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PROSTATE CANCER SURVIVORSHIP AND ANDROGEN DEPRIVATION THERAPY

- **Specialist-initiated androgen deprivation therapy (ADT) /hormonal therapy is the mainstay of prostate cancer treatment and is often continued for long periods of time, with prescribing ongoing in primary care**
- **In addition to adverse drug effects such as hot flushes, fatigue and sexual issues, hormonal therapy can also affect a patient's cardiometabolic, bone and mental health**
- **Pharmacological and non-pharmacological treatments can alleviate the burden of adverse effects associated with hormonal therapy, increase adherence and reduce distress for patients**
- **Prescribers should be aware that there are many potential drug-drug interactions and some important specialist-led monitoring requirements associated with hormonal therapy**

CANCER SURVIVORSHIP IN GENERAL

Breast and prostate cancer are the commonest newly diagnosed cancers in Ireland (apart from non-melanoma skin cancer [NMSC]) for both men and women (most common incident cancers in 2018-2020 at 32% and 30% respectively); the prognosis is good for both diseases, with the 5 year survival on average above 80%.[1]

There is a growing recognition of the nuanced care needs of patients and the requirements to support them to live well with and beyond cancer in the longer term. The National Cancer Survivorship Needs Assessment has been identified as a priority area by the National Cancer Control Programme (NCCP) in Ireland to support clinicians in managing patients' medical problems, psychosocial distress and their increased risk of further cancer diagnoses or recurrence of disease.[2]

This bulletin will focus on androgen deprivation therapy (ADT), which patients with **prostate cancer** are commonly prescribed in primary care; the diagnosis and systemic hospital based anti-cancer treatments which are utilised in the active treatment phase of prostate cancer are not discussed. We have signposted to useful resources for healthcare professionals on risk factors, diagnosis and staging at the end of this bulletin; links to helpful patient-directed information sources are also provided. There is a separate NMIC bulletin covering adjuvant endocrine therapies used in patients with breast cancer.

AN INTRODUCTION TO PROSTATE CANCER

There were 4071 new incidence cases of prostate cancer in Ireland reported in 2021.[3] The cumulative lifetime risk of a diagnosis of prostate cancer is 1 in 8; the majority are at stage 2 at diagnosis and within 1 year of diagnosis, and 28% will receive ADT for the treatment of prostate cancer.[4] The 5 year survival rate is above 90%.[5]

The management of prostate cancer is specialist-led and includes active surveillance, radical prostatectomy or radiotherapy and ADT in the localised setting, and novel anti-androgens and chemotherapy in addition to lifelong ADT in the metastatic setting. The prostate gland is dependent on androgens for growth and development with ADT serving as the cornerstone of treatment.[6]

Evidence suggests that General Practitioners (GPs) may feel underprepared in caring for patients on the cancer survivorship journey. For example, in one study focusing on patients diagnosed with prostate cancer and who are on ADT, 38% of GPs reported their knowledge of ADT was inadequate (n=103) and highlighted knowledge gaps when it came to the adverse effects (AEs) of ADT, particularly the functional AEs (e.g. hot flushes, fatigue and erectile dysfunction), despite a large proportion of GPs prescribing ADT medications regularly.[7,8]

The purpose of this bulletin is to increase GPs' awareness of the AEs and drug-drug interactions (DDIs) associated with these medications so they can recognise and manage them should they occur.

It is important that GPs are aware of the potentially deleterious effects on bone and cardiovascular (CV) health associated with ADT. The routine monitoring for patients prescribed these medicines is generally specialist-led, however whilst not GP-initiated, GPs need to be aware that the patient is on ADT and therefore it is important that this is highlighted in the chart once specialist correspondence is received.

ANDROGEN DEPRIVATION THERAPY: CURRENT GUIDELINES FOR TIMING OF USE, MONITORING AND DRUG INTERACTIONS

ADT may be included in the treatment plan for individual patients with prostate cancer who have localised disease, locally advanced disease, and metastatic disease. The choice and timing of the initiation of ADT depends on a number of factors including the extent and progression of the disease, patient comorbidities, previous treatments, patient preference and medicine availability.[9] For men with metastatic prostate cancer, ADT should be continued lifelong, unless specifically discontinued.

Castrate resistant prostate cancer (CRPC) is defined as showing disease progression during ADT with testosterone levels at castrate levels.[10] Active surveillance occurs for low-risk patients who have a life expectancy of >10 years; the intent is curative and there is a defined plan for assessment and monitoring markers. Prostate-specific antigen [PSA] monitoring helps with treatment decisions and there can be a situation where disease on imaging remains stable but there is a "biochemical recurrence". Watchful waiting occurs when a patient has a <10 year life expectancy and is considered a palliative approach that avoids treatment-related toxicity.[10,11]

There are a number of international guidelines such as the European Society of Medical Oncology (ESMO) guideline 2020 which includes details on the stage matched treatment options for prostate cancer and is available here.[9]

Monitoring of the patient's clinical condition, symptoms and the radiological and/or biochemical (i.e. PSA monitoring) progression of disease is undertaken by specialists in conjunction with a multidisciplinary team which guides treatment choices. Patients may be prescribed intermittent ADT, where they go through breaks from ADT (i.e. "treatment holidays"), but continue with PSA monitoring during this time.[12,13]

Stewardship of specific medicine-related monitoring will generally be specialist-led, however it is important that GPs are aware of the required monitoring, which is detailed for specific ADT medicines in the tables to follow.

Drug interactions: Use of ADT is associated with many potential DDIs, including pharmacodynamic and pharmacokinetic interactions. The tables to follow provide some limited, but not exhaustive, information on the DDIs associated with individual ADT agents; please refer to the relevant Summary of Product Characteristics (SmPC) for details of the full interaction profile.

Many ADT medicines have the potential to **prolong the QT interval**, therefore concomitant use of other medicines also associated with QT prolongation needs to be carefully evaluated. These include but are not limited to disopyramide, amiodarone, sotalol, methadone, moxifloxacin and antipsychotics. The benefit/risk ratio should be assessed and consideration of the potential for torsade de pointes evaluated prior to commencing these medicines.[14] This is a helpful resource for checking the QT prolongation potential of other medications. The NCCP has created a helpful link to all the various medication regimes utilised for prostate cancer, providing advice around the precautions, adverse effects, monitoring and drug interactions for specific medications.[14]

ADT is composed of luteinising hormone-releasing hormone (LHRH) agonists and antagonists and anti-androgens (steroidal, non-steroidal and other androgen blocking agents).

LUTEINISING HORMONE-RELEASING HORMONE (LHRH) AGONISTS AND ANTAGONISTS

Luteinising hormone-releasing hormone (LHRH) agonists (e.g. goserelin, leuprorelin and triptorelin) which are initiated by specialists, ultimately inhibit the secretion of pituitary LH which results in a fall in testosterone (there is an initial increase in testosterone caused by the LH surge, as medications initially overstimulate production; this decreases LH by negative feedback loop, hence the initial flare). A tumour flare, now rare, can be associated with a temporary worsening of symptoms, with exacerbation of pain, uraemia leading to raised creatinine levels, and the development of neurological sequelae such as spinal cord compression.[15] Levels of testosterone fall by day 21 and remain suppressed, and this causes the prostate tumour regression.[6] LHRH agonists are used in metastatic prostate cancer, locally advanced prostate cancer and as adjuvant therapy with radiotherapy or prostatectomy in those with high risk locally advanced prostate cancer.[16]

Concomitant treatment with anti-androgen medications for 3 days prior to starting the LHRH agonist and continuing for 3 to 4 weeks prevents this initial "tumour flare". LHRH agonists are also associated with a reduction in bone mineral density (BMD) and glucose intolerance (see table 1).[14] It is advised to monitor for depression (especially in those with a history of depression) and also monitor cardiac health (blood pressure, glucose and risk of myocardial infarction and heart failure).[14,17,18] Further information is provided in the NCCP regimens for goserelin, leuprorelin and triptorelin.

LHRH antagonists (e.g. degarelix and relugolix) directly decrease the secretion of follicle stimulating hormone (FSH) and LH, which reduces the secretion of testosterone by the testes.[6] LHRH antagonists are used in advanced hormone dependent prostate cancer and as adjuvant treatment with radiotherapy in high risk localised and locally advanced hormone dependent prostate cancer.[19,20] LHRH antagonists are also associated with reduced BMD, glucose intolerance, risk of cardiovascular disease (CVD) and abnormal liver function tests (LFTs) (see table 1).[14] Further information

is provided in the NCCP regimens for degarelix and relugolix.

Table 1 summarises the LHRH agonists and antagonists used in the treatment of prostate cancer and includes information on the individual route of administration, precautions, monitoring advice and common adverse reactions.

Table 1: LHRH agonists and antagonists[16-20]

Drug Route of administration	Precautions include* *Monitoring required includes**	Potential drug interactions include*
LHRH agonists		
Goserelin S/C – 4 weekly or 3 monthly	Risk of depression, **QT prolongation (assess benefit: risk ratio)**, tumour flares with ureteric obstruction and SC compression in first few weeks after use – risk reduced by co-administration of anti-androgen for 3 days before and 3 weeks after commencing), ↓BMD (caution if risk of osteoporosis), glucose intolerance, CVD, injection site reactions, hepatic dysfunction and jaundice (leuprorelin), seizures and benign intracranial hypertension reported (leuprorelin) *Monitoring includes: mood, BMD, glucose, risk factors for CVD, symptoms of heart failure and LFTs (leuprorelin)*	Medicines with potential to cause QT interval prolongation e.g. amiodarone, (es)citalopram, domperidone.
Leuprorelin S/C - 1, 3 or 6 monthly		
Triptorelin IM – 1, 3 or 6 monthly		
LHRH antagonists		
Degarelix S/C - monthly	**Risk of QT prolongation (assess benefit: risk ratio),** injection site reactions (degarelix), ↑LFTs, ↓BMD, glucose intolerance, CVD –consider risk factors, ↑relugolix levels (2-fold) in severe renal impairment – caution in severe renal impairment, risk of PK-DDI (relugolix) *Monitoring includes: LFTs (in those with hepatic disease), BMD, CV risk factors and glucose*	Medicines with potential to cause QT interval prolongation e.g. amiodarone, citalopram, domperidone. Relugolix is a P-gp substrate; co-administration with P-gp inhibitors (e.g. clarithromycin) may ↑bioavailability. Combined P-gp and strong CYP inducers (e.g. rifampicin, carbamazepine) may ↓ bioavailability (dose adjustment may be required)
Relugolix ▼ Oral - daily		

BMD-bone mineral density; CVD-cardiovascular disease; IM-intramuscular; LFTs-liver function tests; P-gp- P-glycoprotein; PK-pharmacokinetics; SC-spinal cord; S/C-subcutaneous. *list not exhaustive; full prescribing details are in the Summary of Product Characteristics

ANTI-ANDROGENS

Non-steroidal anti-androgens e.g. apalutamide, bicalutamide, darolutamide and enzalutamide are androgen receptor inhibitors that block androgen binding, resulting in reduced growth of prostate cancer cells and tumour regression. They are used in advanced prostate cancer in combination with LHRH analogues or surgical castration, and as adjuvant therapy alongside radical prostatectomy or radiotherapy for patients with high-risk locally advanced cancer.[21-23] Non-steroidal anti-androgens may be associated with an increased risk of seizures, falls and fractures, hypothyroidism (apalutamide), CVD, skin rashes and hypersensitivity reactions (see table 2).[14]

During treatment, and for individually defined periods after cessation of treatment, barrier contraception +/- another effective form of contraception may be required as harmful metabolites may be present in semen which could pose a potential risk to a developing fetus in any pregnant woman or woman of child bearing age.[14] Please see the individual SmPCs for full prescribing information, including advice on missed doses. Further information is provided in the NCCP regimens for apalutamide, bicalutamide, enzalutamide and darolutamide.

Steroidal anti-androgen: Cyproterone acetate (CA) inhibits the effects of androgens at androgen – dependent target organs. CA is used in the treatment of inoperable prostate cancer and also to reduce the initial increase of androgen which occurs with the LHRH agonists.[24]

Abiraterone acetate inhibits the enzyme CYP17 which is used for androgen biosynthesis in testicular, adrenal and prostate cancer, and results in reduced circulating testosterone levels.[25] It is used with prednisolone or prednisone for the treatment of metastatic hormone sensitive prostate cancer with ADT or for metastatic castrate resistant cancer before the patient meets the criteria for chemotherapy or where a patient progresses on/after chemotherapy.

Abiraterone is associated with an increased risk of fluid retention, hypertension, CVD, hepatic dysfunction, reduced BMD, glucose intolerance, anaemia and skeletal muscle effects (see table 2).[14] Further information is provided in the NCCP regimens for abiraterone acetate. Of note, abiraterone acetate can also be used in combination with poly (ADP-ribose) polymerase

inhibitors (PARPis) e.g., niraparib (available as a dual action tablet) or olaparib.[26] Table 2 summarises information about anti-androgen therapy (steroidal, non-steroidal and other androgen blocking medications) including details of route of administration, precautions, monitoring advice and adverse effects.

Table 2: Anti-androgen therapy – steroidal, non-steroidal and other androgen blocking medicines [21-25,27]

Drug Route of administration	Precautions include* *Monitoring required includes**	Potential drug interactions include*
Anti-androgens		
Non-steroidal		
Bicalutamide Oral – daily	Moderate to severe hepatic disease-caution, risk of hepatic toxicity, glucose intolerance, QT prolongation. CYP3A4 inhibitor-potential DDIs, potentiation of warfarin effect *Monitoring includes: LFTs periodically (particularly in first 6/12), glucose, QT interval, and cardiac health*	*INR if on warfarin* Risk of QT prolongation Bicalutamide inhibits CYP3A4 – caution with drugs metabolised predominantly by CYP3A4 (e.g. some CCBs).
Apalutamide Oral – daily	Risk of seizure (not recommended in people with history of or at risk of seizures), falls and fractures, IHD and cerebrovascular disorders – monitor, potent enzyme inducer (may result in ↓efficacy of some medicines), recent CVD – caution, QT prolongation – assess benefit risk, Skin and cutaneous adverse reactions *Monitoring includes: BMD, CV risk factors, QT interval, consider TFTs as may trigger hypothyroidism*	*INR if on warfarin* Risk of QT prolongation Apalutamide is a potent enzyme inducer – potential interaction with many medicines (see SmPC).
Darolutamide Oral – daily	Avoid strong P-gp and CYP3A4 inducers as may ↓darolutamide levels, QT prolongation, recent CVD – caution, discontinue if develops ↑LFTs, monitor for adverse effects in patients with severe renal or hepatic impairment *Monitoring includes: QT interval, LFTs*	Risk of QT prolongation Darolutamide has many potential drug interactions (see SmPC)
Enzalutamide Oral – daily	Risk of seizures, posterior reversible encephalopathy syndrome, second primary malignancies, potent enzyme inducer (may result in ↓efficacy of some medicines), QT prolongation, recent CVD – caution, hypersensitivity reactions *Monitoring includes: QT interval*	*INR if on warfarin* Risk of QT prolongation Enzalutamide has many potential drug interactions (see SmPC)
Steroidal		
Cyproterone acetate Oral – daily	Contraindicated in liver disease, liver tumours, severe depression, current thrombo-embolic (TE) processes. Risk of meningioma, liver toxicity, depression, TE event, anaemia, raised blood glucose, dyspnoea, suppression of adrenocortical function *Monitoring includes: LFTs, adrenocortical function (ACTH tests)*	CA inhibits CYP2D6 – has many potential drug interactions (see SmPC)
Other androgen blocking medicines		
Abiraterone acetate Oral – daily (**not** with food, which increases the systemic exposure to abiraterone)	Contraindicated in severe hepatic disease; risk of hypertension, hypokalaemia, fluid retention and HF, CVD - caution (consider ECHO), QT prolongation; risk of hepatotoxicity and hepatic impairment, ↓↑glucose, ↓BMD, anaemia, sexual dysfunction, myopathy/rhabdomyolysis, consider risk of steroid withdrawal on discontinuation *Monitoring includes: LFTs (transaminases 2-weekly for first 3/12, then monthly), BP, K^+(maintain at 4mmol/L), fluid retention*	Risk of QT prolongation Abiraterone acetate has many potential drug interactions (see SmPC)

BMD-bone mineral density; BP-blood pressure; CCBs-calcium channel blockers; CVD-cardiovascular disease; CYP-cytochrome P450; CA-cyproterone acetate; DDI-drug drug interactions; ECHO-echocardiogram; HF-heart failure; IHD-ischaemic heart disease; K^+-potassium; LFTs-liver function tests; P-gp – P-glycoprotein; SC-spinal cord; SmPC-Summary of Product Characteristics; TdP-Torsade de pointes; TE-thromboembolic; TFTs-thyroid function tests; *full prescribing details are in the Summary of Product Characteristics

ADVERSE EFFECTS OF ANDROGEN DEPRIVATION THERAPY

Adverse effects (AEs) of ADT in the management of prostate cancer include physical, psychological, sexual and metabolic effects.

Physical AEs include hot flushes and fatigue which are the most common and weight gain/weight loss, loss of muscle mass, loss of body hair, ankle swelling, genital shrinkage and feminisation e.g. gynaecomastia and mastalgia.[28]

Metabolic AEs include the increased risk of adiposity, diabetes, hyperlipidaemia and hypertension, which can lead to cardiovascular issues such as ischaemic heart disease, atrial fibrillation, left ventricular dysfunction and stroke.

Other physical AEs include haematological issues including anaemia that can also contribute to malaise in those taking ADT.[29] Hypothyroidism, haematuria, hepatotoxicity, gastrointestinal AEs (including loss of appetite), rashes, hair loss and headaches may also be experienced by patients.

Psychological AEs include depression, increased emotionality and cognitive effects.[30-32]

Sexual AEs include erectile dysfunction (ED), decreased libido and ejaculatory issues.[28] It is estimated that after 6 months on ADT, only 7% of men engage in any sexual activity.[33]

Other factors which affect quality-of-life as a result of ADT for prostate cancer include relationship strain, sleep disturbances and loss of confidence.[28,33]

PHARMACOLOGICAL MANAGEMENT OF ADVERSE EFFECTS OF ADT

Gabapentin, venlafaxine, medroxyprogesterone acetate, cyproterone acetate and megestrol acetate have all been shown to be effective for managing hot flushes in patients who experience ADT related vasomotor dysfunction (note that some of these therapies may be used off-label).[34-36] Selective serotonin reuptake inhibitors such as paroxetine are also an option.[37] Tamoxifen or radiotherapy may be considered for the treatment of gynaecomastia or mastalgia (with guidance from specialist team).[38] Impaired sexual function can be managed with phosphodiesterase type-5 inhibitors, intraurethral dissolvable prostaglandin pellets and intracavernosal prostaglandin injections, usually in conjunction with sexual health or urology specialist input.[39]

Patients who have been treated for prostate cancer may have untreated psychological distress and are at high risk for drug abuse and alcohol abuse disorders.[40] For all men who are prescribed ADT a significant number will have unmet mental health needs. Antidepressants/anxiolytics should be considered for patients who are experiencing mental health issues which do not respond to lifestyle and environmental/behavioural changes.

NON-PHARMACOLOGICAL MANAGEMENT OF ADVERSE EFFECTS OF ADT

Patients have a preference for behavioural and lifestyle strategies over pharmacological interventions.[28] Exercise including cardio and weights have benefits for patients when it comes to managing the AEs of ADT. Exercise improves glucose control and lipid profile and improves overall cardiovascular health.[41] Resistance training increases muscle mass and decreases fat.[42] In addition, physical exercise improves mood issues and cognition.[32] It also reduces the risk of falls and improves fatigue.[41,43] Nutritional guidance is important for patients, particularly in the management of cardiometabolic risk factors and also to ensure an adequate supply of protein, calcium, vitamin D, iron and vitamin B12 in the diet.[44,45] Acupuncture has some benefit for management of hot flushes.[46] Patients have reported trying simple techniques such as layered and loose clothing, fans, cool compresses and deep breathing techniques to counteract hot flushes.[28] Interventions such as penile rehabilitation and vacuum erection devices may be considered for sexual issues.[39,47] Intimacy issues are prominent and affect patients and partners. Generally a multifactorial approach is most successful with many couples requiring some support; counselling, sexual psychotherapy and education are important aspects of rehabilitation. Tips such as sitting down to urinate if urinary stream is affected due to genital shrinkage, acceptance therapy, talk therapy, increased physical affection and communication skills with partners, and where there are cognitive issues, memory aids and calendar reminders have been reported as helpful to patients.[48] Other sources of distress can include employment, insurance and financial strains and an awareness of these can help manage a patient's fears holistically.[49]

PRACTICAL CONSIDERATIONS FOR PATIENTS ON ADT

Considerations for the overall health of the patient include managing and optimising I) cardiometabolic health, II) bone health, III) mood, IV) cognition and V) fear of recurrence.[50-53]

I) Cardiometabolic health: Cancer survivors and patients with prostate cancer on ADT are at increased risk of hypertension, hyperlipidaemia, diabetes, venous thromboembolism, major cardiovascular events such as myocardial infarction, left ventricular dysfunction and stroke.[41,54-56] Hypogonadism alters body composition, creating lipid abnormalities and increased risk of metabolic syndrome.[56,57] This is associated with a decrease in quality-of-life.[58]

Many patients who are diagnosed with prostate cancer have already accumulated some cardiovascular risk factors. It has been shown that these patients are more at risk of cardiovascular events and there is variation in risk between the specific hormonal therapies used.[55,56] Evidence shows that 99% of patients with prostate cancer will have at least 1 uncontrolled risk factor.[59]

The European Society of Cardiology guideline on cardio-oncology advises on the baseline cardiovascular risk assessment and monitoring of patients who are on ADT.[60] The Canadian Urological Association ADT guideline also advises about lifestyle modifications and interval assessment of these patients.[41] General lifestyle advice should be given to this cohort of patients for example smoking cessation can result in a reduced risk of recurrence.[61]

II) Bone health can be challenged in many ways for patients who have prostate cancer whether it be from radiotherapy or chemotherapy regimens, the presence of metastases or indeed the use of both oral and IM hormonal therapies. Androgens have direct and indirect effects on osteoclastic and osteoblastic bone remodelling thus helping to maintain bone mass and mitigate bone loss.[62] Patients undergoing prostate cancer treatment with ADT have an increased rate (5-10 fold increase) of loss of BMD at multiple skeletal sites, compared with "healthy men" or other patients who have prostate cancer but are not on ADT.[63] In the first year of treatment with ADT, there is a 2 to 8% loss of spinal BMD and a 2 to 6.5% loss at the hip in comparison to the normal male who is expected to lose 0.5-1% of BMD per year.[64] The rate of BMD loss increases in direct proportion to the time on ADT.[65] Surviving 5 years after the diagnosis of prostate cancer, 19.4% of those who had received ADT had a fracture as opposed to 12.6% of those who had not.[66]

Guidelines recommend that patients who are commencing ADT should have a baseline assessment of fracture risk, a DEXA scan at the time of commencement and that general measures to prevent bone loss are put in place; bone health should also be

reviewed every 1 to 2 years.[67] Pharmacological therapy such as bisphosphonates or denosumab may be required.[68]

III) Mood: The use of ADT is associated with an increased risk of major depression and a worsening of any pre-existing depressive symptoms.[69] Furthermore, there may be an increased risk of suicidal thoughts and suicidality, non-adherence to treatment and increased presentations to emergency services as a result of mood disorders following a prostate cancer diagnosis.[70,71] Patients should be screened for mood disorders.[72] Management is with a biopsychosocial approach, e.g. as per the UK NICE guidance management of mood disorders in primary care.[73]

IV) Cognition can be a common concern for men who are undergoing hormonal treatment for prostate cancer and this is across a variety of domains such as concentration, verbal fluency, memory and executive functioning and can range from being a minor annoyance to interfering with activities of daily living.[74] An awareness that this can be an issue for patients and appropriate screening, monitoring, patient education and referral where appropriate is advised.

V) Fear of recurrence is associated with increased anxiety in patients who are on the prostate cancer survivorship journey. This can manifest as increased requests for PSA testing or non-presentation for investigations.[75,76]

Issues with adherence may occur due to the many AEs of ADT which patients encounter. The rates for non-adherence to ADT can be as high as 50%; patient barriers include complex dosing schedules, burden of medicine management, fasting or dietary requirements, cost, AEs and DDIs.[77] Patient specific factors include lack of education, physical or cognitive issues, living alone, mental health issues or experiencing frequent symptoms.[77] Adherence in general is better for oral therapy.[78,79]

Specialist-led strategies to improve AEs for patients struggling with symptoms such as hot flushes, low libido and ED, include the use of intermittent versus continuous ADT treatment or the use of ADT for the shortest time necessary.[50,80]

Adherence to other regular medications can also be an issue e.g. statin therapy. Patients may have comorbidities which become neglected, which increases frailty and compromises a patient's fitness for treatment resulting in poorer outcomes.[53,81]

List of references available on ePublication on www.nmic.ie.
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Every effort has been made to ensure that this information is correct and is prepared from the best available resources at our disposal at the time of issue.

PRESCRIBING TIPS AND TRICKS

Ensure the specific androgen deprivation therapy (ADT) is included in the patient's list of regular medications as this may assist with highlighting drug interaction issues when repeat prescribing

Check for ADT drug interactions if prescribing a new medication

Monitoring is required with some ADT. Follow SmPC guidance and the National Cancer Control Programme (NCCP) regimen for details on the required monitoring for the specific ADT

Polypharmacy is an ongoing issue for patients who are cancer survivors

Mental health disorders are common and should be screened for as appropriate

Consider assessment of cardiometabolic, bone and sexual health.

USEFUL RESOURCES

Healthcare professional directed links:

- National Cancer Control Programme (NCCP) medication regimens (link to individual medication adverse reactions, required monitoring and DDIs)
- National Clinical Guideline on the diagnosis and staging of patients with prostate cancer
- NICE 2021 updated guidance on indications and pathways for referral for suspected prostate cancer diagnosis including information on PSA thresholds
- More information for counselling on the use of PSA blood tests for screening and diagnosis can be found on US National Cancer Institute website
- European Association of Urology guidance on the adverse effects of ADT and ways to mitigate them
- Helpful resource for checking the QT prolongation potential of other medications
- Primary Care of the Prostate Cancer Survivor
- American Cancer Society prostate cancer survivorship care guidelines
- A survivorship distress thermometer
- Health related QOL screening tool for patients with prostate cancer

Patient directed links:

- NCCP Know the signs of Prostate Cancer poster: https://www.hse.ie/eng/services/list/5/cancer/prevention/prostate-cancer-know-the-signs-and-symptoms.pdf
- NCCP patient information booklet: Having your prostate checked: a guide. This booklet provides information on having a prostate check https://www.hse.ie/eng/services/list/5/cancer/patient/leaflets/having-your-prostate-checked-a-guide.pdf
- NCCP patient information booklet: Good bone health after cancer treatment https://www.hse.ie/eng/services/list/5/cancer/patient/leaflets/good-bone-health-after-cancer-treatment.pdf
- NCCP patient information booklet on sexual wellbeing after pelvic cancer treatment https://www.hse.ie/eng/services/list/5/cancer/profinfo/resources/booklets/pelvic%20cancer.pdf

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