8. Malignant disease and immunosuppression

An ever increasing number of cytotoxic drugs and biological therapies - now referred to as Systemic anti-cancer therapy (SACT) - are used in the management of malignant disease. The recommended doses and schedules vary according to the tumour type and regimen. Details on the different regimens for differing tumour types are available via the SCAN (South East Scotland Cancer Network) website http://www.scan.scot.nhs.uk/Pages/default.aspx.

SACT should always be prescribed under the supervision of a cancer specialist. With the exception of hormonal treatments, the whole course of oral SACT for the treatment of cancer is most commonly dispensed by the hospital pharmacy. The prescription should not be repeated except on the explicit instruction of a specialist.

Non-malignant disease

Cytotoxic drugs are also used for their immunosuppressive or anti-proliferative effects in the treatment of autoimmune conditions, rheumatoid arthritis, psoriasis, prevention of transplant rejection and in vasculitis. All staff in any care setting must be aware of the risks of handling these drugs and the precautions that need to be taken to safeguard themselves and others. For further information refer to COSHH regulation 2002 www.hse.gov.uk/coshh/ and CEL 30 (2012) www.sehd.scot.nhs.uk/mels/CEL2012_30.pdf.

Most of the SACT drugs listed below are for specialist use only and are not suitable for general use in primary care. They are listed here for information only. The only SACT drugs that may be prescribed on occasion by GPs are cyclophosphamide, azathioprine, methotrexate, mercaptopurine and hydroxycarbamide after initiation or recommendation of a specialist.

Toxicity

Common side-effects of cytotoxic drugs include fatigue, reversible alopecia, nausea and vomiting, oral ulceration, diarrhoea, skin rashes, bone marrow suppression and effects on fertility. Possible effects on fertility and gonadal function must be discussed before treatment begins. The summary of product characteristics (SPC) should be referred to for details on specific side-effects of each drug. For further advice on the management of specific chemotherapy toxicities refer to NHS Lothian advice - http://intranet.lothian.scot.nhs.uk/NHSLothian/Healthcare/A-Z/OOQS-TheOncologyOnlineQualitySystem/Pages/gchemospectox.aspx

Treatment related toxicities experienced by patients should be discussed with the specialist for further advice and support.

8.1 - Cytotoxic Drugs

Drugs for cytotoxic-induced side-effects

H - Calcium folinate (folic acid)
H - Mesna

8.1.1 Alkylating Drugs

R – Bendamustine
H – Busulfan
H – Chlorambucil

KEY:
H – Hospital Use Only
S – Specialist Initiation or Recommendation
R – Restricted Use Only

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Prescribing Points

- **R** – Bendamustine is approved for restricted use as a 1st line treatment of chronic lymphocytic leukaemia (CLL) (Binet stage B or C) in patients for whom fludarabine combination chemotherapy is not appropriate.

### 8.1.2 Anthracyclines and other cytotoxic antibiotics

- **H** - Bleomycin
- **H** - Daunorubicin
- **H** – Doxorubicin
- **H** - Epirubicin
- **H** – Idarubicin
- **H** - Mitomycin
- **H** - Mitoxantrone

### 8.1.3 Antimetabolites

- **R** – Azacitidine
- **H** - Capecitabine
- **H** - Cladribine (Leustat®, Litak®)
- **H** - Cytarabine
- **R** – Fludarabine
- **H** - Fluorouracil
- **H** - Gemcitabine
- **S** - Mercaptopurine (Puri-Nethol®, Xalpurine®)
- **S** - Methotrexate
- **R** – Pemtrexed
- **H** - Raltitrexed
- **H** - Tioguanine

Prescribing Points

- **R** – Azacitidine is approved for restricted use for the treatment of adult patients who are not eligible for haematopoietic stem cell transplantation (SCT) with intermediate-2 and high-risk myelodysplastic syndrome (MDS), chronic myelomonocytic leukaemia (CMML) or acute myeloid leukaemia (AML).
  
  - Cladribine is available as a sub-cutaneous injection (Litak®) and as an i.v. infusion (Leustat®).
  
  - **R** – Fludarabine is approved for restricted use for the treatment of B-cell chronic lymphocytic leukaemia (CLL) in patients with sufficient bone marrow reserves. First line treatment should only be initiated in patients with advanced disease, Rai stages III/IV (Binet stage C), or Rai stages I/II (Binet stage A/B) where the patient has disease related symptoms or evidence of progressive disease. Fludarabine is restricted to use by specialists in haemat-oncology.

**KEY:**

- **H** – Hospital Use Only
- **S** – Specialist Initiation or Recommendation
- **R** – Restricted Use Only
Mercaptopurine is available as tablets (Puri-Nethol®) and as a 20mg/mL oral suspension (Xaluprine®). The oral suspension and tablet formulations are not bioequivalent in terms of peak plasma concentrations and therefore careful haematological monitoring of the patient is advised if switching formulations. Mercaptopurine dosing is governed by cautiously monitoring haematotoxicity.

- **R** – Pemetrexed is approved for restricted use for the following indications
  - monotherapy for the second-line treatment of patients with locally advanced or metastatic non-small cell lung cancer (NSCLC) other than predominantly squamous cell histology. It is restricted to use in patients with good performance status who would otherwise be eligible for treatment with docetaxel.
  - monotherapy for the maintenance treatment of locally advanced or metastatic non-small cell lung cancer other than predominantly squamous cell histology in patients whose disease has not progressed immediately following platinum-based chemotherapy. To be used in patients with performance status 0 or 1, non-progression patients of advanced non-squamous non-small cell lung cancer after 4 cycles of cisplatin and pemetrexed first-line chemotherapy. It is restricted to patients in whom histology has been confirmed as adenocarcinoma or large cell carcinoma.
  - in combination with cisplatin for the first line treatment of patients with locally advanced or metastatic non-small cell lung cancer (NSCLC) other than predominantly squamous cell histology.
  - in combination with cisplatin is accepted for restricted for the treatment of chemotherapy-naïve patients with stage III/IV unresectable malignant pleural mesothelioma.

### 8.1.4 Vinca alkaloids and etoposide

- **H** - Etoposide
- **H** - Vinblastine
- **H** - Vincristine
- **H** - Vinorelbine

### 8.1.5 Other antineoplastic drugs

- **R** - Afatinib (Giotrif®)
- **H** - Aflibercept (Zaltrap®)
- **H** - Amsacrine
- **H** - Arsenic trioxide
- **H** - Bexarotene
- **R** - Brentuximab
- **H** - Bortezomib
- **H** - Carboplatin
- **R** - Cetuximab
- **H** - Cisplatin
- **H** - Crisantaspase (Erwinase®)
- **H** - Dacarbazine
- **R** - Crizotinib
- **R** - Dasatinib
- **H** - Docetaxel
- **R** - Erlotinib
- **S** - Hydroxycarbamide

**KEY:-**

<table>
<thead>
<tr>
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<td>S</td>
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<tr>
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<td>Restricted Use Only</td>
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### Prescribing Points

- **R** – Afatinib is approved for restricted hospital use as monotherapy, for the treatment of epidermal growth factor receptor (EGFR) tyrosine kinase inhibitor-naïve adult patients with locally advanced or metastatic non-small cell lung cancer with activating EGFR mutation(s). Afatinib is restricted to use in patients with an exon 19 deletion mutation.

- Afiblercept (Zaltrap®) is approved for use in patients with good performance status of 0-1 in combination with irinotecan/5-fluorouracil/folinic acid (FOLFIRI) chemotherapy in adults with metastatic colorectal cancer that is resistant to or has progressed after an oxaliplatin-containing regimen.

- Bortezomib is approved for use in combination with rituximab, cyclophosphamide, doxorubicin and prednisone (VR-CAP) for the treatment of adult patients with previously untreated mantle cell lymphoma who are unsuitable for haematopoietic stem cell transplantation.

- **R** – Brentuximab is approved for restricted use in the treatment of adult patients with relapsed or refractory CD30+ Hodgkin lymphoma (HL): 1. following autologous stem cell transplant (ASCT) or 2. following at least two prior therapies when ASCT or multi-agent chemotherapy is not a treatment option.

- **R** – Cetuximab is approved for restricted use for the following indications –
  - Treatment of patients with epidermal growth factor receptor expressing KRAS wild-type metastatic colorectal cancer in combination with chemotherapy. Restricted to use in patients who have not previously received chemotherapy for their metastatic disease, with liver metastases only that are considered non-resectable but in whom potentially curative liver metastasis resection would be undertaken if the lesions became resectable after treatment.

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**KEY:**

- **H** – Hospital Use Only
- **S** – Specialist Initiation or Recommendation
- **R** – Restricted Use Only
with chemotherapy and cetuximab.

- First line treatment of patients with epidermal growth factor receptor expressing, RAS wild-type metastatic colorectal cancer in combination with irinotecan or oxaliplatin based chemotherapy.

- **R** – Crizotinib is approved for restricted use for the treatment of adults with previously treated anaplastic lymphoma kinase (ALK)-positive advanced non-small cell lung cancer.

- **R** – Dasatinib is not recommended for the treatment of chronic, accelerated or blast-crisis phase CML in adults with imatinib intolerance or whose CML is resistant to treatment with standard-dose imatinib. People currently stabilised on dasatinib can continue treatment. (See NICE MTA 214 for further information).

- **R** – Erlotinib is approved for restricted use for the following indications –
  - Treatment of patients with locally advanced or metastatic non-small cell lung cancer, after failure of at least one prior chemotherapy regimen. Erlotinib is restricted to use in patients who would otherwise be eligible for treatment with docetaxel monotherapy.
  - First-line treatment of patients with locally advanced or metastatic non-small cell lung cancer with epidermal growth factor receptor (EGFR) activating mutations.

- **R** – Idelalisib – is approved for restricted use for the following indications –
  - In patients with relapsed chronic lymphocytic leukaemia who are unsuitable for chemotherapy and for treatment naïve patients with 17p deletion or TP53 mutation who are unsuitable for chemo-immunotherapy.
  - As monotherapy for the treatment of adult patients with follicular lymphoma that is refractory to two prior lines of treatment.

- **R** – Imatinib – is approved for restricted use for the following indications –
  - Adjuvant treatment of adult patients who are at significant risk of relapse following resection of Kit (CD117)-positive gastrointestinal stromal tumours.
  - First-line treatment of adults with chronic phase Philadelphia-chromosome-positive chronic myeloid leukaemia (CML).
  - High-dose imatinib is not recommended for the treatment of chronic, accelerated or blast-crisis phase Philadelphia-chromosome-positive CML that is resistant to standard-dose imatinib (See NICE MTA 214 for further information).

- **R** – Nilotinib is approved for restricted use for the following indications –
  - Treatment of chronic or accelerated phase Philadelphia-chromosome-positive chronic myeloid leukaemia (CML) in adults whose CML is resistant to treatment with standard-dose imatinib or who have imatinib intolerance.
  - First-line treatment of adults with chronic phase Philadelphia-chromosome-positive CML.

- Nintedanib is approved for use in combination with docetaxel as 2\textsuperscript{nd} line treatment of adult patients with non-small cell lung cancer after 1\textsuperscript{st} line chemotherapy. Treatment to be continued until disease progression or unacceptable toxicity. Nintedanib monotherapy can be continued if patients have received at least 4 cycles of docetaxel.

- Paclitaxel albumin (Abraxane\textsuperscript{©}) is approved for use in combination with gemcitabine for the first line treatment of adult patients with metastatic adenocarcinoma of the pancreas.
- Panobinostat is approved for use in combination with bortezomib and dexamethasone for the treatment of adult patients with relapsed and/or refractory multiple myeloma who have received at least 2 prior regimens including bortezomib and an immunomodulatory agent.

- Regorafenib is approved for 3rd line treatment in relapsed or unresectable gastrointestinal stromal tumours in patients who have progressed on or are intolerant to prior treatment with imatinib or sunitinib.

- Ruxolitinib is approved for use in the treatment of disease-related splenomegaly or symptoms in adult patients with primary myelofibrosis, post polycythaemia vera myelofibrosis or post essential thrombocythaemia myelofibrosis.

- **R – Sunitinib** is approved for restricted use for the following indications –
  - Treatment of unresectable and/or metastatic malignant gastrointestinal stromal tumour after failure of imatinib treatment due to resistance or intolerance. Treatment with sunitinib should not be continued if there is evidence of unacceptable toxicity or progression of disease.
  - Treatment of unresectable or metastatic, well-differentiated pancreatic neuroendocrine tumours with disease progression in adults.

- **R – Trastuzumab** is approved for restricted use for the following indications –
  - Treatment of adult patients with HER2 positive metastatic breast cancer. Trastuzumab should only be used in patients whose tumours have either HER2 over expression or HER2 gene amplification.
  - Trastuzumab 600mg/5ml solution for injection can be used as an alternative to trastuzumab iv infusion.

- Trastuzumab is also approved for use 1st line in combination with cisplatin and capecitabine for the treatment of patients with HER2 positive metastatic adenocarcinoma of the stomach or gastro-oesophageal junction.

- Trastuzumab emtansine (Kadcyla®) is not recommended by the SMC for the treatment of HER2-positive breast cancer. Requires submission and approval of an Individual Patient Treatment Request (IPTR) before prescribing.

### 8.2 - Drugs affecting the immune response

#### 8.2.1 Antiproliferative immunosuppressants

- **S - Azathioprine**
- **S - Mycophenolate mofetil**
- **S - Myfortic® (mycophenolic acid)**

**Prescribing Points**

- Mycophenolate mofetil and mycophenolic acid (Myfortic®) are not bioequivalent. Prescriptions for mycophenolic acid should always be prescribed as the brand Myfortic®.

- Myfortic® should be restricted to use when patients are GI intolerant of standard mycophenolate mofetil.

#### 8.2.2 Corticosteroids and other immunosuppressants

- **S – Ciclosporin (Capimune®)**

  Ciclosporin 10mg Capsules and Liquid formulation (Neoral®)

**KEY:**

- **H** – Hospital Use Only
- **S** – Specialist Initiation or Recommendation
- **R** – Restricted Use Only

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Prescribing Points

- Ciclosporin preparations should be prescribed by brand name only due to differences in bioavailability.
- The formulary choice for ciclosporin is Capimune® (10mg capsules and liquid formulation must be prescribed as Neoral®).
- Patients currently stabilised on alternative brands of ciclosporin should remain on their established brands.
- Transplant patients must be continued on the brand of ciclosporin initiated by the transplant centre. This may be either Neoral® or Capimune® depending upon which transplant centre is providing patient care.
- Patients on ciclosporin and tacrolimus should be regularly monitored for adverse effects including hypertension and renal impairment.
- Tacrolimus preparations should be prescribed by brand name only due to differences in bioavailability.
- R – Tacrolimus granules (Modigraf®) are approved for restricted use only in patients where small changes (less than 0.5mg) in dosing increments are required (e.g. in paediatric patients) or in seriously ill patients who are unable to swallow tacrolimus capsules.

8.2.3 Anti-lymphocyte monoclonal antibodies

- H - Alemtuzumab (off-label)
- H - Obinutuzumab (Gazyvaro®)
- H - Rituximab

Prescribing Points

- Alemtuzumab can be obtained on a ‘named patient basis’ for malignant conditions.
- Obinutuzumab is approved for use in combination with chlorambucil for the treatment of adult patients with previously untreated chronic lymphocytic leukaemia and with comorbidities making them unsuitable for treatment with full dose fludarabine based therapy.
- Rituximab may also be used for non-malignant conditions in rheumatology.
- The use of rituximab in combination with glucocorticoids for the induction of remission in adult patients with severe, active granulomatosis with polyangiitis (Wegener’s) (GPA) and microscopic polyangiitis (MPA) is restricted to specialist use in patients who have relapsed following treatment with cyclophosphamide or who are intolerant to or unable to receive cyclophosphamide.

8.2.4 Other immunomodulating drugs

- H - Bacillus Calmette-Guerin (BCG)
- H - Interferon alfa
H - Lenalidomide (Revlimid®)
H - Peginterferon alfa
H - Pomalidomide (Imnovid®)
H - Thalidomide

**Drugs used in multiple sclerosis**

H - Dimethyl fumarate (Tecfidera®)
R - Fingolimod (Gilenya®)
H - Glatiramer (Copaxone®)
H - Interferon beta
R - Natalizumab (Tysabri®)
H - Peginterferon-beta-1a (Plegridy®)
H - Teriflunomide (Aubagio®)

**Prescribing Points**

- BCG is used as a bladder instillation for the treatment of bladder carcinoma.
- Interferon-alfa is used by haematologists and also in the treatment of hepatitis B and chronic hepatitis C.
- Peginterferon-alfa is used in combination with ribavirin for the treatment of chronic hepatitis C.
- Pomalidomide is approved for use in combination with dexamethasone for the treatment of adult patients with relapsed and refractory multiple myeloma who have received at least two prior treatment regimens, including lenalidomide and bortezomib, and have demonstrated disease progression on the last therapy.
- Thalidomide and lenalidomide are used in the treatment of myeloma – effective pregnancy prevention is mandatory in women of child-bearing potential.

**Drugs used in multiple sclerosis**

- All treatments listed above for the management of multiple sclerosis should only be prescribed by an identified specialist neurologist in the disease-modifying clinic.
- Interferon beta is used in the treatment of relapsing-remitting multiple sclerosis.
- Glatiramer is used in the treatment of relapsing-remitting multiple sclerosis.
- Peginterferon-beta-1a only requires to be administered once every fortnight.
- Dimethyl fumarate is a twice daily oral treatment for patients with relapsing remitting multiple sclerosis (RRMS) as an alternative to interferon beta or glatiramer. Refer to BNF/SPC for ongoing monitoring requirements.
- **R** – Fingolimod is approved for restricted use by a neurologist as a single disease modifying therapy in highly active RRMS despite treatment with at least one disease modifying therapy with an unchanged or increased relapse rate or ongoing severe relapses, as compared to the previous year.

Fingolimod is also approved as an alternative to natalizumab in patients with rapidly evolving severe relapsing remitting multiple sclerosis defined by two or more disabling relapses in one
year and with one or more gadolinium-enhancing lesions on brain magnetic resonance imaging (MRI) or a significant increase in T2 lesion load compared with a previous MRI.

- **R** – Natalizumab is accepted for restricted use by a neurologist as a single disease modifying therapy in highly active relapsing remitting multiple sclerosis (RRMS) only in patients with rapidly evolving severe RRMS defined by two or more disabling relapses in one year and with one or more gadolinium-enhancing lesions on brain magnetic resonance imaging (MRI) or a significant increase in T2 lesion load compared with a previous MRI.

- Natalizumab is not approved by the SMC for use as a single disease modifying therapy in highly active RRMS despite treatment with either beta-interferon or glatiramer.

- Teriflunomide is a once daily oral treatment for patients with RRMS as an alternative to interferon beta or glatiramer. Patients need to have their LFTs monitored at baseline and every fortnight for the first 6 months.

- For the management of spasticity related to MS please refer to section 10.2.2 of the Formulary.

- Sativex® is a cannabinoid derivative licensed as an adjunct treatment for moderate to severe spasticity associated with multiple sclerosis in patients who have not responded adequately to other skeletal muscle relaxants. Sativex® has not been approved by the Scottish Medicines Consortium (SMC). **Sativex® should not be prescribed unless an Individual Patient Treatment Request has been approved by NHS Fife.** The dose should be titrated over 2 weeks; response to treatment should be reviewed after 4 weeks and treatment stopped if an adequate response is not achieved.


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### 8.3 - Sex hormones and hormone antagonists in malignant disease

#### 8.3.1 Oestrogens

- **S** - Diethylstilbestrol

#### 8.3.2 Progestogens

- **S** - Medroxyprogesterone
- **S** - Megestrol
- **S** - Norethisterone

**Prescribing Points**

- Progestogens are used as 3rd line endocrine therapy in breast cancer and are occasionally used in frail patients with advanced renal cancer or advanced endometrial cancer.
- Progestogens should be used with caution in patients at risk of thromboembolism and in conditions that may worsen with fluid retention.
- Megestrol 40mg (unlicensed strength) daily may also be prescribed for menopausal symptoms for women receiving endocrine therapy.

#### 8.3.4 Hormone antagonists

##### 8.3.4.1 Breast Cancer

**KEY:**

- **H** – Hospital Use Only
- **S** – Specialist Initiation or Recommendation
- **R** – Restricted Use Only

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a) Neo-adjuvant therapy of postmenopausal breast cancer (given for at least three months prior to surgery or radiotherapy)

1st Choice  
S - Letrozole (Femara®)

2nd Choice  
S - Tamoxifen

b) Adjuvant therapy of early breast cancer (specialist will determine choice of regime)

Pre- or peri-menopausal breast cancer

1st Choice  
S - Tamoxifen

Post-menopausal breast cancer

Low risk of recurrence

1st Choice  
S – Tamoxifen (for 5 years)

Risk of early recurrence (or contraindication to tamoxifen)

1st Choice  
S – Letrozole (for 5 years)

2nd Choice  
S – Anastrozole (for 5 years)

Risk of late recurrence

S – Tamoxifen (for 5 years)

Then

S – Letrozole (for 4 years)

c) Metastatic breast cancer (continued until disease progression)

No prior adjuvant tamoxifen

1st Choice  
S – Letrozole (Femara®)

2nd Choice  
S – Tamoxifen

Prior adjuvant tamoxifen

1st Choice  
S – Letrozole (Femara®)

2nd Choice  
S – Exemestane

Prescribing Points

- Neo-adjuvant endocrine therapy may be given to postmenopausal women for at least 3 months to down-stage locally advanced tumours before definitive local treatment with surgery or radiotherapy.
- Adjuvant endocrine therapy is given for 5 to 9 years after local treatment, to reduce the risk of relapse.
- In metastatic disease, endocrine therapy is continued until the disease progresses. The sequential use of endocrine therapies may control metastatic disease for lengthy periods in oestrogen-receptor positive breast cancer.

KEY:

H – Hospital Use Only
S – Specialist Initiation or Recommendation
R – Restricted Use Only

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Last amended February 16
The aromatase inhibitors letrozole, anastrozole and exemestane are ineffective in premenopausal women unless concomitant goserelin is given to suppress ovarian function. Letrozole plus goserelin may be given where there is a contraindication to tamoxifen in premenopausal women.

Tamoxifen is more effective when ovarian function is suppressed in premenopausal women. Concomitant goserelin is usually given for the first two years of adjuvant tamoxifen therapy in patients with a high risk of recurrence.

Oophorectomy is an alternative to goserelin in premenopausal women.

Tamoxifen increases the risk of venous and arterial thrombosis. Letrozole or anastrozole should be used instead in patients with an increased risk of thromboembolism.

Tamoxifen increases the risk of endometrial cancer. Abnormal vaginal bleeding should be investigated promptly.

Patients who are peri-menopausal at initiation of adjuvant endocrine therapy and who have completed 2-3 years of tamoxifen may be switched to exemestane for the remainder of the 5 years on the recommendation of the specialist.

Endocrine therapy may cause a transient increase in bone pain in patients with bony metastases.

8.3.4.2 Gonadorelin analogues and gonadotrophin – releasing hormone antagonists

Gonadorelin analogues

1st Choice
S – Triptorelin (Decapeptyl®)
S – Leuprolelin (Prostap®)
S – Goserelin (Zoladex®)

2nd Choice

Anti-androgens
R – Abiraterone (Zytiga®)
S – Bicalutamide
S – Cyproterone
R – Enzalutamide (Xtandi®)
S – Flutamide

Gonadotrophin – releasing hormone antagonists
R – Degarelix (Firmagon®)

Prescribing Points

- Endocrine therapies are commonly used in the management of patients with prostate cancer.
- Neo-adjuvant endocrine therapy may be given for up to three months to down-stage locally advanced tumours before definitive local treatment with radiotherapy.
- Locally advanced prostate cancers unsuitable for local therapy may be treated by a gonadorelin analogue, or by bicalutamide alone in younger men who wish to retain potency.
- Gonadorelin analogues are also used in metastatic prostate cancer, with initial anti-androgen cover to prevent tumour flare, and the combination of a gonadorelin analogue and an anti-
androgen is used to provide maximal androgen blockade in second-line treatment of metastatic disease.

- **R** – Abiraterone (Zytiga®) is approved for use with prednisolone for the treatment of metastatic castration resistant prostate cancer for the following indications –
  
  - in adult men whose disease has progressed on or after a docetaxel-based chemotherapy regimen. It is restricted to use in patients who have received only one prior chemotherapy regimen.
  
  - In adult men who are asymptomatic or mildly symptomatic after failure of androgen deprivation therapy in whom chemotherapy is not clinically indicated.

- Bicalutamide is the first choice of anti–androgen because of its once daily administration schedule. It should not be used as monotherapy for the treatment of localised prostate cancer, but it is licensed for monotherapy of locally advanced prostate cancer.

- Cyproterone 50mg twice daily may be used to treat hot flushes associated with gonadorelin analogues.

- **R** – Degarelix (Firmagon®) is approved for restricted specialist use for the treatment of adult male patients with advanced hormone-dependent prostate cancer. For use in patients who are at risk of an initial ‘testosterone flare’ with gonadorelin analogues.

- **R** – Enzalutamide (Xtandi®) is approved for restricted specialist use for the treatment of adult men with metastatic castration resistant prostate cancer whose disease has progressed on or after docetaxel therapy.

### 8.3.4.3 Somatostatin analogues

Also see Shared Care Protocol for the use of Somatostatin Analogues in the treatment of Neuroendocrine Tumours

http://www.fifeadtc.scot.nhs.uk/media/8556/somatostatin_analogues.pdf

<table>
<thead>
<tr>
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<tr>
<td>S – Octreotide</td>
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<td>S – Octreotide depot (Sandostatin Lar®)</td>
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<tr>
<td>S – Lanreotide (Somatuline LA®, Somatuline Autogel®)</td>
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**Prescribing Points**

- Somatostatin analogues are used for the relief of symptoms associated with neuroendocrine tumours, particularly carcinoid syndrome, and also in acromegaly.

- Short-acting octreotide is used in the initial treatment of carcinoid syndrome.

- Sandostatin LAR® is used for the maintenance treatment of carcinoid syndrome.

- Somatuline® LA is used for the maintenance treatment of carcinoid syndrome.

- Somatuline Autogel® is used in the management of neuroendocrine tumours.
8.4 Bisphosphonates used in malignant disease

- Denosumab 70mg/ml (Xgeva®)
- Disodium pamidronate IV infusion
- Ibandronic acid 50mg tablets
- Sodium clodronate
- Zoledronic acid IV infusion

Prescribing Points

- See section 6.6 for bisphosphonates used in osteoporosis.
- Renal function, electrolytes, calcium and phosphate should be monitored during treatment with bisphosphonates. Doses of bisphosphonates should be adjusted in renal impairment.
- Osteonecrosis of the jaw has been reported in patients with cancer receiving treatment regimens including bisphosphonates. Many of these patients were also receiving chemotherapy and corticosteroids. A dental examination with appropriate preventive dentistry should be made prior to treatment with bisphosphonates in patients with concomitant risk factors (e.g. cancer, chemotherapy, corticosteroids, poor oral hygiene). While on treatment, these patients should avoid invasive dental procedures if possible.
- There are two preparations of denosumab available, Xgeva® is the product licensed for bone metastases.
- Denosumab 70mg/ml (Xgeva®) is approved for specialist use for 1st line treatment of all breast cancer patients with metastatic bone disease who would be eligible for treatment with i.v. zoledronic acid. Patients should also be prescribed daily calcium + vitamin D supplementation.
- Xgeva® is not approved by the SMC for bone loss associated with hormone ablation in men with prostate cancer who are at increased risk of fractures.
- Disodium pamidronate is used in bone metastases associated with multiple myeloma.
- Zoledronic acid is approved for use in multiple myeloma to prevent skeletal episodes. It has not been approved by the SMC for the prevention of skeletal related events in patients with advanced prostate cancer involving bone.