein thrombosis, DVT) – Tell your doctor if you have a pain or swelling in the leg or you are short of breath

Constipation – Take plenty of fluids, a high fibre diet and take gentle exercise

Peripheral neuropathy – Tingling or ‘pins and needles’ in the hands/feet

Drowsiness

Tremor

Bradycardia (slowing of the heart)

Ref. GMCN Oral SACT hand book

* Indicates where the cost of the medicine will be greater than £1000 per cycle (may be up to £5000 per cycle) of treatment

TIOGUANINE

Available as 40mg tablets

Used for Acute Myelogenous Leukaemia (AML), Chronic Granulocytic Leukaemia

Drug interactions

Aminosalicylate derivatives (eg. olsalazine, mesalazine or sulfasalazine) should be administered with caution

Patient counselling points

- Swallow your tablets whole with a glass of water
- Tell your doctor if you unexplained bruising or bleeding
- Tell your doctor if you suddenly feel unwell or have a temperature

Side effects

Bone marrow suppression – Increased risk of infection. Contact the hospital key worker if your temperature goes above 38°C

Nausea and vomiting – If this occurs this can be managed with anti-sickness medication

Stomatitis (soreness of the mouth) – Drinking plenty of fluid and cleaning the teeth regularly, gently brush with soft toothbrush can help minimise the risk.

Ref. Patient Information Leaflet last updated on the eMC: 3 April 2013

TOPOTECAN

Available as 250 microgram and 1mg capsules

Keep the capsules in their original packaging, and store them in the fridge 2 -8°C away from direct sunlight.

Used for relapsed small cell lung cancer, Cervical cancer stage IVB

Drug interactions

Ciclosporin

Patient counselling points

- Swallow whole with water, either with or without food. Do not open the capsules.
- Prompt treatment required for delayed diarrhoea

Side effects

Bone marrow suppression – Increased risk of infection. Contact the hospital key worker if your temperature goes above 38°C

GI disturbances (nausea/vomiting /delayed diarrhoea) – Take loperamide capsules promptly after first loose stool and take after every loose stool as directed

Asthenia (weakness)

Alopecia (hair loss)

Anorexia

Ref. BNF 63 and Macmillan drug information

TRETINOIN (ATRA)

Available as 10mg capsules

Used for acute Pro-Myelocytic Leukaemia (APML)

Drug interactions

Vitamin A preparations, tetracyclines

Patient counselling points

- Swallow whole with or after food
- Protect your skin from sunlight – even on a bright but cloudy day. Do not use sunbeds. Use a sunscreen
- Women of child bearing potential should use extra contraceptive precaution

Side effects

Bone marrow suppression – Increased risk of infection. Contact the hospital key worker if your temperature goes above 38°C

Dry skin, dry mouth, dry eyes – Your doctor can prescribe soothing creams and eye drops

Rash, itchiness – Use moisturising creams regularly to help prevent dryness.

Bone pain

Headache

Ref. GMCN Oral SACT hand book

VANDETANIB*

Available as 100mg and 300mg tablets.

Used for locally advanced or metastatic medullary thyroid cancer (MTC).

Drug interactions

Vandetanib is a CYP3A4 inducer – caution with **CYP3A4 substrates**: estroprogestatives, cyclosporine, tacrolimus, docetaxel, bortezomib. Caution with potent **CYP3A4 inhibitors**: itraconazole, ketoconazole, ritonavir and clarithromycin. Avoid potent CYP3A4 inducers: rifampicin, carbamazepine, phenobarbital and St John's Wort.

Careful monitoring and possible dose adjustment – dabigatran, digoxin, metformin.

Proton pump inhibitors not recommended.

Medicinal products known to also prolong the QTc interval and/or induce Torsades de pointes:

- Combination contraindicated: arsenic, cisapride, erythromycin intravenous (IV), toremifene, mizolastine, moxifloxacin, Class IA and III antiarrhythmics is contra-indicated.
- Combinations not recommended: methadone, haloperidol, amisulpride, chlorpromazine, sulpiride, zuclopenthixol, lumefantrine, pentamidine, ondansetron.

Patient counselling points

- Take with or without food, about the same time each day.
- Some people who are taking vandetanib become more sensitive to the sun - always use sunscreen and wear clothes to avoid exposure to the sun.
- Use caution before driving or using machines as may make you feel tired, weak, or cause blurred vision.

Side effects

Patients should be counselled to report immediately to their doctor any signs that might indicate a serious side effect to vandetanib has occurred including:

- Seizures, headache, confusion or difficulty concentrating.
- Difficulty in breathing, especially if associated with cough or fever (**signs of lung inflammation**).
- Light-headedness, fainting, or chest discomfort (**signs of electrical changes or abnormal heart beat**).
- Severe skin reactions affecting large parts of the body, including redness, pain, ulcers, blisters and shedding of the skin.
- Severe diarrhoea.

Other very common side effects include:

Nausea and vomiting – If this occurs this can be managed with anti-sickness.

High blood pressure – Your doctor may prescribe a medicine to treat this.

Fatigue – Rest as you need to, eat a balanced nutritious diet and plenty of fluids.

Ref. SPC accessed via www.medicines.org.uk on 13/5/13

* Indicates where the cost of the medicine will be greater than £1000 per cycle (may be up to £5000 per cycle) of treatment

VEMURAFENIB*

Available as 240mg tablets

Used for metastatic melanoma

Drug interactions

Amiodarone, amitriptyline, azithromycin, clarithromycin, rifampicin, carbamazepine, phenytoin, St John's Wort, warfarin, oral contraceptives

Patient counselling points

- Swallow the tablets whole with a glass of water
- Take with or without food – but do not take regularly on an empty stomach
- Avoid skin exposure – use sunscreen and lip balm (minimum SPF of 30) and wear protective clothing

Side effects

Rash, itching, dry or scaly skin – A simple moisturiser will help prevent dryness

GI disturbances (nausea/vomiting/diarrhoea/constipation)

Decreased appetite and changes in taste

Headache, joint or muscle pain, pain in the extremities, back pain

Tiredness (fatigue) – Rest as you need to, eat a balanced nutritious diet and drink plenty of fluids

Ref. Patient information leaflet Roche

Vemurafenib SPC accessed via www.medicines.org.uk on 20 May 2013

* Indicates where the cost of the medicine will be greater than £1000 per cycle (may be up to £5000 per cycle) of treatment

VINORELBINE

Available as 20mg, 30mg and 80mg capsules

Refrigerate 2-8°C. Stable for up to 72 hours at room temperature

Used for Non Small Cell Lung cancer, metastatic Breast cancer

Drug interactions

Clarithromycin, itraconazole, clozapine

Patient counselling points

- Swallow whole with a glass of cold water, with or after food.
- Food does not affect absorption but it is advised to take with light snack to reduce G.I upset
- The liquid content of the capsule is an irritant and may cause damage if in contact with skin, mucosa or eyes. Damaged or cut capsules should not be swallowed and should be returned to the pharmacy for safe destruction
- Advise the patient to take an ondansetron tablet about half an hour before taking the vinorelbine to reduce the risk of vomiting

Side effects

Bone marrow suppression – Increased risk of infection. Contact the hospital key worker if your temperature goes above 38°C

GI disturbance (nausea/vomiting/diarrhoea/anorexia/stomatitis (soreness of mouth)

Alopecia (hair loss) – progressive with treatment, usually mild

Muscle pain, jaw pain

Tiredness (fatigue) – Rest as you need to, eat a balanced nutritious diet and drink plenty of fluids

Ref. GMCN Oral SACT hand book

VISMODEGIB*

Available as 150mg capsules

Used for Basal cell carcinoma

Drug interactions

Proton pump inhibitors, H2 receptor antagonists, Antacids, Clarithromycin, Rifampicin, Erythromycin, Fluconazole, Phenytoin, St John's Wort.

Patient counselling points

- The capsules must be swallowed whole with water, with or without food.
- The capsules must not be opened (part of pregnancy prevention package).
- Use sunscreen and lip balm (minimum SPF of 30) and wear protective clothing.

Side effects

Feeling sick (nausea) and **being sick** (vomiting) – If this occurs this can be managed with anti-sickness medication.

Reduced appetite and weight loss.

Taste disturbance or loss of taste.

Diarrhoea – Drink plenty of fluids. Your doctor may prescribe anti-diarrhoeals.

Constipation – Take plenty of fluids, a high fibre diet and take gentle exercise. Your doctor may also prescribe laxatives.

Indigestion.

Feeling tired (fatigue) – Rest as you need to, eat a balanced nutritious diet and drink plenty of fluids.

Rash or dry itchy skin – Use moisturising creams regularly to help prevent dryness.

Muscle spasms.

Muscle pain, joint pain or pain in the extremities.

Abdominal pain or back pain.

Hair loss.

Ref. Vismodegib SPC. Accessed via eMC www.medicines.org.uk on 28 October 2014

* Indicates where the cost of the medicine will be greater than £1000 per cycle (may be up to £5000 per cycle) of treatment

Oral anti-cancer administration table for patients with swallowing difficulties

Drug Name Tablet (T)/Capsule (C)	Can be:		Mixed With	Route	Comment
	Dissolved	Opened		PO/feeding tube	
Afatinib (T)	YES		Non-carbonated water No other liquids should be used	PO/Enteral tube	Disperses in approximately 100 ml of non-carbonated drinking water. The tablet should be dropped into the water without crushing it, and stirred occasionally for up to 15 min until it is broken up into very small particles. The dispersion should be consumed immediately. Rinse glass with approximately 100 ml of water which should also be consumed. The dispersion can also be administered through a gastric tube
Axitinib (T)	YES		Distilled/ Purified water	PO/Enteral tube	Do NOT use tap/ bottled water. 15ml distilled/ purified water should be used for enteral route. Use amber-coloured syringe/ container to disperse tablet - light sensitive. Ensure suspension is protected from light.
Bosutinib (T)	NO		See comment	PO	Film coated, immediate release tablets. Do not crush. Pfizer have not evaluated crushing, splitting, dissolving or feeding tube administration.
Busulfan (T)	YES		Water	PO/Enteral tube	Disperses in 18 minutes. Liquid prep available.
Cabozantinib (C)		NO	See comment	PO	This class of drugs – TKIs – and Cometriq® in particular are associated with increased likelihood of gastrointestinal bleeding and fistula formation. For this reason, opening the capsules cannot be recommended
Capecitabine (T)	YES		Raspberry or blackcurrant juice (NOT citric juices)	PO/Enteral tube	Disperses in 15 minutes in 200ml lukewarm water (not hot).
Chlorambucil (T)	YES		Water	PO/Enteral tube	Disperses in 18 minutes. Tablets should not be divided.

Drug Name Tablet (T)/Capsule (C)	Can be:		Mixed With	Route	Comment
	Dissolved	Opened		PO/feeding tube	
Crizotinib (C)	YES	NO	Water	PO/Enteral tube	Allow capsule to disintegrate in 30ml (2 tablespoons) boiling water, add 15ml (1 tablespoon) room temperature water – consume immediately but ensure not boiling hot on drinking. A mint sweet before and after taking can help mask the taste.
Cyclophos-phamide (T)	YES		Water	PO/Enteral tube	Disperses in ~25 minutes. Liquid prep available.
Dabrafenib (C)		NO	See comment	PO	Capsules should not be opened or crushed and should not be mixed with food or liquids due to chemical instability of dabrafenib
Dasatinib (T)	YES		100% apple or 100% orange juice (NOT water)	PO/Enteral tube	Disperses in 20 minutes in 30ml volume and rinse with 15ml. Resting of suspension increase bitterness - consume immediately after dispersion.
Erlotinib (T)	YES		Water, sweetened fruit juice (NOT grapefruit juice), Orasweet	PO/Enteral tube	Disperses in 5-8 minutes.
Etoposide (C)	NO	NO	Oral injection can be mixed with orange/ apple juice/ lemonade (NOT milk, grapefruit or cranberry juice)	PO/Enteral tube	Use injection orally at 70% of oral dose. Prepared by aseptic unit (requires orange order form by pharmacist). Liquid prep available.
Everolimus (T)	YES		Water (NOT milk or fruit juice)	PO/Enteral tube	Disperses in 5-10 minutes in 30ml.
Fludarabine (T)	NO		See comment	PO	Alternative IV route, refer to pharmacist/clinician.
Gefitinib (T)	YES		Water	PO/Enteral tube	Disperses in 20 minutes.
Hydroxy-carbamide (C)	YES	YES	Water	PO	Siklos® tablets disperse immediately in 5ml or capsules can be opened. Liquid prep available.
Ibrutinib (C)		NO	See comment	PO	The capsules are hard and should not be opened, broken, or chewed.

ORAL ANTI-CANCER ADMINISTRATION TABLE FOR PATIENTS WITH SWALLOWING DIFFICULTIES

Drug Name Tablet (T)/Capsule (C)	Can be:		Mixed With	Route	Comment
	Dissolved	Opened		PO/feeding tube	
Idarubicin (C)	NO	NO	See comment	PO	Contents of idarubicin capsules are extremely irritating to tissues. Alternative IV route.
Imatinib (T)	YES		Water, apple juice	PO	Nil info enteral feeding.
Isotretinoin (C)		YES	Lukewarm milk or soft food such as cottage cheese, ice cream, yoghurt, chocolate mousse or oatmeal	PO/Enteral tube	See patient information sheet. Enteral feeding - may need dose adjustment if given this route (lower peak levels).
Lapatinib (T)	YES		Water (NOT grapefruit juice)	PO/Enteral tube	Disperses in 15 minutes.
Lenalidomide (C)	NO	NO	See comment	PO	No info available, refer to pharmacist/clinician.
Lomustine (C)		YES	Milk, yoghurt, fromage frais, ice cream, pureed food	PO	Nil info enteral feeding. Do NOT mix with water or juice as this can cause stomach irritation.
Melphalan (T)	YES		Water	PO	Nil info enteral feeding. Best not to take with food due to reduction in bioavailability.
Mercaptopurine (T)	YES		Water	PO/Enteral tube	Disperse in a syringe (oral/enteral). Liquid prep available.
Methotrexate (T)	YES		Water	PO/Enteral tube	Tablets disperse. Liquid prep available.
Mitotane (T)	NO		High fatty food/ dairy based products, e.g. yoghurt, mousse	PO/Enteral tube	Dilute dairy based products containing crushed tablets in water for administration via enteral feeding tube. Liquid prep available.
Nilotinib (C)		YES	Apple sauce (pureed apple)	PO	Only use apple sauce. Content of ONE capsule in ONE teaspoon of apple sauce only. Nil info enteral feeding.

Drug Name Tablet (T)/Capsule (C)	Can be:		Mixed With	Route	Comment
	Dissolved	Opened		PO/feeding tube	
Pazopanib (T)	NO		See comment	PO	Crushing tablets significantly increases bioavailability and absorption (Adverse events reported most frequently with the crushed-tablet administration included erythema, vomiting, and fatigue). Refer to pharmacist/clinician.
Pomalidomide (C)		NO	See comment	PO	Hard gelatine capsules should not be opened or crushed. If powder from pomalidomide makes contact with the skin, the skin should be washed immediately and thoroughly with soap and water. If pomalidomide makes contact with the mucous membranes, they should be thoroughly flushed with water.
Ponatinib (T)	NO		See comment	PO	Film coated tablets should not be dissolved or crushed. Nil info on the safety and efficacy of crushed or broken tablets, or naso-gastric tube administration.
Procarbazine (C)		YES	Water	PO/Enteral tube	Powder is very irritant. Give immediately once dispersed as unstable. Liquid prep available.
Ruxolitinib (T)	NO		See comment	PO	Tablets are uncoated, immediate-release and should not be crushed. In addition, risk of drug exposure from dust/powder/bits of tablet if crushed. Contact medicines information.
Sorafenib (T)	YES		Water	PO	Disperses in 10 minutes. Nil info enteral feeding.
Sunitinib (C)		YES	Apple sauce, yoghurt (Saline if used for enteral feeding)	PO/Enteral tube	Mix contents in a teaspoonful of apple sauce/ yoghurt. For enteral feeding, disperse contents in 5ml saline, and rinse with 5ml. Some discolouration of the tube may remain, due to the strong orange colour of the sunitinib.
Temozolomide (C)		YES	Fruit Juice (NOT grapefruit), apple sauce	PO/Enteral tube	30ml fruit juice for enteral route. Liquid prep available.
Teysuno (C)	YES	NO	Water	PO/Enteral tube	Try commercial jelly products obtainable over-the-counter to aid swallowing of tablets (e.g. Pill Glide). Capsules dissolve in 50°C water.

ORAL ANTI-CANCER ADMINISTRATION TABLE FOR PATIENTS WITH SWALLOWING DIFFICULTIES

Drug Name Tablet (T)/Capsule (C)	Can be:		Mixed With	Route	Comment
	Dissolved	Opened		PO/feeding tube	
Thalidomide (C)		YES	Semi-solid foods e.g. apple sauce, pudding and ice cream. (Water for NG)	PO/Enteral tube	Disperses in water but not very water-soluble, therefore enteral tubes must be flushed well post-dose to avoid blockage.
Tioguanine (T)	YES		Water (simple syrup, wild cherry syrup as flavouring)	PO	Do NOT stir tablets or shake the container, allow tablets to disperse naturally. Liquid prep available. Nil info enteral feeding. Tablets can be halved using dedicated tablet cutter.
Topotecan (C)	NO	NO	See comment	PO	No information on opening capsules.
Tretinoin (C)		YES	Soya bean oil or lukewarm milk	PO/Enteral tube	See patient information sheet.
Vandetanib (T)	YES		Water (NO other liquid)	PO/Enteral tube	Stir tablet until dispersed (approx 10 mins).
Vemurafenib (T)	NO		See comment	PO	Tablets have low solubility and permeability. Due to hardness of tablets, crushing is difficult. Refer to pharmacist/clinician.
Vinorelbine (C)		NO	See comment	PO	Vinorelbine capsules must not be opened as they are carcinogenic, and the liquid irritant to oesophagus. Alternative IV route.
Vismodegib (C)		NO	See comment	PO	The capsules must not be opened. Vismodegib has a low solubility in aqueous media.

Oral anti-cancer patient and carer education checklist

Oral anti-cancer patient and carer education checklist	
<p>Prior to first cycle:</p> <p><i>This checklist must be completed with the patient/carers at the point of handing the medication to the patient either in conjunction with or following a pre-treatment consultation</i></p>	<p>Tick if discussed with the patient/carers</p>
Instructions for taking	
Explain how and when to take the medicine including any treatment breaks	
If the patient is unable to swallow tablets or capsules or has a feeding tube, please refer to oral SACT counselling handbook to dissolve or open capsules (if appropriate for the oral anti-cancer medicine)	
Missed doses can be taken if near to the scheduled time. Otherwise, do not try and catch up or double the next dose. Wait until the next dose is due	
In case of vomiting after taking a dose, do not repeat the dose and take the next dose at the normal time. If this occurs again, contact the chemotherapy team/24 hour advice line	
Check patient aware of side effects and has received written information. Any side effects should be reported to your chemotherapy nurse or doctor	
If the patient is taking any prescribed/over the counter medicine/supplement - the patient should inform their medical team	
Return any unused oral anti-cancer medicine to the hospital pharmacy. Do not flush or throw them away (for high cost drugs see counselling handbook)	
Storage and handling	
The oral anti-cancer medicine should not be handled by anyone who is pregnant or planning a pregnancy (unless taking on the advice of medical team)	
If the carer is giving the anti-cancer medicine, they should not handle the medicine directly but wear gloves or push the medicine out of the blister pack (if applicable) directly into a medicine pot	
Store the tablets/capsules in the container provided	
Store the tablets/capsules in a secure place, away from and out of sight of children	
Wash hands thoroughly after taking/giving the oral anti-cancer medicine	
Check the patient understands how to take the treatment, by asking them to repeat back their instructions	
Written information provided	
Taking an oral anti-cancer medicine patient information sheet	
Diary for taking your oral anti-cancer medicine (if applicable)	
For swallowing difficulty only – give relevant factsheet if appropriate for the oral anti-cancer medicine and an oral anti-cancer pack with disposables (e.g. oral/enteral syringes) Dissolving oral anti-cancer tablets safely Opening oral anti-cancer capsules safely Giving an oral anti-cancer medicine through a feeding tube Giving an anti-cancer syringe by mouth	
Patient name	Counselled/educated by
Hospital number	Pharmacist/Pharmacy technician/Nurse/Interpreter
Signature and date	Signature and date

Before all subsequent cycles:

- Check the patient has understood the checklist above and repeat if necessary
- Check any side effects experienced with their previous cycle were discussed with their medical team
- If a dose adjustment has been made, the patient is aware why their dose has been changed and how many tablets/capsules they should now take
- Check they had no problems taking their previous cycle
- Check the patient understands how to take the treatment, by asking them to repeat back their instructions

Please retain a copy and /or endorse the prescription/ electronic patient record as evidence counselling took place at each cycle

Factsheet 1: Dissolving oral anti-cancer tablets

This factsheet will guide you or a carer through how to give anti-cancer tablets safely as a solution.

You should only dissolve anti-cancer tablets if you have been advised how to do this safely by a healthcare professional.

This procedure is not suitable for all medicines. Please only use this procedure for the anti-cancer tablets that healthcare professionals have advised you about.

Remember

- Your anti-cancer tablets should not be handled by anyone who is pregnant or planning a pregnancy unless you are taking on the advice of your medical team.
- Use the oral anti-cancer pack provided.
- Store the tablets in the container provided.
- Store the tablets in a secure place, away from and out of the sight of children.

Preparation

You will need a clean and clear working surface.

Try to ensure there are no interruptions (for example from pets or children).

Do not mix different medicines together.

Procedure

1. You will need to have ready the following items:
 - the anti-cancer tablets needed for the dose
 - a glass and a spoon (kept only for this purpose)
 - half a glass of tap water (unless otherwise specified)
(Suitable liquid or flavouring _____)
 - yellow special clinical waste bag
 - kitchen roll (kept only for this purpose)
 - pair of non-sterile disposable gloves
 - plastic apron
2. Place a sheet of kitchen towel on the working surface.
3. Put on the gloves and apron.
4. Put the tablet(s) needed for the dose in the glass.
5. Add the water to the tablet(s) and allow to disperse.
6. Agitate the solution using the spoon every 5 minutes or so to help the tablet(s) disperse.
 - **Note** different tablets take different amounts of time to disperse and may not dissolve completely. For example, there may be small lumps or grains in the solution.
7. When the tablet(s) has dispersed, take the medicine/give the medicine to the patient.
8. To ensure that the whole dose is taken, swirl the glass with water and take/give to the patient. Repeat if necessary.

9. In case of any spillages, please see Table 1 below for details
10. Clean the work surface with damp kitchen roll and dispose of gloves, kitchen roll and apron into the yellow clinical waste bag provided.
11. Seal and return the waste bag to the hospital when full.
12. Wash hands thoroughly.

Table 1: Handling spillages

Contact	Action
Skin	Immediately wash the affected area thoroughly with luke warm soapy water. Do not scrub as this may damage the skin. Contact your doctor for advice if you have any adverse effects.
Eye	Wash the eye with plenty of fresh water every few minutes for about 20 minutes. Contact your doctor for advice if you have any adverse effects.
Work surface or floor	Wearing protective clothing (gloves and apron) wipe up the spillage using paper towels. Wash the area with warm soapy water and dry with absorbent paper towel. Kitchen towel should be put in the special clinical waste bag.
Clothing	Wearing gloves, blot the area with kitchen towel, remove clothing and wash separately from other items. Wash any affected areas of your skin as described above. Kitchen towel should be put in the special clinical waste bag.

Factsheet 2: Opening oral anti-cancer capsules

This factsheet will guide you or a carer through how to open anti-cancer capsules safely so the contents may be taken in a small amount of food or drink.

You should only open anti-cancer capsules if you have been advised how to do this safely by a healthcare professional.

This procedure is not suitable for all medicines. Please only use this procedure for the anti-cancer capsules that healthcare professionals have advised you about.

Remember

- Your anti-cancer capsules should not be handled by anyone who is pregnant or planning a pregnancy unless you are taking on the advice of your medical team.
- Use the oral anti-cancer pack provided.
- Store the capsules in the container provided.
- Store the capsules in a secure place, away from and out of the sight of children.

Preparation

You will need a clean and clear working surface.

Try to ensure there are no interruptions (for example from pets or children).

Do not mix different medicines together.

Procedure

The label instructions for some anti-cancer capsules states that they should be taken on an empty stomach. Taking a small amount of food with the capsule being taken as described in the following procedure is acceptable.

1. You will need the following items:

- the anti-cancer capsule(s) needed for the dose
- two medicine pots
- two spoons (to be kept only for this purpose)
- liquid or soft food
(Suitable liquid or soft food: _____)
- yellow clinical waste bag
- kitchen roll (to be kept only for this purpose)
- pair of non-sterile gloves
- mask
- plastic apron

2. Place a sheet of kitchen towel on the working surface.

3. Put on the gloves, mask and apron.

4. Put the capsule(s) needed for the dose in one medicine pot.

5. Hold a capsule firmly at each end.

6. With the second medicine pot underneath carefully twist and pull the capsule open. Empty the contents into the medicine pot. Place the empty capsule in the yellow clinical waste bag.

7. Repeat steps 5 and 6 for each capsule needed for the dose.
8. Add some liquid or soft food to the capsule contents in the medicine pot and mix. See page 1. Do not put the spoon that has been in contact with the medicine back into the food container, if applicable.
9. Take the medicine/give the medicine to the patient. Make sure that the whole dose is taken. You may need to rinse the medicine pot with water or juice and take/give to the patient.
10. In case of any spillages, please see Table 1 below for details.
11. Place all disposable items (e.g. medicine pots) used into the yellow clinical waste bag provided.
12. Clean the work surface with damp kitchen roll and dispose of kitchen roll, mask, gloves and apron into the yellow clinical waste bag provided. The medicine pots and spoons can be washed in warm soapy water, rinsed and dried before being re-used.
13. Seal and return the waste bag to the hospital when full.
14. Wash hands thoroughly.

Table 1 Information on handling spillages

Contact:	Action
Skin	Immediately wash the affected area thoroughly with luke warm soapy water. Do not scrub, as this may damage the skin. Contact your doctor for advice if you have any adverse effects.
Eye	Wash the eye(s) with plenty of fresh water every few minutes for about 20 minutes. Contact your doctor for advice if you have any adverse effects.
Work surfaces and floors	Wearing protective clothing (gloves, apron, mask) wipe up the spillage using paper towels. Wash the area with warm soapy water and dry with absorbent paper towel. Kitchen towels used should be put in the yellow clinical waste bag.
Clothing	Wearing gloves, blot the area with kitchen towel, remove clothing and wash separately from other items. Wash any affected areas of your skin as described above. Kitchen towel should be put in the special clinical waste bag

Factsheet 3: Giving an anti-cancer medicine through a feeding tube

This factsheet will guide you through how to give anti-cancer tablets/capsules/liquids/prepared syringes safely through a feeding tube.

You should only give an anti-cancer medicine through a feeding tube if you have been taught how to do this safely by a healthcare professional. It is safe for you to handle these medicines if you are taking them as part of your treatment, however they may cause side effects (including skin irritation) if handled by others.

This procedure is not suitable for all medicines. Please only use this procedure for the anti-cancer tablets/capsules/liquids that pharmacy staff have advised you about.

Remember

- Your anti-cancer medicines should not be handled by anyone who is pregnant or planning a pregnancy unless you are taking the advice of your medical team.
- Use the oral anti-cancer pack provided.
- Store the anti-cancer medicines in the container provided.
- Store the anti-cancer medicines in a secure place, away from and out of the sight of children.

Preparation

You will need a clean and clear working surface.

Try to ensure there are no interruptions (for example from pets or children).

Do not mix different medicines together.

If there are problems fitting the anti-cancer medicine in around feeds, please talk to the dietitian.

Feeding tube procedure

1. You will need to have ready the following items:
 - the anti-cancer tablets/capsules/liquids/prepared syringes needed for the dose
 - tap water (unless otherwise specified)
(Suitable liquid: _____)
 - three 50ml oral/enteral syringes
 - one syringe cap
 - yellow special clinical waste bag
 - kitchen roll (kept only for this purpose)
 - pair of non-sterile disposable gloves
 - mask
 - plastic apron
2. Place a sheet of kitchen towel on the working surface.
3. Fill two syringes with 30-50mls of water for flushing the tube.
4. Put on the gloves, mask and apron.
5. Prepare the dose according to the type of medicine you have i.e. tablet/capsule/liquid/prepared syringe. See details of how to do this below.

6. If a feed is running, stop the feed and flush the feeding tube with 30-50mls of water using one of the 50ml oral/enteral syringes.
7. Give the prepared medicine through the feeding tube. Draw up about 10ml of water into the medicine syringe to rinse and give through the feeding tube. This will ensure that the whole dose has been given.
8. If more than one type of medicine is needed to be given at the same time, flush the feeding tube with 30-50ml of water between each medicine to prevent the different medicines mixing in the feeding tube.
9. Once all medicine doses have been given, flush the feeding tube with the second 50ml oral/enteral syringe containing 30-50mls of water.
10. Re-start the feed.
11. The syringes can be washed in warm soapy water, rinsed and dried before being re-used. Replace syringes after using 30 times or sooner if necessary.
12. In case of any spillages, please see Table 1 below for details
13. Clean the work surface with damp kitchen roll and dispose of kitchen roll, mask, apron and gloves into the yellow clinical waste bag provided.
14. Seal and return the waste bag to the hospital when full.
15. Wash hands thoroughly.

How to prepare TABLETS to give through a feeding tube

1. Place a sheet of kitchen towel on the working surface.
2. Put on the gloves and apron.
3. Remove the plunger from one of the oral/enteral syringes and put the tablet(s) for the dose inside the barrel. Carefully replace the plunger to within about 1cm of the tablet(s).
4. Draw up about 10ml of water in to the syringe. More water may be needed for some tablets. Leave some air in the syringe to help agitate the tablet(s).
5. Put a syringe cap on the syringe and allow the tablet(s) to disperse.
6. Agitate the syringe every 5 minutes or so to help the tablet(s) disperse.
 - **Note** different tablets take different amounts of time to disperse and may not dissolve completely. For example, there may be small lumps or grains in the solution.
7. When the tablet(s) has dispersed, the dose is ready to administer. Refer back to point 6 of the feeding tube procedure and continue as directed.

How to prepare CAPSULES to give through a feeding tube

1. You will need two medicine pots and a spoon (used only for this purpose) in addition to the list stated in point one of the procedure.
2. Place a sheet of kitchen towel on the working surface.
3. Put on the gloves, mask and apron.
4. Put the capsule(s) needed for the dose in one medicine pot.

5. Hold a capsule firmly at each end.
6. With the second medicine pot underneath carefully twist and pull the capsule open. Empty the contents into the medicine pot. Place the empty capsule in the yellow clinical waste bag.
7. Repeat steps 5 and 6 for each capsule needed for the dose.
8. Add about 15-30ml of water to the capsule contents in the medicine pot and mix.
9. Once the capsule contents have been dispersed in the water, draw up the mixture into the oral/enteral syringe and give through the feeding tube.
10. Rinse the medicine pot with water, draw up into the oral/enteral syringe and give this through the feeding tube also to ensure that the whole dose is given.
11. Refer back to point 6 of the feeding tube procedure and continue as directed.
12. The medicine pots and spoons can be washed in warm soapy water, rinsed and dried before being re-used for this purpose.

How to prepare LIQUIDS to give through a feeding tube

1. Place a sheet of kitchen towel on the working surface.
2. Put on the gloves and apron.
3. Shake the liquid well to ensure that the medicine is evenly distributed.
4. Use an oral syringe to draw out the dose from the medicine bottle.
5. The medicine can then be transferred to one of the 50ml oral/enteral syringes and given through the feeding tube unless you are told to dilute it first.
6. If the liquid is very thick or contains sugars, it may need to be diluted before giving through the feeding tube. In these cases:
 - a. Use an oral syringe to draw up the dose and put it in a medicine pot.
 - b. Add water to the medicine pot and stir until well mixed.
 - c. Draw up the mixture into an oral/enteral syringe and give through the feeding tube.
 - d. Rinse the medicine pot with water and give this through the feeding tube also to ensure that the whole dose is given.
7. Refer back to point 6 of the feeding tube procedure and continue as directed.

How to prepare ANTI-CANCER SYRINGES to give through a feeding tube

Depending on the type of feeding tube being used, the anti-cancer syringes provided may or may not attach directly to the feeding tube. The syringes will attach directly to most gastrostomy (PEG) tubes. Adaptors may be available for other types of tube – please ask the dietitian.

1. You will need a tray and a pair of scissors (used only for this purpose) in addition to the list stated in point one of the procedure.
2. Place a sheet of kitchen towel on the working surface.
3. Put on the gloves and apron.
4. Collect the anti-cancer syringe(s) needed for the dose.
5. Cut open one end of the plastic wrapper and place the syringe(s) on the tray.

6. Follow point 6 of the feeding tube procedure.
7. To give the anti-cancer syringe, holding the first anti-cancer syringe over the tray, carefully remove the cap from the syringe by twisting it anti-clockwise. Put the cap in the clinical waste bag.
8. Attach the anti-cancer syringe to the feeding tube and gently push in.
9. Disconnect the syringe and place it directly in the clinical waste bag.
10. If more than one anti-cancer syringe is needed, flush the feeding tube with about 10ml of water between each syringe.
11. Once all anti-cancer syringes have been given, refer back to point 8 of the feeding tube procedure and continue as directed with the exception of point 11.

Table 1: Handling spillages

Contact	Action
Skin	Immediately wash the affected area thoroughly with luke warm soapy water. Do not scrub as this may damage the skin. Contact your doctor for advice if you have any adverse effects.
Eye	Wash the eye with plenty of fresh water every few minutes for about 20 minutes. Contact your doctor for advice if you have any adverse effects.
Work surface or floor	Wearing protective clothing (gloves and apron) wipe up the spillage using paper towels. Wash the area with warm soapy water and dry with absorbent paper towel. Kitchen towel should be put in the special clinical waste bag.
Clothing	Wearing gloves, blot the area with kitchen towel, remove clothing and wash separately from other items. Wash any affected areas of your skin as described above. Kitchen towel should be put in the special clinical waste bag.

Factsheet 4: Giving an anti-cancer syringe by mouth

This factsheet will guide you through how to give a prepared anti-cancer syringe safely by mouth.

For one or more of the following reasons, these anti-cancer medicines have been supplied as a liquid in a syringe:

- Difficulty with swallowing tablets/capsules
- The dose needed cannot be achieved with tablets/capsules in the strengths that are available.

You should only give an anti-cancer medicine this way if you have been taught how to do this safely by a healthcare professional. It is safe for you to handle these medicines if you are taking them as part of your treatment, however they may cause side effects (including skin irritation) if handled by others.

This procedure is not suitable for all medicines. Please only use this procedure for the anti-cancer syringes that pharmacy staff has advised you about.

Remember

- Anti-cancer syringes should not be handled by anyone who is pregnant or planning a pregnancy.
- Use the oral anti-cancer pack provided.
- Store the anti-cancer medicines in the container provided.
- Store the anti-cancer medicines in a secure place, away from and out of the sight of children.

Preparation

You will need a clean and clear working surface.

Try to ensure there are no interruptions (for example from pets or children).

Do not mix different medicines together.

Check how often and over what period of time the treatment has been prescribed. Instructions can be found on the label on the outer bag containing the syringes.

Procedure

1. You will need to have ready the following items:
 - the anti-cancer syringes needed for the dose
 - cup or glass (disposable or kept only for this purpose)
 - tap water (unless otherwise specified)
(Suitable liquid or flavouring: _____)
 - yellow special clinical waste bag
 - kitchen roll (kept only for this purpose)
 - pair of non-sterile disposable gloves
 - plastic apron
 - pair of scissors
 - tray
2. Place a sheet of kitchen towel on the tray.
3. Put on the gloves and apron.
4. Collect the anti-cancer syringe(s) needed for the dose.

5. Cut open one end of the plastic wrapper and place the syringe(s) on the tray.
6. Holding the syringe over the tray, carefully remove the cap from the syringe by twisting it anti-clockwise. Put the cap in the clinical waste bag.
7. Gently pull the plunger in the syringe backwards slightly to release, then **slowly** push the contents of the syringe into the cup. Direct the liquid against the side of the cup to avoid splashes.
8. Place the empty syringe in to the clinical waste bag.
9. Add some suitable liquid to the liquid in the cup.
10. The patient should drink the contents of the cup immediately. Alternatively, the syringe can be given by mouth directly.
11. Repeat for any additional syringe.
12. In case of any spillages, please see Table 1 below for details
13. Clean the work surface with damp kitchen roll and dispose of gloves, kitchen roll and apron into the yellow clinical waste bag provided.
14. All other items should be washed in hot soapy water separate from other household items.
15. Seal and return the waste bag to the hospital when full.
16. Wash hands thoroughly.

Table 1: Handling spillages

Contact	Action
Skin	Immediately wash the affected area thoroughly with luke warm soapy water. Do not scrub as this may damage the skin. Contact your doctor for advice if you have any adverse effects.
Eye	Wash the eye with plenty of fresh water every few minutes for about 20 minutes. Contact your doctor for advice if you have any adverse effects.
Work surface or floor	Wearing protective clothing (gloves and apron) wipe up the spillage using paper towels. Wash the area with warm soapy water and dry with absorbent paper towel. Kitchen towel should be put in the special clinical waste bag.
Clothing	Wearing gloves, blot the area with kitchen towel, remove clothing and wash separately from other items. Wash any affected areas of your skin as described above. Kitchen towel should be put in the special clinical waste bag.

Factsheet 5: Opening isotretinoin capsules

This factsheet provides information for parents of children who have been prescribed isotretinoin capsules.

Wherever possible, anti-cancer capsules should be swallowed whole with a glass of water.

However, some people (particularly children) cannot swallow whole capsules or they may have a feeding tube through which they also take medicines. This factsheet will guide you through how to open isotretinoin capsules safely, so the contents can be taken in a small amount of food or drink.

You should only open isotretinoin capsules if you have been advised on how to do this safely by a healthcare professional. It is safe for people to handle the capsules if they are taking them as part of their treatment, however the capsules may produce side effects (including skin irritation) if handled by others.

This procedure is only suitable for isotretinoin. Please note it is not suitable for all medicines.

Remember

- The anti-cancer capsules should never be handled by anyone who is pregnant or planning a pregnancy.
- Use the oral anti-cancer pack provided.
- Store capsules in the container provided.
- Store the capsules in a secure place, away from and out of the sight of children.
- In case of a spillage while opening these capsules, see the advice in Table 1 below.

Preparation

You will need a clean and clear working surface.

Try to ensure there are no interruptions (for example from pets or children).

Do not mix different medicines together. You will need to follow the appropriate procedure for each different type of medicine.

1. You will need to have ready the following items:
 - The anti-cancer capsule(s) needed for the dose
 - Two plastic medicine pots
 - A spoon (to be used only for this purpose) or three oral/enteral syringes
 - Small pair sharp clean scissors (to be used only for this purpose)
 - A small plastic tray
 - Kitchen roll (to be used only for this purpose)
 - Pair of non-sterile gloves
 - Mask
 - Plastic apron
 - Small amount of liquid or soft food
(Suitable soft food if giving by mouth: ice-cream, chocolate mousse, yoghurt, cottage cheese or oatmeal)
(Suitable liquid if giving by feeding tube: lukewarm milk, vegetable oil or olive oil)
 - Small sealable plastic bag
 - Yellow clinical waste bag
2. Line a plastic tray with kitchen towel and place on a clean, clear working surface.
3. Put on gloves, mask and apron.

4. Put the capsule(s) needed for the dose in a medicine pot.
5. Take a capsule between finger and thumb and hold firmly upright. With the scissors snip the tip off the capsule into the tray to avoid any possible harm to the eyes.
6. Carefully squeeze the contents of the capsule into the medicine pot.
7. Discard empty capsule into a small sealable bag.
8. Use a fresh piece of kitchen roll to wipe any drug from the gloves then dispose of kitchen roll immediately in the small sealable bag.
9. Repeat steps 4 to 7 for each capsule needed for the dose.
10. After all the required capsules have been emptied, add some liquid or soft food (see above) to the capsule contents in the medicine pot and mix together.
11. If using a feeding tube, flush the feeding tube with the liquid (see above) using one of the syringes.
12. Give the medicine to the patient either using the spoon if it is given by mouth **or** draw up the mixture into the syringe if the mixture is to be given down a feeding tube.
13. Rinse the medicine pot with liquid or soft food to ensure the whole dose is given.
14. If using a feeding tube, flush the feeding tube with the liquid (see above) using the second syringe.
15. Place the medicine pots and kitchen roll into small sealable bag and seal before placing in the yellow waste bag.
16. In case of any spillages, please see Table 1 below for details.
17. Clean the work surface with damp kitchen roll. The medicine pots, scissors, spoon and syringes (if used) can be washed in warm soapy water, rinsed and dried before being re-used for this purpose.
18. Dispose of gloves, apron, mask and sealable bag in yellow clinical waste bag provided.
19. Seal and return yellow waste bag to the Royal Marsden when full.
20. Wash hands thoroughly.

Table 1: Handling spillages

Contact	Action
Skin	Immediately wash the affected area thoroughly with luke warm soapy water. Do not scrub as this may damage the skin. Contact your doctor for advice if you have any adverse effects.
Eye	Wash the eye with plenty of fresh water every few minutes for about 20 minutes. Contact your doctor for advice if you have any adverse effects.
Work surface or floor	Wearing protective clothing (gloves and apron) wipe up the spillage using paper towels. Wash the area with warm soapy water and dry with absorbent paper towel. Kitchen towel should be put in the special clinical waste bag.
Clothing	Wearing gloves, blot the area with kitchen towel, remove clothing and wash separately from other items. Wash any affected areas of your skin as described above. Kitchen towel should be put in the special clinical waste bag.

Factsheet 6: Opening tretinoin capsules

This factsheet provides information for patients or parents of children who have been prescribed tretinoin capsules.

Wherever possible, anti-cancer capsules should be swallowed whole with a glass of water.

However, some people (particularly children) cannot swallow whole capsules or they may have a feeding tube through which they also take medicines. This factsheet will guide you through how to open tretinoin capsules safely so the contents can be taken in a small amount of food or drink.

You should only open tretinoin capsules if you have been advised on how to do this safely by a healthcare professional. It is safe for people to handle the capsules if they are taking them as part of their treatment, however the capsules may produce side effects (including skin irritation) if handled by others.

This procedure is only suitable for tretinoin. Please note it is not suitable for all medicines.

Remember

- The anti-cancer capsules should never be handled by anyone who is pregnant or planning a pregnancy.
- Use the oral anti-cancer pack provided.
- Store capsules in the container provided.
- Store the capsules in a secure place, away from and out of the sight of children.
- In case of a spillage while opening these capsules, see the advice in Table 1 below.

Preparation

You will need a clean and clear working surface.

Try to ensure there are no interruptions (for example from pets or children).

Do not mix different medicines together. You will need to follow the appropriate procedure for each different type of medicine.

1. You will need to have ready the following items:
 - The anti-cancer capsule(s) needed for the dose
 - Two plastic medicine pots
 - Three oral/ enteral syringes
 - Small pair sharp clean scissors (to be used only for this purpose)
 - A small plastic tray
 - Kitchen roll (to be used only for this purpose)
 - Pair of non-sterile gloves
 - Mask
 - Plastic apron
 - Small amount of liquid
(Suitable liquid: lukewarm milk, soya bean oil)
 - Small sealable plastic bag
 - Yellow clinical waste bag
2. Line a plastic tray with a piece of kitchen towel and place on a clean, clear working surface.
3. Fill two syringes with the liquid (see above) for flushing the tube.

4. Put on gloves, mask and apron.
5. Put the capsule(s) needed for the dose in a medicine pot.
6. Take a capsule between finger and thumb and hold firmly upright. With the scissors snip the tip off the capsule into the tray to avoid any possible harm to the eyes.
7. Carefully squeeze the contents of the capsule into the medicine pot.
8. Discard empty capsule into a small sealable bag.
9. Use a fresh piece of kitchen roll to wipe any drug from the gloves then dispose of kitchen roll immediately in the small sealable bag.
10. Repeat steps 6 to 9 for each capsule needed for the dose.
11. After all the required capsules have been emptied, add some liquid (see above) to the capsule contents in the medicine pot, mix together and draw up the mixture into the syringe.
12. If using a feeding tube, flush the feeding tube with the liquid (see above) using one of the syringes.
13. Give the prepared medicine to the patient either by mouth **or** down a feeding tube.
14. Rinse the medicine pot with the liquid to ensure the whole dose is given.
15. If using a feeding tube, flush the feeding tube with the liquid (see above) using the second syringe.
16. Place the medicine pots and kitchen roll into small sealable bag and seal before placing in the yellow waste bag.
17. Clean the work surface with damp kitchen roll. The medicine pots, scissors and syringes can be washed in warm soapy water, rinsed and dried before being re-used for this purpose.
18. Dispose of gloves, apron, mask and sealable bag in yellow clinical waste bag provided.
19. Seal and return yellow waste bag to the Royal Marsden when full.
20. Wash hands thoroughly.

Table 1: Handling spillages

Contact	Action
Skin	Immediately wash the affected area thoroughly with luke warm soapy water. Do not scrub as this may damage the skin. Contact your doctor for advice if you have any adverse effects.
Eye	Wash the eye with plenty of fresh water every few minutes for about 20 minutes. Contact your doctor for advice if you have any adverse effects.
Work surface or floor	Wearing protective clothing (gloves and apron) wipe up the spillage using paper towels. Wash the area with warm soapy water and dry with absorbent paper towel. Kitchen towel should be put in the special clinical waste bag.
Clothing	Wearing gloves, blot the area with kitchen towel, remove clothing and wash separately from other items. Wash any affected areas of your skin as described above. Kitchen towel should be put in the special clinical waste bag.

Factsheet 7: Procarbazine and food

Your doctor has prescribed an anti-cancer medicine called procarbazine for you (or your child). Please read this fact sheet carefully before you start taking your anti-cancer capsules.

Procarbazine belongs to a group of medicines that may react with tyramine. Tyramine is a chemical that is present in certain protein-containing foods and drinks.

A reaction may cause an increase in blood pressure. The chance of this happening is very small and the symptoms are usually mild. A reaction is most likely to occur from 7 days after starting procarbazine therapy until 14 days after finishing the course of procarbazine. If the reaction is going to occur it can occur up to 20 minutes after having the food or drink.

The symptoms of a mild reaction might include:

- facial flushing
- rash that may be itchy

Symptoms of a more severe reaction might include:

- sudden onset headache
- pounding heart
- neck stiffness
- sweating, shivering, chills
- nausea or vomiting
- sensitivity to light

The symptoms of **any** reaction should resolve within a few hours. If you are concerned about a reaction you may experience, you can contact your hospital doctor.

Tyramine is released as proteins age and breakdown, therefore it is usually found in foods that are aged, fermented, pickled or smoked. However, it can also be found in protein-containing foods that are improperly stored and allowed to spoil. You or your child should only eat food containing protein if it is fresh.

Some foods and drink must be avoided completely but others you can continue to eat in moderation but start with a small amount first, to ensure they still agree with you. If you still feel well after trying a small amount, more of the same food or others mentioned on the list are unlikely to cause a reaction. However, they could still cause a reaction so avoid eating or drinking them in large quantities. Below is a list of some foods and drinks known to contain high levels of tyramine.

Foods to avoid completely

- Mature or aged cheese, for example: cheddar, stilton, blue cheese, brie
- Pickled fish
- Concentrated yeast or meat extracts, for example: Marmite, Bovril, gravy, stock-cubes (for example: OXO)
- Broad-bean pods

Foods that may be eaten in moderation (see advice above)

Over-ripe fruit	Avocado
Fermented soya beans	Banana
Beer (including alcohol free beer)	Hung game
Wine (including non-alcoholic wine)	Salami/pepperoni/bologna sausage
Lager (including alcohol free lager)	Cured meats
Other alcoholic beverages	Liver
Sour cream	Caviar and smoked fish
Yogurt	Soy sauce and Soya products e.g. tofu and miso

There may be other, more unusual foods you eat that aren't listed here, so remember – only eat food containing protein if it is fresh.

Procarbazine can also interact with alcohol. You may become intolerant of alcohol and it may also cause you to feel sick. Spirits contain little or no tyramine but can still interact with procarbazine because of reduced tolerance to alcohol. Bearing this in mind, it is best to keep alcohol intake to a minimal level, however it is best to avoid alcohol altogether.

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