

**Beers Criteria:** use of >1 med with anticholinergic properties ↑ risk of cognitive decline, delirium, & falls/fractures<sup>5</sup>

**Low Anticholinergic Activity; Moderate/High Anticholinergic Activity; Unconfirmed Anticholinergic Activity**

	Antibiotics	Antiparkinsonian	Cardiovascular Agents	Immunosuppressants
	<b>ampicillin</b> <b>cefoxitin</b> X ⊗ <b>clindamycin</b> gentamicin (Oint & Sol'n NIHB covered) <b>piperacillin</b> X ⊗ <b>vancomycin</b> ☞ ▼	<b>amantadine</b> SYMMETREL <b>benztropine mesylate</b> COGENTIN <b>bromocriptine</b> PARLODEL <b>carbidopa/levodopa</b> ☆ SINEMET <b>entacapone</b> COMTAN <b>ethopropazine</b> PARSITAN <b>phenelzine</b> NARDIL <b>pramipexole</b> MIRAPEX <b>procyclidine</b> KEMADRIN <b>selegiline</b> ELDEPRYL ☞ ▼ <b>trihexyphenidyl</b> ARTANE	<b>atenolol</b> TENORMIN <b>captopril</b> CAPOTEN <b>chlorthalidone</b> GENERIC ONLY <b>digoxin</b> LANOXIN, TOLOXIN <b>diltiazem</b> ☆ CARDIZEM, TIAZAC <b>dipyridamole</b> PERSANTINE, AGGRENOX ☞ ▼ <b>disopyramide</b> RYTHMODAN <b>furosemide</b> LASIX <b>hydralazine</b> APRESOLINE <b>isosorbide</b> ISORDIL <b>metoprolol</b> ☆ LOPRESOR <b>nifedipine</b> ADALAT <b>quinidine</b> GENERIC ONLY X ⊗ <b>triarterene</b> DYRENIUM <b>warfarin</b> ☆ COUMADIN	<b>azathioprine</b> IMURAN <b>cyclosporine</b> NEORAL ☞ <b>hydrocortisone</b> CORTEF <b>methylprednisolone</b> MEDROL <b>prednisone</b> WINPRED
	<b>Antidepressants</b> <b>amitriptyline</b> ELAVIL <b>clomipramine</b> ANAFRANIL <b>desipramine</b> NORPRAMIN <b>doxepin &gt;6mg</b> SINEQUAN <b>imipramine</b> TOFRANIL <b>nortriptyline</b> ☆ AVENTYL -less anticholinergic effects than amitriptyline & imipramine <b>trimipramine</b> SURMONTIL	<b>Antipsychotics</b> <b>aripiprazole</b> ☆ ABILIFY ☞ & MAINTENA ☞ ▼ <b>asenapine</b> SAPHRIS (☞-BPAD) ☞ <b>chlorpromazine</b> LARGACTIL <b>clozapine</b> CLOZARIL ☞ ▼ <b>flupentixol</b> FLUANXOL <b>fluphenazine</b> MODITEN <b>haloperidol</b> HALDOL <b>loxapine</b> LOXAPAC <b>lurasidone</b> ◊ LATUDA ☞ ☞ <b>methotrimeprazine</b> NOZINAN <b>olanzapine</b> ZYPREXA <b>paliperidone</b> INVEGA ☞ ▼ on injection only <b>pericyazine</b> NEULEPTIL <b>perphenazine</b> TRILAFON <b>pimozide</b> ORAP <b>quetiapine</b> SEROQUEL <b>risperidone</b> ☆ RISPERDAL ☞ ▼ on injection only <b>trifluoperazine</b> STELAZINE <b>ziprasidone</b> ☆ ZELDOX <b>zuclopenthixol</b> ◊ CLOPIXOL	<b>Cardiovascular Agents</b> <b>atropine</b> LOMOTIL on SPDP ⊗ <b>belladonna</b> GENERIC ONLY X ⊗ <b>bisacodyl</b> BISACODYL X ▼ OTC <b>chlordiazepoxide/clidinium</b> LIBRAX X ⊗ <b>climidine</b> TAGAMET <b>dicyclomine</b> BENTYLOL ⊗ <b>dimenhydrinate</b> GRAVOL OTC <b>diphenoxylate/atropine</b> LOMOTIL on SPDP ⊗ <b>domperidone</b> MOTILIUM <b>famotidine</b> ☆ PEPCID OTC & Rx <b>loperamide</b> IMODIUM OTC ☑ if used short term <b>meclizine</b> BONAMINE <b>metoclopramide</b> MAXERAN <b>nizatidine</b> AXID <b>prochlorperazine</b> STEMETIL ☑ if used short term <b>promethazine</b> PHENERGAN OTC X ⊗ <b>ranitidine</b> ZANTAC OTC & Rx -low anticholinergic activity if adjusted for renal function <b>scopolamine</b> TRANSDERM V OTC on SPDP ⊗ <b>Preferred Agents:</b> bisacodyl X , PPIs, domperidone; ondansetron; famotidine, or ranitidine if ≤150mg/day	<b>Muscle Relaxants</b> <b>baclofen</b> ☆ LIORESAL ☞ on intrathecal only <b>cyclobenzaprine</b> FLEXERIL ☞ ▼ <b>methocarbamol</b> ROBAXIN OTC X ⊗ <b>orphenadrine</b> NORFLEX OTC X ⊗ <b>tizanidine</b> ZANAFLEX ☞ ☞
TCA			<b>Gastrointestinal Agents</b> <b>atropine</b> LOMOTIL on SPDP ⊗ <b>belladonna</b> GENERIC ONLY X ⊗ <b>bisacodyl</b> BISACODYL X ▼ OTC <b>chlordiazepoxide/clidinium</b> LIBRAX X ⊗ <b>climidine</b> TAGAMET <b>dicyclomine</b> BENTYLOL ⊗ <b>dimenhydrinate</b> GRAVOL OTC <b>diphenoxylate/atropine</b> LOMOTIL on SPDP ⊗ <b>domperidone</b> MOTILIUM <b>famotidine</b> ☆ PEPCID OTC & Rx <b>loperamide</b> IMODIUM OTC ☑ if used short term <b>meclizine</b> BONAMINE <b>metoclopramide</b> MAXERAN <b>nizatidine</b> AXID <b>prochlorperazine</b> STEMETIL ☑ if used short term <b>promethazine</b> PHENERGAN OTC X ⊗ <b>ranitidine</b> ZANTAC OTC & Rx -low anticholinergic activity if adjusted for renal function <b>scopolamine</b> TRANSDERM V OTC on SPDP ⊗ <b>Preferred Agents:</b> bisacodyl X , PPIs, domperidone; ondansetron; famotidine, or ranitidine if ≤150mg/day	<b>Opioids</b> <b>meperidine</b> DEMEROL X ⊗ ☞ on controlled release only, ☞ inj & liquid <b>codeine</b> DURAGESIC ☞ ☞ <b>fentanyl</b> DILAUDID, HYDROMORPH CONTIN ☞ on CR only <b>hydromorphone</b> ☆ <b>morphine</b> ☆ STATEX, M.O.S., KADIAN ☞ <b>oxycodone</b> SUPEDOL, OXY IR, OXYNEO ☞ ⊗ <b>tramadol</b> ULTRAM, LIAVIA, TRIDURAL, ZYTRAM XL X ⊗ <b>Preferred Agents:</b> acetaminophen X , NSAIDs (e.g. ibuprofen, naproxen)
SSRI	<b>citalopram</b> ☆ CELEXA <b>escitalopram</b> ☆ CIPRALEX <b>fluoxetine</b> PROZAC <b>fluvoxamine</b> LUVOX <b>paroxetine</b> PAXIL <b>sertraline</b> ☆ ZOLOFT			
Other	<b>bupropion</b> ☆ WELLBUTRIN, ZYBAN <b>desvenlafaxine</b> PRISTIQ X ⊗ <b>duloxetine</b> CYMBALTA <b>mirtazapine</b> ☆ REMERON <b>moclobemide</b> ☆ MANERIX <b>phenelzine</b> NARDIL <b>trazodone</b> ☆ TRAZOREL <b>venlafaxine</b> ☆ EFFEXOR In older adults, citalopram & sertraline are the usually preferred SSRIs.	<b>Antiseizure Drugs</b> <b>carbamazepine</b> TEGRETOL <b>divalproex</b> ☆ EPIVAL <b>oxcarbazepine</b> TRILEPTAL ☞ ▼ <b>valproic acid</b> ☆ DEPAKENE <b>Preferred Agents:</b> divalproex, gabapentin, lamotrigine, levetiracetam	<b>Respiratory Meds</b> <b>acridinium bromide</b> TUDORZA GENUAIR ☞ ▼ <b>acridinium/formoterol</b> DUAKLIR GENUAIR ☞ ▼ <b>fluticasone/salmeterol</b> ADVAIR ☞ ☞ <b>ipratropium</b> /salbutamol ATROVENT/COMBIVENT <b>glycopyrronium</b> SEEBRI BREEZHALER ☞ ▼ <b>glycopyrronium/Indacaterol</b> ULTIBRO BREEZHALER ☞ ▼ <b>pseudoephedrine</b> COUGH & COLD PRODUCTS OTC X ⊗ <b>theophylline</b> THEOLAIR, UNIPHYL <b>tiotropium</b> SPIRIVA <b>tiotropium/olodaterol</b> INSPIOLTO ☞ ▼ <b>umeclidinium</b> INCRUSE ELLIPTA ☞ ▼ <b>umeclidinium/vilanterol</b> ANORO ELLIPTA ☞ ▼ <b>umeclidinium/vilanterol/fluticasone</b> TRELEGY ELLIPTA ☞ ☞ To minimize systemic effects of inhalational meds: avoid overuse, use aerochamber for ipratropium inhaler.	<b>Miscellaneous</b> <b>buspirone</b> ◊ BUSPAR <b>celecoxib</b> CELEBREX <b>colchicine</b> GENERIC ONLY <b>ketotifen ophthalmic</b> ZADITOR X ▼ <b>lithium</b> CARBOLITH, DURALITH <b>metformin</b> GLUCOPHAGE, GLYCON, g <b>methotrexate</b> GENERIC ONLY <b>naratriptan</b> AMERGE ☞ ▼ <b>pancuronium</b> GENERIC ONLY X ⊗ <b>sumatriptan</b> IMITREX ☞ ▼ <b>zolmitriptan</b> ZOMIG ☞ ▼ ☆ = Denotes medications with anticholinergic activity that may be better tolerated than others in that class. Whenever possible, anticholinergic medications should be avoided, and the preferred agents used. ◊ = Unable to confirm anticholinergic activity (black font) AChEI = Acetylcholinesterase Inhibitor (e.g. donepezil ARICEPT, galantamine REMINYL, rivastigmine EXELON) ☞ ☞ CR = Controlled-release formulation PPI = Proton pump inhibitor (e.g. rabeprazole) OTC = Over-the-counter SPDP = Saskatchewan Prescription Drug Plan Saskatchewan Health finds co-administration of this agent with an AChEI acceptable If patient is currently on this medication, Saskatchewan Health will NOT cover an AChEI
	<b>Antihistamines/Antipruritics</b> <b>brompheniramine</b> COUGH & COLD PRODUCTS OTC X <b>chlorpheniramine</b> CHLOR-TRIPOLON OTC X <b>cyproheptadine</b> PERIACTIN OTC X ⊗ <b>diphenhydramine</b> BENADRYL OTC X <b>doxylamine</b> UNISOM X ⊗ <b>hydroxyzine</b> ATARAX <b>pyrilamine</b> MIDOL, PAMPRIN OTC X ⊗ <b>trimeprazine</b> ◊ PANECTYL ⊗ <b>triprolidine</b> COTRIDIN X ⊗ <b>Preferred Agents:</b> cetirizine REACTINE X ▼ & fexofenadine ALLEGRA X ▼ (controversial rating as medium/high activity), desloratadine AERIUS X ▼, loratadine CLARITIN X ▼. All available OTC.	<b>Antispasmodics</b> <b>dicyclomine</b> FORMULEX, BENTYLOL ⊗ <b>glycopyrrolate</b> ROBINUL X ⊗ <b>hyoscine butylbromide</b> BUSCOPAN		
	<b>Antimuscarinics/Antinotice Meds</b> <b>darifenacin</b> ENABLEX ☞ ☞ <b>fesoterodine</b> TOVIAZ ☞ ☞ <b>flavoxate</b> URISPAS X ⊗ <b>mirabegron</b> ◊ MYRBETRIQ ☞ ☞ <b>oxybutynin</b> DITROPAN X ⊗ on XL only <b>propiverine</b> MICTORYL PEDIATRIC ☞ ▼ <b>solifenacin</b> VESICARE on SPDP ▼ <b>tolterodine l-tartrate</b> DETROL LA on SPDP ▼ <b>tropium</b> TROSEC ☞ ☞	<b>Benzodiazepines</b> <b>alprazolam</b> XANAX short-acting <b>chlordiazepoxide</b> LIBRIUM long-acting ⊗ <b>clonazepam</b> RIVOTRIL intermediate-acting <b>clorazepate</b> TRANXENE long-acting ⊗ <b>diazepam</b> VALIUM long-acting <b>flurazepam</b> DALMANE long-acting ⊗ <b>lorazepam</b> ☆ ATIVAN intermediate-acting <b>midazolam</b> VERSED short-acting X ⊗ <b>oxazepam</b> ☆ SERAX intermediate-acting <b>temazepam</b> ☆ RESTORIL intermediate-acting <b>triazolam</b> HALCION short-acting Avoid long- & ultra-short acting agents in older adults. (Clonazepam ok, if long-acting required e.g. chronic anxiety)		

**Dementia & Anticholinergic Medications**

Diseases associated with an essential cholinergic deficit include Alzheimer’s dementia, Lewy body dementia & to some extent other dementias (not frontal). Anticholinergic drugs worsen the deficit and are therefore highly problematic. **Donepezil** <sup>ARICEPT</sup>, **rivastigmine** <sup>EXELON</sup>, and **galantamine** <sup>REMINYL</sup> are reversible inhibitors of the enzyme acetylcholinesterase. Because of the mechanism of action, medications with anticholinergic effects can interfere with the activity of donepezil, rivastigmine and galantamine. The first page of this document contains a list of medications with anticholinergic effects, with an emphasis on those with moderate to high activity. Drug coverage (in Sask.) may be affected if a patient is using a medication on this list concurrently with donepezil, rivastigmine or galantamine. In addition to the concerns related to anticholinergic medications in individuals who already have a dementia diagnosis, **there is evidence that exposure to strong anticholinergic medications (esp. antidepressants, antiparkinson meds, antipsychotics, bladder antimuscarinics, & antiepileptics) is associated with an increased risk of dementia** (~10% over 1 to 11 years esp. for individuals <80 years;<sup>10</sup> increased dementia incidence [OR 1.17 (95%CI 1.10-1.24)] in individuals who had a anticholinergic medication 15-20 years before a dementia diagnosis;<sup>11</sup> 1.2x increased risk of all-cause dementia – dose-dependent relationship.<sup>12</sup>)

**Adverse Effects (AEs) of Anticholinergic Medications**

The use of medications with anticholinergic activity comes with the risk of AEs in older adults (e.g., cognitive dysfunction/decline, delirium, sedation, orthostatic hypotension, falls, fractures, urinary retention). Avoiding the use of medications with anticholinergic properties in older adults is the ideal, however minimizing their use may also be a strategy for minimizing the risk of AEs. Also, selecting medications with low anticholinergic activity is preferred over those with higher anticholinergic activity. However, individuals who take multiple medications with low anticholinergic activity may also have an increased risk of AEs. Even small increases in the anticholinergic burden increases the risk of morbidity, and a higher anticholinergic burden increases the risk of cardiovascular disease and mortality in older individuals.<sup>13,14,15</sup>

**Spectrum of Anticholinergic Side-Effects**

Mild	Moderate	Severe
<ul style="list-style-type: none"> <li>Dryness of mouth (modest)</li> </ul>	<ul style="list-style-type: none"> <li>Moderately disturbing dry mouth/thirst</li> <li>Speech problems</li> <li>Reduced appetite</li> </ul>	<ul style="list-style-type: none"> <li>Difficulty chewing, swallowing, speaking</li> <li>Mucosal damage – ulceration of gums &amp; buccal mucosa</li> <li>Impaired perception of taste &amp; texture of food</li> <li>Malnutrition</li> <li>Dental decay/caries, periodontal disease, denture misfit</li> <li>Respiratory infection</li> </ul>
<ul style="list-style-type: none"> <li>Mild dilatation of pupils</li> </ul>	<ul style="list-style-type: none"> <li>Inability to accommodate</li> <li>Vision disturbances</li> <li>Dizziness</li> </ul>	<ul style="list-style-type: none"> <li>Increased risk of accidents &amp; falls leading to ↓ function</li> <li>Exacerbation/precipitation of acute angle closure glaucoma</li> <li>Photophobia</li> </ul>
<ul style="list-style-type: none"> <li>Mild constipation</li> </ul>	<ul style="list-style-type: none"> <li>Esophagitis</li> <li>Reduced gastric secretions, gastric emptying (atony)</li> <li>Reduced peristalsis, constipation</li> </ul>	<ul style="list-style-type: none"> <li>Fecal impaction (in patients with constipation)</li> <li>Altered absorption of concomitant medications</li> <li>Paralytic ileus, pseudo-obstruction</li> </ul>
<ul style="list-style-type: none"> <li>Urinary hesitancy</li> </ul>		<ul style="list-style-type: none"> <li>Urinary retention, urinary tract infection (in patients with urinary hesitancy)</li> </ul>
<ul style="list-style-type: none"> <li>Mild/transient increased HR</li> </ul>	<ul style="list-style-type: none"> <li>Increased heart rate</li> </ul>	<ul style="list-style-type: none"> <li>Conduction disturbances supraventricular tachyarrhythmias</li> <li>Exacerbation of angina</li> <li>Congestive heart failure</li> <li>Myocardial infarction</li> </ul>
<ul style="list-style-type: none"> <li>Decreased sweating</li> </ul>		<ul style="list-style-type: none"> <li>Thermoregulatory impairment leading to hyperthermia (heat stroke). {Additional risk if also on diuretic.}</li> </ul>
<ul style="list-style-type: none"> <li>Drowsiness</li> <li>Fatigue</li> <li>Mild amnesia</li> <li>Inability to concentrate</li> </ul>	<ul style="list-style-type: none"> <li>Excitement</li> <li>Restlessness</li> <li>Confusion</li> <li>Memory impairment</li> </ul>	<ul style="list-style-type: none"> <li>Profound restlessness &amp; disorientation, agitation</li> <li>Hallucinations, delirium</li> <li>Ataxia, muscle twitching, hyperreflexia, seizures</li> <li>Exacerbation of cognitive impairment (in patients with dementia)</li> </ul>

**Tips to Deal with Anticholinergic Side-Effects**

General approach:

- Identify the cause
- Discontinue unnecessary offending medications
- Reduce the dose
- Look for effective alternatives that are less likely to cause the side effect

Dry Mouth:

- 80% of the most commonly prescribed medications can cause dry mouth (e.g. incontinence meds, Parkinson’s meds, antidepressants, antipsychotics, NSAIDs, opioids, muscle relaxants, antihistamines, benzodiazepines, antihypertensives [clonidine, alpha-blockers, beta-blockers, calcium channel blockers, diuretics, ACE inhibitors]).
- When appropriate, instruct patients to take meds associated with dry mouth early in the day since salivary production is lowest at night.
- Divided doses may also be less likely to cause dry mouth than a single large dose.
- Consider therapeutic alternatives that are less likely to cause dry mouth.
- Avoid: alcohol-containing mouthwashes, alcoholic beverages, caffeine, tobacco.
- Swish mouth with water every 2 hours.
- Drink plenty of fluids while eating to make swallowing easier; avoid foods that are hard to chew.
- Chewing sugar-free gum or sucking on sugar-free candy mechanically stimulates salivation and can be recommended to promote salivation in patients with functioning salivary glands.
- Nondrug options: bedroom humidifier; artificial saliva or oral lubricants (**MOUTH KOTE, BIOTENE GEL, ORAL BALANCE GEL, MOI-STIR SPRAY** ▼ for Palliative care).
- Pharmacologic options: pilocarpine (muscarinic agonist) 5 to 10mg of pilocarpine 3 or 4 times daily to a max of 30mg daily – will cause salivation in patients with functioning salivary glands. Duration of action is 3 to 5 hours. Common side effects (dose-dependent): sweating, nausea, rhinitis, flushing, urinary frequency. **CI:** uncontrolled asthma, narrow-angle glaucoma, acute iritis. **Pilocarpine eye drops** cost significantly less than pilocarpine tablets and can be used orally for treatment of dry mouth. **4 drops of the 2% solution, directly on tongue or add to small amount of water & swish and swallow, 3 times daily** (can swish and spit to reduce systemic side effects).

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