Pharmacy Forum NI

Leading Promoting Supporting

A Guide to Support Medication Review in Older People

Developed by the Northern Ireland Pharmacists working with Older People (NIPOP) Network

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Contents

The development and on-going update of this guide is the responsibility of the Northern Ireland Pharmacists working with Older People (NIPOP) Network Steering Group (Appendix 1). It has been compiled using a variety of up to date prescribing assessment tools and resources relating to the management of medicines in older people (Appendix 2) and will be reviewed annually by the group. If you have any queries about this guide please contact **carmel.darcy@ westerntrust.hscni.net**

Printed documents may become out of date. Always ensure you have the latest version by referring to the Electronic Medicines Compendium (available at **www.medicines.org.uk**) for the most up to date information on specific medicines.

Acknowledgement

This guide includes information from the STOPP/START criteria version 2[3] with permission from Dr D O'Mahony (**denis.omahony@ucc.ie**).

Introduction

As the population ages and life expectancy increases, a greater number of older people are living with several long-term conditions that are being managed with an increasing number of medicines – 'polypharmacy'.

Polypharmacy can present many positive benefits for the patient; by alleviating pain, suffering and disability, improving functional capacity, independence, quality of life and ultimately extending life. However when an increasing number of medicines are prescribed inappropriately their benefits may not be realised and they can have a number of negative effects. Older people are at considerable risk of experiencing these negative effects; from adverse drug reactions, drug interactions, non-adherence, increased hospital admissions and even mortality.

Maintaining a careful balance becomes more difficult with increasing age and medicine review is one important element of optimising a patient's medicines to ensure they can support their long-term conditions, multi-morbidities and positive polypharmacy[1].

This guide is aimed at supporting healthcare professionals when carrying out comprehensive reviews of the appropriateness of medicines prescribed for older people. This document is intended to be used only as a guide. It is not intended to be a prescriptive document and should not be used in isolation of other relevant up to date resources e.g. NI Formulary, NICE Clinical Guidelines, BNF etc. When carrying out medicine reviews, patients should be reviewed on an individual basis; using a person-centred approach to reach any decision to change or add a medicine[1]. Decisions should also take account of all relevant clinical information, risks and benefits to the patient.

In June 2018 around one in nine people in Northern Ireland were aged 70 or over with 37,700 people aged 85 or more[2]

How to use this guide

Section one is a list of medicines or medicine classes (grouped per BNF section) which should be routinely reviewed in older people in certain circumstances and stopped or amended in some way. The table also includes the reason why and in a few examples, some practical advice on how best to stop or amend. The icon indicates the medicine or medicine class can increase the risk of falls. The icon indicates the anticholinergic effect on cognition. Further details are included within the appendices.

Proton Pump Inhibitors (PPIs)[3,18] *e.g. lansoprazole, omeprazole*	
Used for uncomplicated peptic ulcer disease or erosive peptic oesophagitis at full therapeutic dosage for > 8 weeks;	No evidence *Earlier discontinuation or dose reduction is indicated*
In patients with current, or at high risk of C difficile infection	May be a risk factor for C difficile infection

In addition to the examples included in the guide, consideration should be given to any drug:

Indication	Without an evidence-based clinical indication. (Refer to NI Formulary/ NICE Clinical Guidelines/BNF).
Duration	Used beyond the recommended duration, where treatment duration is well defined.
Duplication	Class duplication e.g. two concurrent NSAIDs, SSRIs, loop diuretics, ACE inhibitors, anticoagulants (optimisation of monotherapy within a single drug class should be observed prior to considering a new agent).
Falls Risk	That is known to predictably increase the risk of falls e.g. Benzodiazepines and antipsychotics. Medicines with a propensity to cause falls are highlighted within the main sections with the icon.
Renal Impairment	Which is potentially inappropriate for older patients with acute or chronic renal impairment. Always refer to BNF/manufacturers' SPC datasheets/Renal Drug Handbook or online database and local formulary guidelines.
Anticholinergic Burden	With antimuscarinic/anticholinergic properties (with concomitant use of two or more prescribed drugs) e.g. tricyclic antidepressants and first generation antihistamines. (There is a risk of increased antimuscarinic/anticholinergic toxicity i.e. constipation, urinary retention, dry mouth, blurred vision, cognitive impairment, delirium). Medicines which have an anticholinergic effect on cognition (AEC score) are highlighted within the main sections with the icon. Total scores can be calculated using the medichec calculator. **http://medichec.com/** An anticholinergic burden (ACB) score can also be calculated using the ACB calculator. **http://www.acbcalc.com/**
Frailty/Limited life expectancy	Older people living with frailty are at higher risk of adverse outcomes from their medicines. Level of frailty should be assessed at each review and consideration given to the burden of existing polypharmacy and the consequences of dose increases and the addition of new therapies. A list of potentially inappropriate prescribing parameters (STOPPFrail) which can be used to help inform decisions to stop or commence medicines in limited life expectancy can be found at **https://academic.oup.com/ageing/article/46/4/600/2948308**

Section two is laid out in a similar format but refers to a list of medicines which may be considered appropriate to commence in older people in certain circumstances. Before starting a new medicine consideration should be paid to any contra-indications to the drug or if a palliative approach would be more appropriate.

Section 1:
Medicines which may be appropriate to stop or alter

Chapter 1: Gastro-intestinal system

Clinical context	*Why review*
Anticholinergic antispasmodic drugs[3] *e.g. hyoscine butylbromide, propantheline*	
Chronic constipation where non-constipating alternatives are available.	Risk of exacerbation of constipation
In patients with narrow angle glaucoma.	Risk of exacerbation of glaucoma.
In patients with chronic prostatism.	Risk of urinary retention.
Domperidone[8]	
Used for more than one week in >60yrs; At a daily oral dose of >30mg; Concomitant use with other QT-prolonging medicines or potent CYP3A4 inhibitors; In patients with CCF or cardiac conduction impairment.	Increased risk of serious cardiac side effects
Proton Pump Inhibitors (PPIs)[BNF, 3,18] *e.g. lansoprazole, omeprazole*	
Used for uncomplicated peptic ulcer disease or erosive peptic oesophagitis at full therapeutic dosage for > 8 weeks;	No evidence *Earlier discontinuation or dose reduction is indicated*
In patients with current, or at high risk of C difficile infection	May be a risk factor for C difficile infection
Use at high dose or long-term use (>1 year)	Increased risk of fractures
Stimulant Laxatives[4] *e.g. bisacodyl, senna*	
Long-term use (except in the presence of opiates)	May exacerbate bowel dysfunction

Chapter 2: Cardiovascular System

Clinical context	*Why review*
ACE inhibitors (ACEIs) or Angiotensin Receptor Blockers (ARBs)[3]	
Patients with hyperkalaemia	Risk of exacerbation of hyperkalaemia which can cause serious arrhythmias
ACE inhibitors (ACEIs), Angiotensin Receptor Blockers (ARBs) and Aliskiren[20]	
Combination use of medicines from 2 classes of RAS blocking agents without presence of heart failure	Increased risk of hyperkalaemia, hypotension, renal impairment. No benefit in patients without heart failure, combination not recommended. *Discontinue one agent.*
Aldosterone antagonists[3, 25] *e.g. spironolactone, eplenerone*	
With concurrent potassium-conserving drugs e.g. ACEI's, ARB's, amiloride, triamterene without monitoring of serum potassium (at least every 6 months)	Increased risk of dangerous hyperkalaemia i.e >6.0mmol/L, risk increased in renal impairment. Use with caution.

Clinical context	*Why review*
Amiodarone[3]	
Used as first line choice in supraventricular tachyarrhythmias (SVTs)	Higher risk of side-effects than beta-blockers, digoxin, verapamil or diltiazem
Anticoagulants[26, 27] *e.g. vitamin K antagonist, direct thrombin inhibitor or factor Xa inhibitors*	
Use for >3 months for first DVT without continuing provoking risk factors (e.g. thrombophilia) Use for >3 months for first PE without continuing provoking risk factors (e.g. thrombophilia)	No proven added benefit
Anticoagulants OR Antiplatelets[3] *e.g. aspirin, clopidogrel, dipyridamole, prasugrel, ticagrelor*	
With concurrent significant bleeding risk i.e. in patients with uncontrolled severe hypertension, bleeding diathesis, recent non-trivial spontaneous bleeding	High risk of bleeding
Anticoagulants PLUS Antiplatelets[3] *e.g. aspirin, clopidogrel, dipyridamole*	
Stable coronary, cerebrovascular, or peripheral arterial disease	No added benefit from dual therapy Increased bleeding risk Intentional combination use under specialist supervision should always be confirmed
Anticoagulants PLUS NSAIDs[3] *e.g. ibuprofen, naproxen*	
Any scenario	Risk of major GI bleeding
Antiplatelets PLUS NSAIDs[3] *e.g. ibuprofen, naproxen*	
Without PPI prophylaxis	Increased risk of peptic ulcer disease
Aspirin[3]	
Long-term use at doses of >160mg/day	Increased risk of bleeding, no evidence of increased efficacy. *Reduce to 75mg/day*
Aspirin PLUS Anticoagulants[3] *e.g. vitamin K antagonist, direct thrombin inhibitor or factor Xa inhibitors*	
Chronic Atrial Fibrillation	No added benefit from aspirin.
Aspirin PLUS Clopidogrel[3]	
For secondary prevention of stroke – unless has had a coronary stent inserted in the previous 12 months or has concurrent ACS or high grade symptomatic carotid arterial stenosis	No evidence of added benefit over clopidogrel monotherapy Intentional combination use under specialist supervision should always be confirmed
Beta-blockers[3] *e.g. bisoprolol*	
In combination with verapamil or diltiazem	Risk of symptomatic heart block
Bradycardia (<50 beats/min), type ll heart block or complete heart block	Risk of complete heart block, asystole
In patients with diabetes mellitus and frequent hypoglycaemic episodes	Risk of suppressing hypoglycaemic symptoms
Beta-blockers (non-selective)[3] *e.g. propranolol*	
History of asthma requiring treatment	Risk of increased bronchospasm

Clinical context	*Why review*
Digoxin[3, 7]	
Long-term dose greater than 125 micrograms/ day with impaired renal function (eGFR<30ml/ min/1.73m^2)	Increased risk of digoxin toxicity if plasma levels not measured
In patients with heart failure with normal systolic ventricular function	No clear evidence of benefit
For use as prophylaxis in paroxysmal atrial fibrillation	No role
Direct thrombin inhibitors[3, SPC] *e.g. dabigatran*	
If CrCl<30mls/min	Risk of bleeding. No supporting evidence at this level of renal function.
Factor Xa inhibitors[3, SPC] *e.g. rivaroxaban, apixaban, edoxaban*	
If CrCl<15mls/min	Risk of bleeding. No supporting evidence at this level of renal function.
Ivabradine[11, BNF, SPC]	
New diagnosis of AF while on treatment	Risk/benefit profile for continuing ivabradine needs reviewed
Bradycardia during treatment (resting heart rate <50 beats/min)	Increased risk of cardiovascular death or non- fatal heart attack, bradycardia and AF. Decrease dose.
No or limited improvement in the symptoms of chronic angina after 3 months use.	No clinical benefit from on-going use - consider stopping. *E.g. Reduce 7.5mg bd to 5mg bd, reduce 5mg bd to 2.5mg bd* *if on 2.5mg bd then stop*
Loop diuretics[3, 49] *e.g. furosemide*	
For dependent ankle oedema only i.e. where there is no clinical, biochemical or radiological evidence of heart failure, liver failure, nephrotic syndrome or renal failure	No evidence of efficacy. *Ambulation, leg elevation and/or compression hosiery (with appropriate assessment for use) is usually more appropriate*
First-line monotherapy for hypertension Treatment of hypertension with concurrent urinary incontinence	Safer, more effective agents are available
No clinical benefit from on-going use.	May exacerbate incontinence. Safer, more effective agents are available
Midodrine[22, SPC]	
Supine (lying face upwards) hypertension	Can cause supine hypertension; *Review dose timing, last daily dose should be taken at least 4hrs before bedtime; Decrease dose; discontinue treatment if this does not resolve despite dose reduction*
If CrCl<30mls/min	*Limited data for use in AKI or severe renal impairment*

Clinical context	*Why review*
Nicorandil[21, SPC]	
Used as first-line antianginal	Not recommended as first-line antianginal agent; Risk of ulcerations & progression to complications; *Use recommended first line antianginals as per NICE guidelines e.g. beta blockers or calcium channel blockers.*
Where ulceration develops (e.g.mucosal, skin, eye)	Can cause ulcerations. *Discontinue nicorandil. Consider an alternative antianginal agent*
Used where concomitant diverticular disease	Increased risk of fistula formation and bowel perforation. *Consider an alternative antianginal agent.*
Used in combination with aspirin, NSAIDS or corticosteroids	Increased risk of GI ulceration, perforation, haemorrhage. *Consider an alternative antianginal agent.*
With medicines which can increase potassium levels, especially in moderate to severe renal impairment	Increased risk of hyperkalaemia. Monitor potassium levels.
With PDE-5 inhibitors e.g. sildenafil and soluble guanylate cyclase stimulators e.g. riociguat	Risk of severe hypotension
In patients with hypovolaemia, acute pulmonary oedema	Risk of hypotension, exacerbation of oedema
Phosphodiesterase type-5 inhibitors[3, SPC] *e.g. sildenafil, tadalafil, vardenafil*	
Used in severe heart failure characterised by hypotension (systolic BP < 90mmHg)	Risk of cardiovascular collapse
With concurrent nitrate therapy for angina, or nicorandil, or guanylate cyclase stimulators e.g. riociguat	Risk of hypotension. Monitor BP.
Simvastatin[10, 28, 29]	
In doses greater than 20mg with concurrent use of e.g. amlodipine, diltiazem, verapamil, amiodarone or ranolazine	Increased risk of S/E. *Reduce dose to 20mg daily or review choice of statin or interacting drug*
Thiazide diuretics[3, SPCs] *e.g. bendroflumethiazide, indapamide*	
History of gout	May precipitate gout
With current significant hypokalaemia (serum K+ < 3.0 mmol/l), hyponatraemia (serum Na+ < 130 mmol/l), hypercalcaemia (corrected Ca+ > 2.65 mmol/l)	May exacerbate hypokalaemia, hyponatraemia, or hypercalcaemia
With current significant Impaired renal function (eGFR < 30ml/min/1.73m²)	Thiazide and related diuretics are ineffective in renal impairment
Ticagrelor[30, 31]	
Long-term use (> 12 months) at 90mg BD in combination with aspirin	No license beyond 12 months at 90mg BD and needs review
Long-term use (>2 years) at 60mg BD in combination with aspirin	Limited safety/efficacy data beyond 3 years of extended treatment and needs review

Clinical context	*Why review*
Verapamil[3, SPC]	
Chronic constipation where non-constipating alternatives are available	Risk of exacerbation of constipation
NYHA Class III/IV heart failure	May worsen heart failure
Bradycardia (HR<50 beats/min), SBP <90mmHg	Risk of complete heart block, asystole

Chapter 3: Respiratory System

Clinical context	*Why review*
Antihistamine (1st generation)[3] *e.g. chlorphenamine, promethazine, diphenhydramine*	
Safer, less toxic antihistamines now widely available	Risk of sedation and anticholinergic side effects
Antimuscarinic bronchodilators[3] *e.g. ipratropium, tiotropium*	
With history of narrow angle glaucoma	May exacerbate glaucoma or bladder outflow obstruction (may cause urinary retention)
Systemic corticosteroids[3] *e.g. prednisolone*	
Used instead of inhaled corticosteroids for maintenance therapy in moderate – severe COPD (GOLD classification stages 2-4)	Unnecessary exposure to long-term side-effects of systemic steroids and effective inhaled therapies are available
Theophylline[BNF, 3]	
Monotherapy for COPD	Risk of adverse effects due to narrow therapeutic index. Safer more effective alternatives available.

Chapter 4: Nervous System

Clinical context	*Why review*
Anticholinergics/antimuscarinics[3, 32] *e.g. orphenadrine, procyclidine, benztropine*	
Used to treat extrapyridamal side-effects (EPS) of neuroleptic medicines	Risk of anticholinergic toxicity
Patients with delirium or dementia	Risk of exacerbation of cognitive impairment
Antipsychotics[3, BNF, 4, 41] *e.g. haloperidol, quetiapine, olanzapine, chlorpromazine, promazine*	
Patients with behavioural and psychological symptoms of dementia (BPSD)	Increased risk of stroke and death *Risperidone and haloperidol are licensed for the treatment (up to 6 weeks) of persistent aggression in moderate to severe Alzheimer's dementia unresponsive to non-pharmacological approaches and where there is a risk of harm to self or others.*
Antipsychotics (moderate-marked anticholinergic effects)[3] *e.g. chlorpromazine, clozapine, flupenthixol, fluphenazine, promazine, zuclopenthixol*	
History of prostatism or urinary retention	High risk of urinary retention
Antipsychotics (other than quetiapine or clozapine)[47]	
Use in patients with Parkinsonism or Lewy Body dementia	Risk of severe EPS

Clinical context	*Why review*
Benzodiazepines[3, 5, 6, BNF, 7] *e.g. chlordiazepoxide, nitrazepam, diazepam, temazepam*	
Long-term use (i.e. 4 weeks or more)	Risk of prolonged sedation, confusion, impaired balance, falls, road traffic accidents. In patients with dementia increased risk of mortality and should be used as a last resort. *If taken for more than 4 weeks -should be withdrawn gradually, risk of benzodiazepine withdrawal syndrome if stopped suddenly*
Acute or chronic respiratory failure (pO2 < 8.0kPa plus or minus pCO2 > 6.5kPa)	Risk of exacerbation of respiratory failure
Betahistine	
Long-term use for the treatment of nausea and vertigo	Causes sedation and increased risk of falls. No evidence of benefit in long term use
Dopamine agonists[3] *e.g. ropinirole, pramipexole*	
Benign essential tremor	No evidence of efficacy
Metoclopramide[9]	
Long-term or high dose use.(excluding palliative use)	Risk of neurological effects e.g. extrapyramidal disorders and tardive dyskinesia *Short term use only (up to 5 days)*
Metoclopramide OR Prochlorperazine[3]	
With Parkinsonism	Risk of exacerbating Parkinsonian symptoms
Opiates (strong oral or transdermal)[BNF, 3] *e.g. pethidine, morphine, fentanyl, oxycodone*	
First line therapy for mild pain	Paracetamol given regularly is often sufficient to manage mild pain
Opiates (Regular use)[3, 7] (as distinct from prn)	
Regular use without concomitant laxative	Risk of severe constipation
Opiates (Long-acting)[3]	
Without short acting opioids for break-through pain	Risk of persistence of severe pain
Phenothiazines[3] *e.g. chlorpromazine, prochlorperazine, levomepromazine, fluphenazine, trifluoperazine*	
First-line treatment – with the exception of prochloperazine for nausea/vomiting/vertigo, chlorpromazine for relief of persistent hiccoughs levomepromazine as an anti-emetic in palliative care	Higher risk of sedative and antimuscarinic side-effects in older people
Tricyclic antidepressants (TCAs)[3, 4, 5, 6] *e.g. amitriptyline, doxepin, dosulepin*	
Used as first line antidepressant treatment	Higher risk of adverse drug reactions than with SSRIs or SNRIs
With dementia With narrow angle glaucoma With cardiac conduction abnormalities With constipation With prostatism or poor history of urinary retention	Risk of worsening condition

Chapter 5: Infections

Clinical context	*Why review*
Nitrofurantoin[12]	
eGFR<45mls/min/1.73m²	Risk of treatment failure and increased risk of side effects. *Short courses of 3-7 days can be used with caution if eGFR 30-44mls/min/1.73m² if there is suspected/proven multi-drug resistance and benefits outweigh risks*

Chapter 6: Endocrine system

Clinical context	*Why review*
Bisphosphonates (oral)[3, 24, 33, SPCs]	
Current or recent history of upper GI disease i.e. dysphagia, oesophagitis, gastritis, duodenitis, or peptic ulcer disease, or upper GI bleeding	Risk of relapse/exacerbation of oesophagitis, oesophageal ulcer, oesophageal stricture
Long-term use (5 years or more, dependent on bisphosphonate used)	Risk of serious upper gastrointestinal disturbances, osteonecrosis of the jaw and atypical stress fractures
Long-term use (> 10 years)	Continuous oral bisphosphonate use for more than 10 years may be actively harmful to the patient *Discontinue and seek specific specialist advice about ongoing management*
Chronic ear infections or suspected choleseatoma	Long-term use (> 2 years) increased risk of osteonecrosis of the external auditory canal
Use in severe renal impairment (CrCl < 30ml/min)	Limited data for use in severe renal impairment. Check individual SPCs.
Use in bed-bound patients	May not be indicated
Patients requiring modified fluids	May not be able to meet administration requirements
Metformin[SPC]	
If eGFR is <30mls/min/1.73m²	Risk of lactic acidosis
Oestrogens[BNF, 3]	
With a history of breast cancer or venous thromboembolism	Increased risk of recurrence
With a history of stroke or new stroke	Combined HRT or oestrogen-only HRT slightly increases the risk of stroke
Oestrogens (without progestogen)[BNF, 3]	
In patients with intact uterus	Risk of endometrial cancer

Clinical context	*Why review*
Sulphonylureas[3] *e.g.gliclazide, glibenclamide, chlorpropamide, glimepiride*	
If eGFR is <30mls/min/1.73m^2	Risk of lactic acidosis
Thiazolidenediones[3, 42] *e.g. pioglitazone*	
Heart failure. Patients at risk of heart failure when used in combination with insulin.	Risk of exacerbation of heart failure. Risk of heart failure. Pioglitazone should be discontinued if deterioration in cardiac status occurs.

Chapter 7: Genito-urinary system

Clinical context	*Why review*
Bladder antimuscarinic drugs[3] *e.g. oxybutynin, tolterodine, solifenacin*	
With dementia or chronic cognitive impairment	Risk of increased confusion, agitation
With narrow angle glaucoma	Risk of acute exacerbation of glaucoma
With chronic prostatism	Risk of urinary retention
	Anticholinergics negate the effect of acetylcholinersterase inhibitors
Alpha1-selective alpha blockers[3] *e.g. alfuzosin, doxazosin, indoramin, tamsulosin*	
With symptomatic orthostatic hypotension or micturition syncope	Risk of precipitating recurrent syncope

Chapter 9: Blood and nutrition

Clinical context	*Why review*
Oral elemental iron doses > 200mg daily[3] *e.g. ferrous fumarate >600mg/day, ferrous sulfate > 600mg/day, ferrous gluconate> 1800mg/day*	
Therapeutic use, especially in the presence of or if prone to chronic constipation	No evidence of enhanced iron absorption above these doses, and increased risk of side-effects
Ascorbic Acid[BNF, 7]	
Used in combination with oral iron for the treatment of iron deficiency anaemia	No evidence of enhanced iron absorption above these doses, and increased risk of side-effects

Chapter 10: Musculoskeletal system

Clinical context	*Why review*
Colchicine[3]	
CrCl<10mls/min	Risk of colchicine toxicity
Colchicine OR NSAIDs	
Long-term use (>3 months) for chronic treatment of gout where no C/I to a xanthine-oxidase inhibitor e.g. allopurinol, febuxostat	Xanthine-oxidase inhibitors are first choice prophylactic drugs in gout

Clinical context	*Why review*
Corticosteroids[3, 23]	
Long-term use (>3 months) as monotherapy for RA or OA Osteoarthritis (other than periodic intra-articular injection for mono-articular pain)	Risk of systemic corticosteroid side effects. Long-term use may be continued in some patients where all other treatment options have been offered.
COX-2 selective NSAIDs[3]	
Concurrent cardiovascular disease	Increased risk of myocardial infarction or stroke
Non-steroidal anti-inflammatory drugs (NSAIDs)[3, BNF] *e.g. ibuprofen, naproxen*	
Use in all older people for symptomatic relief	Risk of serious side-effects and fatalities.
With history of peptic ulcer (PU) disease or GI bleeding	Risk of PU relapse *Unless with concurrent H2 antagonist or PPI use*
With severe hypertension	Risk of exacerbation of hypertension and contraindicated
With severe heart failure	Risk of exacerbation of heart failure and contraindicated
With history of stroke/MI	Increased risk of stroke/MI
With any degree of renal impairment Long-term use (> 3 months) for symptom relief of OA where paracetamol has not been tried	Risk of deterioration in renal function *Simple analgesics preferable and usually as effective for pain relief*
Non-steroidal anti-inflammatory drugs (NSAIDs) PLUS Corticosteroids[3]	
Concurrent use without PPI prophylaxis	Increased risk of peptic ulcer disease
Non-steroidal anti-inflammatory drugs (NSAIDs) PLUS Diuretics[7, SPCs]	
Concurrent long-term use of NSAID.	Risk of acute renal failure. *Monitor renal function if using concurrent NSAID for short term use. Caution with short term concurrent use of NSAID.*
Quinine sulphate[14]	
Long-term use (> 3 months) for leg cramps	Limited benefit and risk of adverse effects associated with high dose use *Stop after 4 weeks if no benefit, interrupt treatment every 3 months and reassess.*

Chapter 11: Eye

Clinical context	*Why review*
Non-selective topical beta blocker[3] *e.g. timolol*	
History of asthma requiring treatment	Risk of increased bronchospasm

Section 2:
Medicines which may be appropriate to start

Chapter 1: Gastro-intestinal System

When to consider starting	*Additional comments*
Laxatives[3, BNF, 7, 34]	
Regular opioid therapy	Use a regular laxative and an osmotic laxative (or docusate which also softens stools)
Proton pump inhibitors (PPIs)[3, 19, SPCs] *e.g. lansoprazole, omeprazole*	
Severe gastro-oesophageal reflux disease or peptic stricture requiring dilatation	Always refer to stop section before commencing any PPI
Treatment with aspirin and a history of peptic ulcer disease	Increased risk of recurrent peptic ulcer
Co-administration of SSRIs with other drugs associated with a risk of bleeding e.g. antiplatelets, NSAIDs, anticoagulants	Increased risk of gastrointestinal haemorrhage
Ranitidine[BNF]	
Benign gastric ulceration, duodenal ulceration, longterm dyspepsia, gastric oesphageal disease	An alternative to PPIs

Chapter 2: Cardiovascular System

When to consider starting	*Additional comments*
ACE inhibitors (ACEIs)[3]	
Systolic heart failure and or documented coronary artery disease	
ACE inhibitors (ACEIs) OR Angiotensin Receptor Blockers (ARBs)[3]	
Diabetes with evidence of renal disease i.e. dipstick proteinuria or microalbuminuria (>30mg/24hrs) with or without serum biochemical renal impairment	
Anticoagulants[3] *e.g. vitamin K antagonist, direct thrombin inhibitor or factor Xa inhibitors*	
Chronic atrial fibrillation	
Antihypertensive therapy[3, 35, 49]	
Under 80 years: Blood pressure >140/90 Over 80 years: Blood pressure >160/90	
Antiplatelets[3] *e.g. aspirin, clopidogrel, prasugrel or ticagrelor*	
Documented history of coronary, cerebral or peripheral vascular disease	
Beta-blockers[3]	
Ischaemic heart disease Stable systolic heart failure	*Appropriate beta-blocker (bisoprolol, nebivolol, metoprolol or carvedilol)*
Statin therapy[28, 29]	
Documented history of coronary, cerebral or peripheral vascular disease unless the patient's status is end-of-life	

Chapter 3: Respiratory System

When to consider starting	*Additional comments*
Inhaled short acting bronchodilator[3, 43, 44, 45, 46] *e.g. salbutamol*	
All patients with symptomatic asthma COPD - initial GOLD groups A,B,C and D, SABA as required may be continued at all stages of COPD	
Long-term Oxygen Therapy (LTOT)[3]	
Documented chronic hypoxaemia (i.e. pO2 < 8.0kPa or 60mmHg or SaO2<89%)	
Regular inhaled corticosteroid[3]	
Moderate – severe asthma or COPD, where FEV1 <50% of predicted value and repeated exacerbations requiring treatment with oral corticosteroids (GOLD stage 3 or 4)	

Chapter 4: Nervous System

When to consider starting	*Additional comments*
Antidepressant (Non-TCA)[3, 7] *e.g. sertraline, citalopram, mirtazapine*	
Persistent major depressive symptoms	Monitor for hyponatraemia Can increase risk of GI bleeds, insomnia and anorexic problems in older people Mirtazapine may have a preferred profile due to its effects on sleep and appetite
Acetylcholinesterase inhibitor[3, BNF, 7, 36, 41] *e.g. donepezil, rivastigmine, galantamine*	
Mild – moderate Alzheimer's dementia (e.g. donepezil, rivastigmine, galantamine) or Lewy Body dementia (donepezil, rivastigmine) or mild-moderate Parkinson's Disease dementia	Drugs for dementia should be initiated by a Dementia specialist.
Memantine[32, 41]	
Increasing BPSD in moderate to severe dementia	Often used to delay prescribing of antipsychotics. Drugs for dementia should be initiated by a Dementia specialist.
Non-ergot dopamine agonists[3, 7] *e.g. ropinirole, pramipexole or rotigotine*	
Restless legs syndrome, once iron deficiency and severe renal failure have been excluded	Risk of impulse control disorders.

When to consider starting	*Additional comments*
Non-ergot dopamine agonists or Levodopa or MAO-B inhibitor[3, 47]	
Idiopathic Parkinson's disease with functional impairment and resultant disability. Add levodopa to people in early stages of Parkinson's disease if motor symptoms impact on their quality of life. Consider choice of dopamine agonist, levodopa or MAO-B inhibitor for people in early stages of Parkinson's disease if symptoms do not impact their quality of life.	
Opiates (high-potency)[3]	
Moderate-severe pain where paracetamol, or low-potency opioids are not appropriate to the pain severity or have been ineffective	
SSRI (or SNRI or pregabalin if SSRI contraindicated)[3, 48]	
Persistent severe anxiety that interferes with independent functioning	

Chapter 6: Endocrine System

When to consider starting	*Additional comments*
Bone anti-resorptive or anabolic therapy[3] *e.g. bisphosphonate, denosumab*	
Documented osteoporosis, where no pharmacological or clinical status contraindication exists (BMD T-scores ≤ -2.5 in multiple sites) and/or previous history of fragility fracture(s)	
Bisphosphonates[3] *e.g.alendronic acid, Risedronate*	
Long-term systemic corticosteroid therapy	Always refer to stop section before commencing any bisphosphonate

Chapter 7: Genito-urinary system

When to consider starting	*Additional comments*
Alpha1-selective alpha blockers[3] *e.g.tamsulosin, alfuzosin*	
Symptomatic prostatism, where prostatectomy is not considered necessary	
5-alpha reductase inhibitor[3] *e.g.finasteride*	
Symptomatic prostatism, where prostatectomy is not considered necessary	
Topical vaginal oestrogen or vaginal oestrogen pessary[3]	
Symptomatic atrophic vaginitis	

START

Chapter 9: Blood and nutrition

When to consider starting	*Additional comments*
Folic acid supplement[3]	
Methotrexate therapy	*Folic acid 5mg once weekly 24-48hrs after methotrexate.*
Vitamin D supplement[BNF, 40]	
All people >65 yrs who have limited exposure to sunlight (e.g. frail or housebound individuals and those who are confined indoors e.g. living in care homes) housebound, experiencing falls, or osteopenia (BMD T-score >-1.0 but < -2.5 in multiple sites)	Simple vitamin D deficiency can be prevented by taking an oral supplement of 10 micrograms (400units) of vitamin D daily
Vitamin D and calcium supplement[3]	
Known osteoporosis and/or previous fragility fracture(s) and/or BMD T-scores ≤-2.5 in multiple sites Long-term systemic corticosteroid therapy	

Chapter 10: Musculoskeletal and joint diseases

When to consider starting	*Additional comments*
DMARD[3]	
Active, rheumatic disease	Initiated by specialists only
Xanthine-oxidase inhibitors[3] *e.g. allopurinol*	
History of recurrent episodes of gout	

Chapter 11: Eye

When to consider starting	*Additional comments*
Topical prostaglandin, prostamide, or beta-blocker[3]	
Primary open-angle glaucoma	

Chapter 14: Immunological products and vaccines

When to consider starting	*Additional comments*
Vaccines[3]	
Trivalent influenza vaccine Pneumococcal vaccine	Annual seasonal vaccination At least once after age 65 according to national guidelines

Appendix 1: Northern Ireland Pharmacists working with Older People (NIPOP) Network Steering Group

Carmel Darcy	Consultant Pharmacist (Older People), Western Health and Social Care Trust
Hilary Mc Kee	Consultant Pharmacist (Older People), Northern Health and Social Care Trust
Jayne Agnew	Consultant Pharmacist (Older People), Southern Health and Social Care Trust
Paula Crawford	Consultant Pharmacist (Older People) Belfast Health and Social Care Trust
Karen Miller	Consultant Pharmacist (Older People) South Eastern Health and Social Care Trust
Paul Mc Gimpsey	Community Pharmacist
Michael Ogilby	Lead General Practice Pharmacist
Sara Laird	Teacher Practitioner, Craigavon Area Hospital
Niamh Mc Garry	Lead Clinical Pharmacist (Older People Services), Belfast Health and Social Care Trust
Julie Magee	Clinical Pharmacist (Care of Older People/Stroke) Northern Health and Social Care Trust
Helen Phillips	Lead Clinical Pharmacist (ECAH, MOOP), South-Eastern Health and Social Care Trust

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Appendix 3: Abbreviations used in this guide

ACEI	angiotensin-converting-enzyme inhibitor
ACS	acute coronary syndrome
AF	atrial fibrillation
AKI	acute kidney injury
ARB	angiotensin receptor blocker
BMD	bone mineral density
BNF	British National Formulary
BP	blood pressure
BPSD	behavioural and psychological symptoms of dementia
CCF	congestive cardiac failure
C/I	contra-indication
COPD	chronic obstructive pulmonary disease
COX-2	cyclooxygenase -2
CrCl	creatinine clearance
CVD	cardiovascular disease
CYP3A4	cytochrome P450 3A4
DMARD	disease-modifying antirheumatic drug
DVT	deep vein thrombosis
eGFR	estimated glomerular filtration rate
EPS	extrapyramidal symptoms
FEV1	forced expiratory volume in the first second
GI	gastrointestinal
GOLD	global initiative for chronic obstructive lung disease
IHD	ischaemic heart disease
LTOT	long term oxygen therapy
MI	myocardial infarction
MRP2	multidrug resistance-associated protein 2
NHS	National Health Service
NI	Northern Ireland
NICE	National Institute for Health care Excellence
NSAID	non-steroidal anti-inflammatory drug
NYHA	New York Heart Association
OA	osteoarthritis
OAT	organic anion transporter
PCO2	partial pressure of carbon dioxide
PDE-5	phosphodiesterase type 5 inhibitor
PE	pulmonary embolism
PO2	partial pressure of oxygen
PPI	proton pump inhibitor
PRN	when required

PU	peptic ulcer
PVD	peripheral vascular disease
QT	an interval seen in an ECG (electrocardiogram) test of heart function
RA	rheumatoid arthritis
RAS	renin-angiotensin system
S/E	side effects
SNRI	serotonin-noradrenaline reuptake inhibitor
SBP	systolic blood pressure
SPC	summary of product characteristics
SSRI	selective serotonin reuptake inhibitor
SVT	supraventricular tachycardia
TCA	tricyclic antidepressant
VTE	venous thromboembolism
WHO	World Health Organisation

Appenidix 4: Non-exhaustive list of some of the common medicines known to prolong the QT-interval and CYP3A4 inhibitors.

Table 1: Non-exhaustive list of some of the common medicines known to prolong the QT-interval[38, BNF].

Antimicrobials	***Antipsychotics (all have some risk)***
Erythromycin	Risperidone
Clarithromycin	Quetiapine
Moxifloxacin	Fluphenazine
Fluconazole	Haloperidol
Ketoconazole	Pimozide
	Chlorpromazine
	Clozapine
Antiarrhythmics	***Antidepressants***
Dronedarone	Citalopram/escitalopram
Sotalol	Amitriptyline
Amiodarone	Clomipramine
Flecainide	Lofepramine
	Doxepin
	Imipramine
Antiemetics	***Others***
Domperidone	Lithium
Ondansetron/Granisetron	Quinine
	Tolteridone

Table 2: Non-exhaustive list of some of the common medicines known to be CYP3A4 inhibitors[39].

Amiodarone	Erythromycin	Quinidine
Azithromycin	Fluconazole	Quinine
Anastrozole	Fluoxetine	Ranitidine
Cimetidine	Grapefruit juice	Sertraline
Clarithromycin	Ketoconazole	Valproic acid
Clotrimazole	Metronidazole	
Diltiazem	Miconazole	
Entacapone (high dose)	Omeprazole	

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