

List of potential Prescribing Safety Indicators (PSIs) related to mental health medications and conditions

Table 1: PIM: Independent of Diagnoses or Conditions (Prescribing [Class/Medication] to a patient aged [age])

PIM: Independent of Diagnoses or Conditions				
Therapeutic Category	Medication/Class	Age	References	
Antipsychotics	<i>Antipsychotics</i>	≥ 65	[25, 34, 38, 42, 43]	
		0–5	[69]	
Antidepressants	<i>Antidepressants</i>	0–5	[69]	
		TCA	≥ 65	[32, 34, 38, 65]
			≤ 18	[103]
		<i>SSRI other than fluoxetine</i>	≤ 18	[73, 103]
		<i>NDRI (Bupropion)</i>	≥ 65	[46]
		<i>NRI (Reboxetine)</i>	≥ 65	[46]
		<i>MAOi (Tranylcypromine)</i>	≥ 65	[45, 46, 77]
Sedative, hypnotics and anxiolytics	<i>Benzodiazepine</i>	≥ 65	[25, 42, 43, 68]	
		<i>Z-drugs</i>	≥ 65	[25, 42]
		<i>Barbiturates</i>	≥ 65	[39, 118]
		<i>Meprobamate</i>	≥ 65	[34, 39, 41, 46, 66, 118]
		<i>Sedating antihistamine</i>	≥ 65	[48]
		<i>Promethazine</i>	≥ 65	[34, 46, 47, 66, 91, 108, 118]
		ADHD medications	<i>All ADHD Medications</i>	< 6
<i>Clonidine</i>	≥ 65			[31, 34, 46, 48, 66, 91, 116]
<i>Guanfacine</i>	≥ 65			[34, 46]
<i>Methylphenidate</i>	≥ 65			[46, 91]
Anticholinergics	<i>Anticholinergics</i>	≥ 65	[38]	

ADHD: Attention deficit hyperactivity disorder. MAOi: Monoamine oxidase inhibitor. NDRI: Norepinephrine–dopamine reuptake inhibitor. NRI: Norepinephrine reuptake inhibitor. SSRI: Selective serotonin reuptake inhibitor. TCA: Tricyclic antidepressants

Table 2: PIM: considering diagnoses or conditions (Prescribing [Class/Medication] to a patient with [Condition] +/- and aged [age])

PIM: considering diagnoses or conditions					
Therapeutic Category	Condition	Medication/Class	Age	References	
Antipsychotics	Dementia but Not Psychosis	<i>Antipsychotics</i>	≥ 65	[73]	
	BPSD	<i>Antipsychotics</i>	≥ 65	[25, 34]	
	Seizures or Epilepsy	<i>Antipsychotics</i>	≥ 65	[116]	
	Parkinson's Disease	<i>Antipsychotics other than quetiapine or clozapine</i>	≥ 65	[25, 32, 48, 73, 92]	
	History of prostatism or previous urinary retention of BPH	Glaucoma	<i>Antipsychotics</i>	-	[71]
			<i>Fluphenazine</i>	-	[71]
			<i>Perphenazine</i>	-	[71]
	<i>Trifluoperazine</i>	-	[71]		
	Syncope	<i>Antipsychotics</i>	≥ 65	[84]	
	Postural Hypotension	<i>Antipsychotics</i>	≥ 65	[84]	
	History of Falls	<i>Antipsychotics</i>	≥ 65	[34, 47, 84]	
	Delirium	<i>Antipsychotics</i>	≥ 65	[34, 84]	
	ADHD without Hyperactivity	<i>Antipsychotics</i>	Children	[103]	
	Arrhythmia	<i>Antipsychotics</i>	≥ 65	[116]	
	Lewy Body Disease	Chronic constipation	<i>Antipsychotics other than quetiapine or clozapine</i>	≥ 65	[25, 32]
			<i>Perphenazine</i>	-	[83]
			<i>Clozapine</i>	≥ 65	[83]
<i>Haloperidol</i>			≥ 65	[83]	
<i>Olanzapine</i>	≥ 65	[83]			
Antidepressants	Heart block	TCA	≥ 65	[88, 93, 116]	
	Cardiac conduction abnormalities	TCA	≥ 65	[25, 43, 68]	
	Cardiovascular risk factors or CVD	TCA	≥ 65	[92]	

	Heart failure	TCA	-	[11, 71, 73]
	Arrhythmia	Amitriptyline at dose >75mg	-	[10]
		Venlafaxine		[71]
	HTN	Duloxetine	-	[71]
		MAOIs		[71]
	Postural hypotension	TCA	≥ 65	[88, 92, 93]
	Syncope	TCA	≥ 65	[47, 116]
		Amitriptyline		[83]
	History of falls	Clomipramine	≥ 65	[83]
		Imipramine		[83]
		SSRI	-	[15, 71]
	Seizures or epilepsy	TCA	-	[71]
	Dementia or cognitive impairment	TCA	-	[15]
		TCA	-	[71]
		Mianserin	-	[71]
		MAOI	-	[71]
	Glaucoma	Citalopram	-	[71]
		Escitalopram	-	[71]
		Fluoxetine	-	[71]
		Fluvoxamine	-	[71]
		Paroxetine	-	[71]
	Prostatism or history of urinary retention or BPH	TCA	-	[71]
	Constipation	TCA	≥ 65	[43, 47, 68, 88, 116]
	Current or recent significant hyponatraemia	SSRI	-	[15]
	Hepatic impairment or cirrhosis	TCA	-	[71]
		Paroxetine		[85]
	Gastrointestinal haemorrhage	Sertraline	≥ 75	[85]
		Fluvoxamine		[85]
		Escitalopram		[85]
	Peptic ulcer disease	SSRI	-	[71]
		Amitriptyline		[83]
	Delirium	Clomipramine	≥ 65	[83]
		Imipramine		[83]
	Acute bipolar depression	TCA	Adults	[49]
Sedative, hypnotics and anxiolytics	Dementia or cognitive impairment	Benzodiazepines	≥ 65	[34, 66, 84, 88]
	History of falls or fractures	Sedative-hypnotics	≥ 65	[88]
	Acute or chronic respiratory failure	Benzodiazepines	≥ 65	[25]
	Sleep apnoea syndrome	Benzodiazepines	≥ 65	[66, 116]
	Delirium	Benzodiazepines	≥ 65	[34, 84]
	BPH	Antihistamine	≥ 65	[116]
	Advanced dementia	Antihistamine 1st generation	-	[86]
	Hepatic impairment or cirrhosis	Benzodiazepines	-	[71]
	Chronic constipation	antihistamines	≥ 65	[116]
	Mood stabilisers	Renal failure	Lithium	-
Thyroid disorders		Lithium	-	[71]
Epilepsy		Lithium	-	[71]
Anti-dementia	Persistent bradycardia	Acetylcholinesterase inhibitors	≥ 65	[25, 42]
	Heart block	Acetylcholinesterase inhibitors	≥ 65	[25]
	Recurrent unexplained syncope	Acetylcholinesterase inhibitors	≥ 65	[34]
Anticholinergics	Dementia or cognitive impairment	Anticholinergics	-	[39]
	Delirium	Anticholinergics	≥ 65	[25, 32, 34, 42]
	Chronic constipation	Anticholinergics	-	[71]
	Glaucoma	Anticholinergics	≥ 65	[25, 42, 47, 66, 88]

ADHD medications	History of urinary retention of BPH	<i>Anticholinergics</i>	-	[50]
	HTN	<i>Atomoxetine</i>	-	[71]
	Anorexia and malnutrition	<i>Methylphenidate</i>	≥ 65	[47]
	Epilepsy	<i>Methylphenidate</i>	-	[71]
	Insomnia	<i>Amphetamine</i> <i>Methylphenidate</i>	≥ 65	[34] [34, 47, 84]
Non-MH medication with MH condition	Delirium	<i>H2-receptor antagonists</i>	-	[84]
		<i>Corticosteroids</i>	≥ 65	[34]
		<i>Meperidine (Pethidine)</i>	≥ 65	[34, 84]
	Insomnia	<i>Pseudoephedrine</i>	-	[34, 47, 84]
		<i>Phenylephrine</i>	-	[34, 47, 84]
		<i>Armodafinil</i>	≥ 65	[34]
		<i>Modafinil</i>	-	[34]
		<i>Theophylline</i>	-	[34, 84]
Depression	<i>Methylidopa</i>	≥ 65	[116]	
Dementia or cognitive impairment	<i>Selegiline</i>	≥ 65	[101]	

ADHD: Attention deficit hyperactivity disorder. BPH: Benign prostatic hyperplasia. BPSD: Behavioural and Psychological Symptoms of Dementia. CVD: Cardiovascular disease. HTN: Hypertension. MAOI: Monoamine oxidase inhibitor. MH: Mental health. SSRI: Selective serotonin reuptake inhibitor. TCA: Tricyclic antidepressants.

Table 3: Drug-drug interactions (Prescribing [Class/Medication] with [Class/Medication] +/- to a patient aged [age])

Drug-drug interactions				
Therapeutic Category	Medication/Class	Medication/Class	Age	References
Antipsychotics	<i>Antipsychotics</i>	<i>Antipsychotic</i>	-	[22, 71]
		<i>Antiparkinsonian agents</i>	≥ 65	[44]
	<i>Pimozide</i>	<i>Macrolides antibiotics</i>	-	[89]
		<i>Azole antifungal</i>	-	[89]
Antidepressants	<i>TCA</i>	<i>MAO</i>	-	[15]
		<i>TCA</i>	≥ 65	[41, 112]
		<i>Cimetidine</i>	-	[111]
		<i>Fluoxetine</i>	-	[111]
		<i>Fluvoxamine</i>	≥ 70	[96]
		<i>Paroxetine</i>	-	[111]
		<i>Selegiline</i>	-	[102]
		<i>Tramadol</i>	-	[15]
		<i>Aspirin (no protection)</i>	-	[15]
		<i>MAOI</i>	-	[89]
	<i>SSRI</i>	<i>SSRI's</i>	≥ 65	[25, 43, 68]
		<i>NSAID (no protection)</i>	≥ 45	[70]
		<i>Venlafaxine</i>	≥ 45	[70]
		<i>Vitamin K antagonists</i>	-	[71]
		<i>Selegiline</i>	-	[111]
		<i>Tramadol</i>	-	[15]
	<i>MAO</i>	<i>Dextromethorphan</i>	-	[89]
		<i>Amphetamine and derivatives</i>	-	[102]
		<i>Narcotic analgesics</i>	-	[102]
		<i>Triptans</i>	-	[102]
<i>Levodopa</i>		-	[104]	
<i>MAOI</i>		≥ 65	[41, 112]	
<i>Amitriptyline</i>		<i>Sertraline</i>	children	[79]
		<i>Trazodone</i>	children	[79]
<i>Citalopram</i>	<i>QT-prolonging drugs</i>	-	[15]	
<i>Citalopram</i>	<i>Linezolid</i>	children	[79]	
<i>Sertraline</i>	<i>Theophylline</i>	-	[89]	
<i>Fluvoxamine</i>	<i>Ramelteon</i>	-	[102]	
<i>Trazodone</i>	<i>anti-HCV antivirals</i>	-	[71]	
<i>Escitalopram</i>	<i>anti-HCV antivirals</i>	-	[71]	
<i>Hypnotic or sedative Benzodiazepine</i>	<i>Hypnotic or sedative</i>	≥ 65	[32, 41, 112]	
	<i>Azole antifungal agents</i>	-	[89]	

Sedative, hypnotics and anxiolytics		<i>Cimetidine</i>	≥ 65	[116]	
		<i>Benzodiazepines</i>	-	[71]	
		<i>Alprazolam</i>		[48]	
		<i>Midazolam</i>	Strong CYP3A4 inhibitor	≥ 65	[48]
		<i>Triazolam</i>		[48]	
		<i>Flurazepam</i>		[71]	
		<i>Guazepam</i>		[71]	
		<i>Triazolam</i>	Anti-HCV antivirals	-	[71]
		<i>Alprazolam</i>		[71]	
		<i>Zolpidem</i>	Strong CYP3A4 inhibitor	≥ 65	[48]
		<i>Zopiclone</i>		[48]	
		<i>Zolpidem</i>	Anti-HCV antivirals	-	[71]
	Mood stabilisers	<i>Valproic acid</i>	<i>Carbapenems</i>	-	[104]
<i>Lamotrigine</i>			Children	[79]	
<i>Clarithromycin</i>			-	[109]	
<i>Erythromycin</i>			≥ 45	[70]	
<i>Cimetidine</i>			≥ 65	[116]	
<i>Carbamazepine</i>		<i>oral or intravaginal contraceptives, patches or pure progestogen pills</i>	-	[71]	
		<i>Warfarin</i>	-	[111]	
		<i>Propoxyphene</i>	-	[89, 111]	
		<i>Rivaroxaban</i>	-	[71]	
<i>Lithium</i>		<i>ACEi</i>	≥ 65	[34]	
		<i>NSAID</i>	≥ 65	[48]	
		<i>Diuretics</i>	-	[49]	
<i>Lamotrigine</i>		<i>Hormonal contraceptive or combination pills</i>	-	[71]	
Anti-dementia	<i>Anticholinesterase drugs</i>	<i>Anticholinergic</i>	≥ 65	[77]	
		<i>Anticholinesterase drugs</i>	-	[71]	
Anticholinergic	<i>Anticholinergic</i>	<i>Anticholinergic</i>	≥ 65	[25, 32, 34, 48]	
ADHD medications	<i>Clonidine</i>	<i>Propranolol</i>	-	[111]	

ADHD: Attention deficit hyperactivity disorder. ACEi: Angiotensin-converting-enzyme inhibitor. CYP: Cytochrome P450. HCV: Hepatitis C virus. MAOi: Monoamine oxidase inhibitor. NSAID: Nonsteroidal anti-inflammatory drugs. SSRI: Selective serotonin reuptake inhibitor. TCA: Tricyclic antidepressants.

Table 4: Inappropriate Duration (Prescribing [Class/Medication] for [duration] +/- to a patient with [condition] +/- and aged [age])

Therapeutic Category	Class/Medication	Inappropriate Duration			
		Condition	Duration	Age	References
Antipsychotics	<i>Antipsychotics</i>	Dementia but not psychosis	>6 weeks	≥ 65	[10]
		as long-term hypnotics	>1 month	≥ 65	[43, 47, 77]
	<i>More than one Antipsychotics</i>	-	>2 month	Adults	[69]
Antidepressants	<i>Three or more Antidepressants</i>	-	>3 month	adults	[69]
	<i>More than one SSRI</i>	-	>2 month	adults	[69]
	<i>SSRI and SNRI combination</i>	-	>2 month	adults	[69]
Sedative, hypnotics and anxiolytics	<i>Hypnotics</i>	-	>1 month	-	[115]
	<i>Benzodiazepine</i>	-	>1 month	-	[15, 99]
	<i>Z-drugs</i>	-	>1 month	-	[15]
	<i>First-generation antihistamine</i>	-	> 1 week	≥ 65	[43, 47]
Non-Specific Psychotropics	<i>Four or more Psychotropics</i>	-	>3 months	6–17	[69]
Non-MH medication with MH condition	<i>Opioids</i>	Dementia (unless palliative)	long term	≥ 65	[43]

MH: Mental health. SNRI: Serotonin and norepinephrine reuptake inhibitors. SSRI: Selective serotonin reuptake inhibitor.

Table 5: Inappropriate dose (Prescribing [Medication] at a dose [Dose] +/- to a patient with [Condition] +/- and aged [Age])

Inappropriate dose					
Therapeutic Category	Medication	Dose	Condition	Age	References
Antipsychotics	<i>Haloperidol</i>	>2 mg/day		≥ 65	[45-47]
	<i>Risperidone</i>	3 mg/day	BPSD: restlessness, agitation	≥ 65	[101]
	<i>Antipsychotics</i>	High dose Total daily dose is above the maximum recommended by the British National Formulary (BNF)		-	[22]
Antidepressants	<i>Fluoxetine</i>	>40 mg/day		≥ 65	[41]
	<i>Imipramine</i>	>100 mg/day		≥ 65	[41]
	<i>Trimipramine</i>	>100 mg/day		≥ 65	[41]
ADHD medications	SR <i>Methylphenidate</i>	two doses per day, rather than one dose		Children	[103]
Sedative, hypnotics and anxiolytics	<i>Alprazolam</i>	>2 mg/day		≥ 65	[39, 47, 68]
	<i>Brotizolam</i>	>0.125 mg/day		≥ 65	[45, 46]
	<i>Gabapentin</i>	>1400mg/day	CrCl 30-59 mL/min	-	[72]
	<i>Gabapentin</i>	>700mg/day	CrCl 15-29 mL/min	-	[72]
	<i>Gabapentin</i>	>300mg/day	CrCl 10-14 mL/min	-	[72]
	<i>Gabapentin</i>	>150mg/day	CrCl < 10 mL/min	-	[72]
	<i>Lorazepam</i>	> 2 mg/day		≥ 65	[45]
	<i>Lormetazepam</i>	>0.5 mg/day		≥ 65	[45, 46]
	<i>Oxazepam</i>	>60 mg/day		≥ 65	[39, 45, 46, 68]
	<i>Pregabalin</i>	>300mg/day	CrCl 30-59 mL/min	-	[72]
	<i>Pregabalin</i>	>150mg/day	CrCl 15-29 mL/min	-	[72]
	<i>Pregabalin</i>	>75mg/day	CrCl < 15 mL/min	-	[72]
	<i>Temazepam</i>	>15 mg/day		≥ 65	[39, 68]
	<i>Triazolam</i>	>0.25 mg/day		≥ 65	[39, 66, 68]
	<i>Zaleplon</i>	>5 mg/day		≥ 65	[45, 46]
<i>Zolpidem</i>	>5 mg/day		≥ 65	[45-47]	
<i>Zopiclone</i>	>7.5mg/day		≥ 70	[96]	

ADHD: Attention deficit hyperactivity disorder. BPSD: Behavioural and Psychological Symptoms of Dementia. CrCl: Creatinine clearance.

Table 6: Monitoring (Prescribing [Class/Medication] with monitoring [Test] [Frequency])

Monitoring						
Therapeutic Category	Medication/Class	Test	Age	Frequency	References	
Antipsychotics	<i>Antipsychotics</i>	Glucose	-	Annually	[39]	
				3-4 months after starting therapy	[49]	
		Weight	-	Annually	[39]	
				3-4 months after starting therapy	[49]	
	Lipid profile	-	3 months after starting therapy	[49]		
Mood stabilisers	<i>Clozapine</i>	WBC	-	NR	[117]	
		<i>Carbamazepine</i>	LFT	-	Annually	[81]
			FBC	-	Annually	[81, 105]
		Carbamazepine level	-	Every 6 months	[50]	
	<i>Valproate</i>	LFT	-	Annually	[81]	
				first 6 months of therapy	[49]	
		FBC	-	Annually	[81, 113]	
	<i>Lithium</i>	lithium level	-	every 3 months	[17, 61]	
				every 6 months	[49]	
annually				[81, 105]		
ADHD medications	<i>Methylphenidate</i>	Growth chart (height and weight)	Children	NR	[103]	

ADHD: Attention deficit hyperactivity disorder. FBC: Full blood count. LFT: Liver function test. NR: Not reported. TFT: Thyroid function test. WBC: White blood count

Table 7: Omission (Patient with [Condition +/- Age] NOT prescribed [Class/Medication])

Omission				
Therapeutic Category	Medication/Class	Condition	Age	References
Anti-dementia	<i>Acetylcholinesterase inhibitor</i>	Mild- moderate Alzheimer's dementia	≥ 65	[25]
		Lewy Body dementia		[25]
Antidepressants	<i>Antidepressants</i>	moderate/severe depressive symptoms lasting at least three months	≥ 65	[43]
	<i>SSRI</i>	Persistent severe anxiety that interferes with independent functioning.	≥ 65	[25]
Mood stabilisers	<i>Mood stabilisers</i>	on antidepressants for acute bipolar depression	Adult	[49]

SSRI: Selective serotonin reuptake inhibitor

Table 8: Other

Therapeutic Category	Indicator	Age	References
Antidepressants	TCA except in case of severe depression or in low dose for neuropathic pain	≥ 65	[42]
	Patient diagnosed with acute bipolar depression is prescribed antidepressant monotherapy	Adult	[49]
Antipsychotics	Risperidone continued following discharge without follow-up to a patient with dementia	≥ 75	[107]
Mood stabilisers	Lithium dose not adjusted or omitted in a patient with a lithium concentration above the therapeutic range (>1. - mmol l-1)	-	[15]
	Lithium prescribed in conjunction with newly prescribed nonsteroidal anti-inflammatory drugs without dose adjustment or increased monitoring	-	[15]
	Lithium therapy prescribed in conjunction with newly prescribed loop or thiazide diuretics without dose adjustment or increased monitoring	-	[15]
	Patient treated with lithium in bipolar disorder does NOT have a serum level 0.8–1.1 mmol/L	Adult	[49]
	Patient on lithium in bipolar disorder and with lithium serum level [1.5 mmol/L) has lithium not discontinued	Adult	[49]
Non-Specific Psychotropics	In bipolar disorder, Patient who has discontinued lithium, does NOT have a recorded gradual reduction of lithium dose over at least 4 weeks	Adult	[49]
	Three or more psychotropic drugs on an as required (PRN) basis.	-	[22]

TCA: Tricyclic antidepressants.