

Deprescribing/ Appropriate Prescribing

Andrea Levin, PharmD, BCACP
Assistant Professor, College of Pharmacy
Nova Southeastern University
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Dr. Kiran C. Patel College
of Osteopathic Medicine
NOVA SOUTHEASTERN UNIVERSITY

NSU
Florida

South Florida Geriatric Workforce Education Program

Disclosures

- The activity speaker does not have any financial relationships with commercial entities to disclose.

Learning Objectives

- Describe the purpose of Beers Criteria
- Describe the problems resulting from polypharmacy (e.g. prescribing cascade)
- Identify medications that can be considered for deprescribing
- Identify medications that can may be underutilized in the elderly
- Describe adverse drug effects affecting elderly patients associated from inappropriately prescribed medications

Abbreviations

- American Geriatrics Society (AGS)
- Potentially Inappropriate Medication (PIM)
- Adverse drug event (ADE)
- Albumin to creatinine ratio (ACR)
- Sulfonylureas (SU)
- Thiazolidinediones (TZDs)
- Heart failure with reduced ejection fraction (HFrEF)
- Trimethoprim-Sulfamethoxazole (TMP-SMX)
- Venous thromboembolism (VTE)
- Contraindicated (CI)

Epidemiology

- In 2015, 617.1 million (9%) of the 7.3 billion people estimated worldwide were ≥ 65 years of age
- By 2030, this will increase to approximately 1 billion (12% of the projected total worldwide population)
- By 2050, this will increase to 1.6 billion (17% of the projected total worldwide population)

Pharmacodynamic and Pharmacokinetic Changes in the Elderly

- Pharmacodynamic
 - Increased sensitivity to medications
- Pharmacokinetic
 - Reduction in renal and hepatic clearance
 - Increased volume of distribution
 - Drug absorption

Renal Considerations

- Decreased renal elimination
- SCr may be under-estimated in the elderly
- Remember the importance of GFR and CrCl
- CKD Staging (ACR consideration-A1, A2, A3)
 - Stage 1: GFR: > or equal to 90 ml/min
 - Stage 2: GFR: 60 to 89 ml/min
 - Stage 3: GFR: 30 to 59 ml/min
 - 3a vs. 3b
 - Stage 4: GFR: 15 to 29 ml/min
 - Stage 5: GFR: < 15 ml/min (or dialysis patients)

Polypharmacy

- Use of more medications than is clinically necessary
- “Prescribing cascade”
- Increased risk for adverse drug events and drug-drug interactions
 - Adults >65 years of age are twice as likely to go the ED (177,000 visits annually) for ADE and almost seven times more likely to be hospitalized as a result of that ED visit.

Medications to Target for Deprescribing

- Antihypertensives
- Antihyperglycemic medications
- NSAIDs
- CNS medications
- Proton pump inhibitors
- Statins
- Bisphosphonates

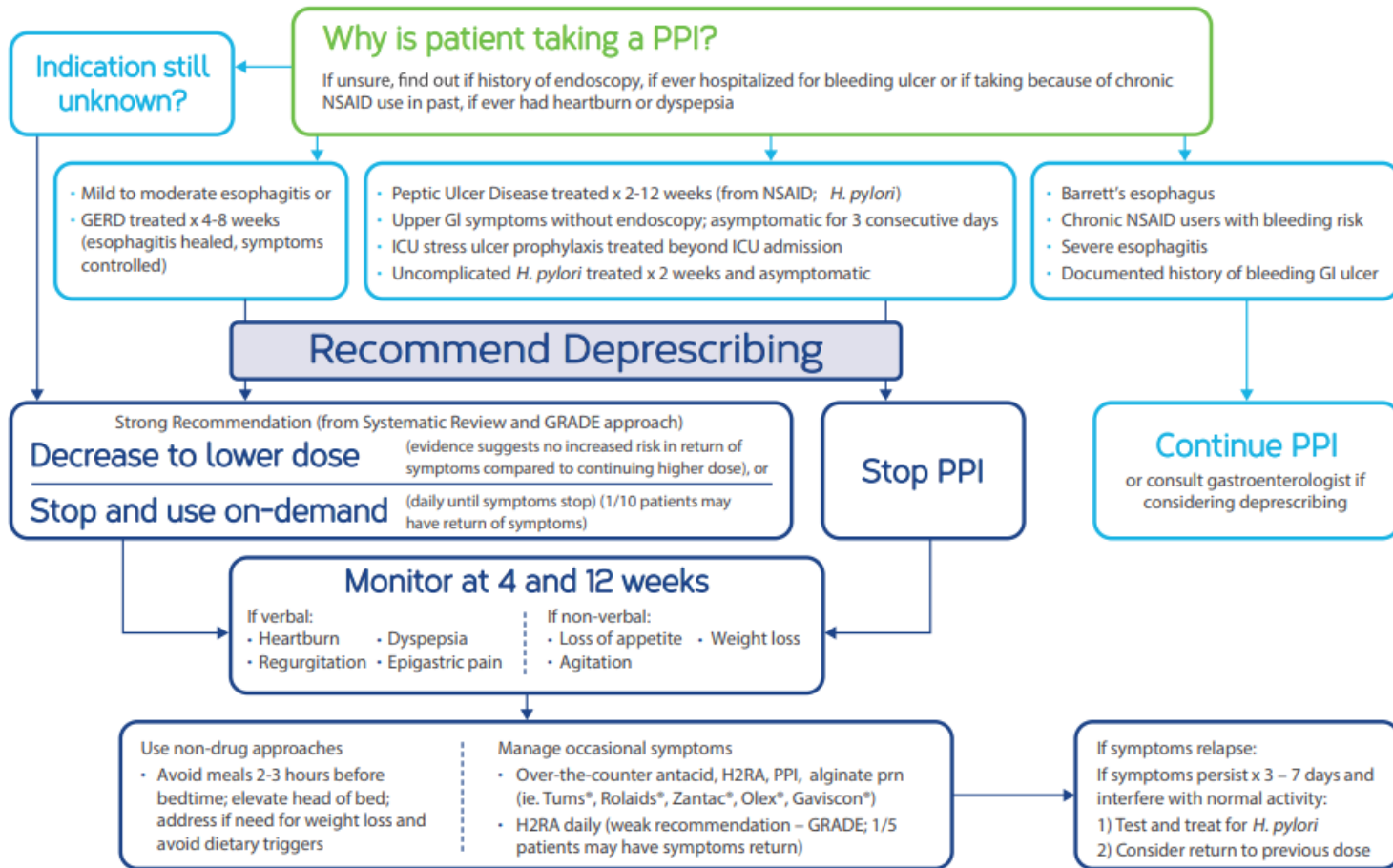
American Geriatrics Society 2019 Updated Beers Criteria for Potentially Inappropriate Medication Use in Older Adults. *J Am Geriatr Soc.* 2019; 00:1-21.

O'Mahony D, O'Sullivan D, Byrne S, O'Connor M N, Ryan C, Gallagher P; STOPP/START criteria for potentially inappropriate prescribing in older people: version 2. *Age Ageing* 2015; 44 (2): 213-218. doi: 10.1093/ageing/afu145

Bemben, N. Deprescribing: An application to medication management in older adults. *Pharmacother.* 2016; 36 (7):774-780.

Steps to Deprescribing

- Thorough medication history/medication reconciliation
- Medication assessment
 - Quantity and type of medications
 - Multiple prescribers
- Determine if a medication should be discontinued
 - Life expectancy
 - Patient preference
 - Symptom control, quality of life, cure, prevention
- Develop a plan for medication discontinuation
- Monitor effects of discontinued medication





PPI Availability

PPI	Standard dose (healing) (once daily)*	Low dose (maintenance) (once daily)
Omeprazole (Losec [®]) - Capsule	20 mg ^a	10 mg ^a
Esomeprazole (Nexium [®]) - Tablet	20 ^b or 40 ^b mg	20 mg
Lansoprazole (Prevacid [®]) - Capsule	30 mg ^a	15 mg ^a
Dexlansoprazole (Dexilant [®]) - Tablet	30 ^c or 60 ^d mg	30 mg
Pantoprazole (Tecta [®] , Pantoloc [®]) - Tablet	40 mg	20 mg
Rabeprazole (Pariet [®]) - Tablet	20 mg	10 mg

Legend

- a Non-erosive reflux disease
- b Reflux esophagitis
- c Symptomatic non-erosive gastroesophageal reflux disease
- d Healing of erosive esophagitis
- + Can be sprinkled on food

* Standard dose PPI taken BID only indicated in treatment of peptic ulcer caused by *H. pylori*; PPI should generally be stopped once eradication therapy is complete unless risk factors warrant continuing PPI (see guideline for details)

Key

GERD = gastroesophageal reflux disease

SR = systematic review

NSAID = nonsteroidal anti-inflammatory drugs

GRADE = Grading of Recommendations Assessment, Development and Evaluation

H2RA = H2 receptor antagonist

Engaging patients and caregivers

Patients and/or caregivers may be more likely to engage if they understand the rationale for deprescribing (risks of continued PPI use; long-term therapy may not be necessary), and the deprescribing process

PPI side effects

- When an ongoing indication is unclear, the risk of side effects may outweigh the chance of benefit
- PPIs are associated with higher risk of fractures, *C. difficile* infections and diarrhea, community-acquired pneumonia, vitamin B12 deficiency and hypomagnesemia
- Common side effects include headache, nausea, diarrhea and rash

Tapering doses

- No evidence that one tapering approach is better than another
- Lowering the PPI dose (for example, from twice daily to once daily, or halving the dose, or taking every second day) OR stopping the PPI and using it on-demand are equally recommended strong options
- Choose what is most convenient and acceptable to the patient

On-demand definition

Daily intake of a PPI for a period sufficient to achieve resolution of the individual's reflux-related symptoms; following symptom resolution, the medication is discontinued until the individual's symptoms recur, at which point, medication is again taken daily until the symptoms resolve



But What About Underutilization?

- Underutilization is the omission of drug therapy which is indicated for the treatment or prevention of a disease
- Reasons for underutilization
 - Increased risk for adverse drug events
 - Current complex medication regimen
 - Life expectancy/comorbid conditions
 - Omission
 - Limited evidence in elderly population

Resources

- American Geriatrics Society (AGS) Beers Criteria For Potentially Inappropriate Medication (PIM)
 - Medications to avoid in older adults
 - Increase risk of confusion, falls, and mortality
 - 2015 update gave consideration to renal dose adjustments and drug-drug interactions
- Screening Tool of Older People's Prescriptions (STOPP)/Screening Tool to Alert to Right Treatment (START)
 - Identifies potential errors in medication use in the elderly
 - Identifies potential omissions in prescribing

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Beers Criteria

- Medications prescribed that are found on Beers are associated with poor health outcomes
 - Confusion
 - Falls
 - Mortality
- Avoiding PIMs can decrease ADE risk

2019 Beers Specific Updates

- Aspirin: use in caution for adults ≥ 70 years of age in primary prevention
- TMP-SMX: Use with caution in reduced kidney function and taking an ACEi/ARB
- Caution expanded from dabigatran to include rivaroxaban in treating VTE or Afib in adults >75 years old
- Tramadol added to the list of medications that may cause hyponatremia
- Vasodilators were removed from Beers since syncope is a common side effect
- Chemotherapeutic medications were removed from Beers

2019 Beers Specific Updates

- H2 Blockers removed from the avoid list for dementia or cognitive impairment but remain for delirium
- Glimepiride was added to the list so that glipizide is the best SU option
- SNRIs should be avoided in individuals with a history of falls/fractures
- Pimavanserin was deemed the preferred agent over aripiprazole in the treatment of psychosis in patients with Parkinsons
 - Quetiapine, pimavanserin, and clozapine are considered acceptable options in the above patients but not as a general rule
- Non DHP CCBs should be avoided in HFrEF
- NSAIDs, COX2 inhibitors, TZDs, and dronedarone should be used with caution in older adults with HF who are asymptomatic and avoided in older adults who are symptomatic

2019 Beers Specific Updates

- Drug-Drug Interactions

- TMP-SMX + phenytoin can increase the risk of phenytoin toxicity
- TMP-SMX or Macrolides (excluding azithromycin), or ciprofloxacin + warfarin can increase the risk of bleeding
- 3 or more CNS agents can increase the risk of falls

- Kidney Function

- Ciprofloxacin and TMP-SMX have an increase risk of CNS effects, tendon rupture, and worsening renal function
- TMP-SMX has an increased risk of hyperkalemia and worsening renal function
- Dofetilide can cause QT prolongation and torsades de pointes
- Edoxaban should be avoided in CrCL <15 ml/min

Utilizing Beers Criteria

Therapeutic Category, Drugs	Rationale
Anticholinergics (eg: meclizine, diphenhydramine, hydroxyzine)	Increased risk of confusion, dry mouth, constipation Diphenhydramine appropriate for allergic reactions
Anti-infective (Nitrofurantoin)	Avoid if CrCl is <30 ml/min or for long term use: Inc. risk of pulmonary toxicity, hepatotoxicity, peripheral neuropathy
Alpha blockers (e.g. doxazosin)	Avoid use as antihypertensive due to orthostatic hypotension
Central acting alpha 2 agonist (example: clonidine, methyldopa)	Avoid as first line antihypertensive due to bradycardia and orthostatic hypotension
Digoxin	<p>Atrial Fibrillation: Avoid as first line; more effective medications available; may increase mortality</p> <p>Heart Failure: Possible benefit in HFrEF (conflicting evidence); however, other medications have stronger data. Consider low dose as side effects are dose dependent and greater benefits are not seen with higher doses</p> <p>Renal: Avoid doses >0.125 mg/day if CKD Stage 4 or 5</p>

Utilizing Beers Criteria

Therapeutic Category, Drugs	Rationale
Antidepressants	Some are highly anticholinergic: sedating, orthostatic hypotension
Antipsychotics	Increased risk of stroke, cognitive decline, mortality, (Avoid in behavioral complications of dementia or delirium unless other options failed)-use acceptable in schizophrenia and bipolar
Benzodiazepines Short-intermediate: alprazolam, lorazepam, temazepam Long: diazepam, clonazepam	Increased risk of cognitive impairment, falls, fractures Long acting may be appropriate for seizure disorder, alcohol withdrawal
Barbiturates (example, pentobarbital, secobarbital, phenobarbital)	Addiction potential, tolerance to sleep benefit, overdose
Eszopiclone, Zolpidem, Zaleplon	Avoid use: Increase in delirium, falls, fractures, ED visits, little improvement in sleep



Why is patient taking an antipsychotic?

- Psychosis, aggression, agitation (behavioural and psychological symptoms of dementia - BPSD) treated \geq 3 months (symptoms controlled, or no response to therapy).

- Primary insomnia treated for any duration or secondary insomnia where underlying comorbidities are managed

- Schizophrenia
- Schizo-affective disorder
- Bipolar disorder
- Acute delirium
- Tourette's syndrome
- Tic disorders
- Autism
- Less than 3 months duration of psychosis in dementia
- Intellectual disability
- Developmental delay
- Obsessive-compulsive disorder
- Alcoholism
- Cocaine abuse
- Parkinson's disease psychosis
- Adjunct for treatment of Major Depressive Disorder

Recommend Deprescribing

Strong Recommendation (from Systematic Review and GRADE approach)

Taper and stop AP (slowly in collaboration with patient and/or caregiver; e.g. 25%-50% dose reduction every 1-2 weeks)

Stop AP
Good practice recommendation

Monitor every 1-2 weeks for duration of tapering

Expected benefits:

- May improve alertness, gait, reduce falls, or extrapyramidal symptoms

Adverse drug withdrawal events (closer monitoring for those with more severe baseline symptoms):

- Psychosis, aggression, agitation, delusions, hallucinations

If BPSD relapses:

Consider:

- Non-drug approaches (e.g. music therapy, behavioural management strategies)

Restart AP drug:

- Restart AP at lowest dose possible if resurgence of BPSD with re-trial of deprescribing in 3 months
- At least 2 attempts to stop should be made

Alternate drugs:

- Consider change to risperidone, olanzapine, or aripiprazole

Continue AP

or consult psychiatrist if considering deprescribing

If insomnia relapses:

Consider

- Minimize use of substances that worsen insomnia (e.g. caffeine, alcohol)
- Non-drug behavioural approaches (see reverse)

Alternate drugs

- Other medications have been used to manage insomnia. Assessment of their safety and effectiveness is beyond the scope of this deprescribing algorithm. See AP deprescribing guideline for details.





Commonly Prescribed Antipsychotics

Antipsychotic	Form	Strength
Chlorpromazine	T IM, IV	25, 50, 100 mg 125 mg/mL
Haloperidol (Haldol®)	T L IR, IM, IV LA IM	0.5, 1, 2, 5, 10, 20 mg 2 mg/mL 5 mg/mL 50, 100 mg/mL
Loxapine (Xylac®, Loxapac®)	T L IM	2.5, 5, 10, 25, 50 mg 25 mg/L 25, 50 mg/mL
Aripiprazole (Abilify®)	T IM	2, 5, 10, 15, 20, 30 mg 300, 400 mg
Clozapine (Clozaril®)	T	25, 100 mg
Olanzapine (Zyprexa®)	T D IM	2.5, 5, 7.5, 10, 15, 20 mg 5, 10, 15, 20 mg 10mg per vial
Paliperidone (Invega®)	ER T PR IM	3, 6, 9 mg 50mg/0.5mL, 75mg/0.75mL, 100mg/1mL, 150mg/1.5mL
Quetiapine (Seroquel®)	IR T ER T	25, 100, 200, 300 mg 50, 150, 200, 300, 400 mg
Risperidone (Risperdal®)	T S D PR IM	0.25, 0.5, 1, 2, 3, 4 mg 1 mg/mL 0.5, 1, 2, 3, 4 mg 12.5, 25, 37.5, 50 mg

IM = intramuscular, IV = intravenous, L = liquid, S = suppository, SL = sublingual, T = tablet, D = disintegrating tablet, ER = extended release, IR = immediate release, LA = long-acting, PR = prolonged release

Antipsychotic side effects

- **APs associated with increased risk of:**
 - Metabolic disturbances, weight gain, dry mouth, dizziness
 - Somnolence, drowsiness, injury or falls, hip fractures, EPS, abnormal gait, urinary tract infections, cardiovascular adverse events, death
- **Risk factors:** higher dose, older age, Parkinsons', Lewy Body Dementia

Engaging patients and caregivers

Patients and caregivers should understand:

- The rationale for deprescribing (risk of side effects of continued AP use)
- Withdrawal symptoms, including BPSD symptom relapse, may occur
- They are part of the tapering plan, and can control tapering rate and duration

Tapering doses

- No evidence that one tapering approach is better than another
- Consider:
 - Reduce to 75%, 50%, 25% of original dose on a weekly or bi-weekly basis and then stop; or
 - Consider slower tapering and frequent monitoring in those with severe baseline BPSD
- Tapering may not be needed if low dose for insomnia only

Sleep management

Primary care:

1. Go to bed only when sleepy
2. Do not use your bed or bedroom for anything but sleep (or intimacy)
3. If you do not fall asleep within about 20-30 min at the beginning of the night or after an awakening, exit the bedroom
4. If you do not fall asleep within 20-30 min on returning to bed, repeat #3
5. Use your alarm to awaken at the same time every morning
6. Do not nap
7. Avoid caffeine after noon
8. Avoid exercise, nicotine, alcohol, and big meals within 2 hrs of bedtime

Institutional care:

1. Pull up curtains during the day to obtain bright light exposure
2. Keep alarm noises to a minimum
3. Increase daytime activity and discourage daytime sleeping
4. Reduce number of naps (no more than 30 mins and no naps after 2pm)
5. Offer warm decaf drink, warm milk at night
6. Restrict food, caffeine, smoking before bedtime
7. Have the resident toilet before going to bed
8. Encourage regular bedtime and rising times
9. Avoid waking at night to provide direct care
10. Offer backrub, gentle massage

BPSD management

- Consider interventions such as: relaxation, social contact, sensory (music or aroma-therapy), structured activities and behavioural therapy
- Address physical and other disease factors: e.g. pain, infection, constipation, depression
- Consider environment: e.g. light, noise
- Review medications that might be worsening symptoms



Why is patient taking a BZRA?

If unsure, find out if history of anxiety, past psychiatrist consult, whether may have been started in hospital for sleep, or for grief reaction.

- Insomnia on its own OR insomnia where underlying comorbidities managed
For those 65 years of age: taking BZRA regardless of duration (avoid as first line therapy in older people)
For those 18-64 years of age: taking BZRA > 4 weeks

- Other sleeping disorders (e.g. restless legs)
- Unmanaged anxiety, depression, physical or mental condition that may be causing or aggravating insomnia
- Benzodiazepine effective specifically for anxiety
- Alcohol withdrawal

Engage patients (discuss potential risks, benefits, withdrawal plan, symptoms and duration)

Recommend Deprescribing

Taper and then stop BZRA

(taper slowly in collaboration with patient, for example ~25% every two weeks, and if possible, 12.5% reductions near end and/or planned drug-free days)

- For those ≥ 65 years of age (strong recommendation from systematic review and GRADE approach)
- For those 18-64 years of age (weak recommendation from systematic review and GRADE approach)
- Offer behavioural sleeping advice; consider CBT if available (see reverse)

Continue BZRA

- Minimize use of drugs that worsen insomnia (e.g. caffeine, alcohol etc.)
- Treat underlying condition
- Consider consulting psychologist or psychiatrist or sleep specialist

Monitor every 1-2 weeks for duration of tapering

Expected benefits:

- May improve alertness, cognition, daytime sedation and reduce falls

Withdrawal symptoms:

- Insomnia, anxiety, irritability, sweating, gastrointestinal symptoms (all usually mild and last for days to a few weeks)

Use non-drug approaches to manage insomnia

Use behavioral approaches and/or CBT (see reverse)

If symptoms relapse:

Consider

- Maintaining current BZRA dose for 1-2 weeks, then continue to taper at slow rate

Alternate drugs

- Other medications have been used to manage insomnia. Assessment of their safety and effectiveness is beyond the scope of this algorithm. See BZRA deprescribing guideline for details.

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This algorithm and accompanying advice support recommendations in the NICE guidance on the use of zaleplon, zolpidem and zopiclone for the short-term management of insomnia, and medicines optimisation. **National Institute for Health and Care Excellence, February 2019**





BZRA Availability

BZRA	Strength
Alprazolam (Xanax®) ^T	0.25 mg, 0.5 mg, 1 mg, 2 mg
Bromazepam (Lectopam®) ^T	1.5 mg, 3 mg, 6 mg
Chlordiazepoxide ^C	5 mg, 10 mg, 25 mg
Clonazepam (Rivotril®) ^T	0.25 mg, 0.5 mg, 1 mg, 2 mg
Clorazepate (Tranxene®) ^C	3.75 mg, 7.5 mg, 15 mg
Diazepam (Valium®) ^T	2 mg, 5 mg, 10 mg
Flurazepam (Dalmane®) ^C	15 mg, 30 mg
Lorazepam (Ativan®) ^{T,S}	0.5 mg, 1 mg, 2 mg
Nitrazepam (Mogadon®) ^T	5 mg, 10 mg
Oxazepam (Serax®) ^T	10 mg, 15 mg, 30 mg
Temazepam (Restoril®) ^C	15 mg, 30 mg
Triazolam (Halcion®) ^T	0.125 mg, 0.25 mg
Zopiclone (Imovane®, Rhovane®) ^T	5 mg, 7.5 mg
Zolpidem (Sublinox®) ^S	5 mg, 10 mg

T = tablet, C = capsule, S = sublingual tablet

BZRA Side Effects

- BZRAs have been associated with:
 - physical dependence, falls, memory disorder, dementia, functional impairment, daytime sedation and motor vehicle accidents
- Risks increase in older persons

Engaging patients and caregivers

Patients should understand:

- The rationale for deprescribing (associated risks of continued BZRA use, reduced long-term efficacy)
- Withdrawal symptoms (insomnia, anxiety) may occur but are usually mild, transient and short-term (days to a few weeks)
- They are part of the tapering plan, and can control tapering rate and duration

Tapering doses

- No published evidence exists to suggest switching to long-acting BZRAs reduces incidence of withdrawal symptoms or is more effective than tapering shorter-acting BZRAs
- If dosage forms do not allow 25% reduction, consider 50% reduction initially using drug-free days during latter part of tapering, or switch to lorazepam or oxazepam for final taper steps

Behavioural Management

Primary care:

- Go to bed only when sleepy
- Do not use bed or bedroom for anything but sleep (or intimacy)
- If not asleep within about 20-30 min at the beginning of the night or after an awakening, exit the bedroom
- If not asleep within 20-30 min on returning to bed, repeat #3
- Use alarm to awaken at the same time every morning
- Do not nap
- Avoid caffeine after noon
- Avoid exercise, nicotine, alcohol, and big meals within 2 hrs of bedtime

Institutional care:

- Pull up curtains during the day to obtain bright light exposure
- Keep alarm noises to a minimum
- Increase daytime activity & discourage daytime sleeping
- Reduce number of naps (no more than 30 mins and no naps after 2 pm)
- Offer warm decaf drink, warm milk at night
- Restrict food, caffeine, smoking before bedtime
- Have the resident toilet before going to bed
- Encourage regular bedtime and rising times
- Avoid waking at night to provide direct care
- Offer backrub, gentle massage

Using CBT

What is cognitive behavioural therapy (CBT)?

- CBT includes 5-6 educational sessions about sleep/insomnia, stimulus control, sleep restriction, sleep hygiene, relaxation training and support

Does it work?

- CBT has been shown in trials to improve sleep outcomes with sustained long-term benefits

Who can provide it?

- Clinical psychologists usually deliver CBT, however, others can be trained or can provide aspects of CBT education; self-help programs are available

How can providers and patients find out about it?

- Some resources can be found here: <http://sleepwellns.ca/>

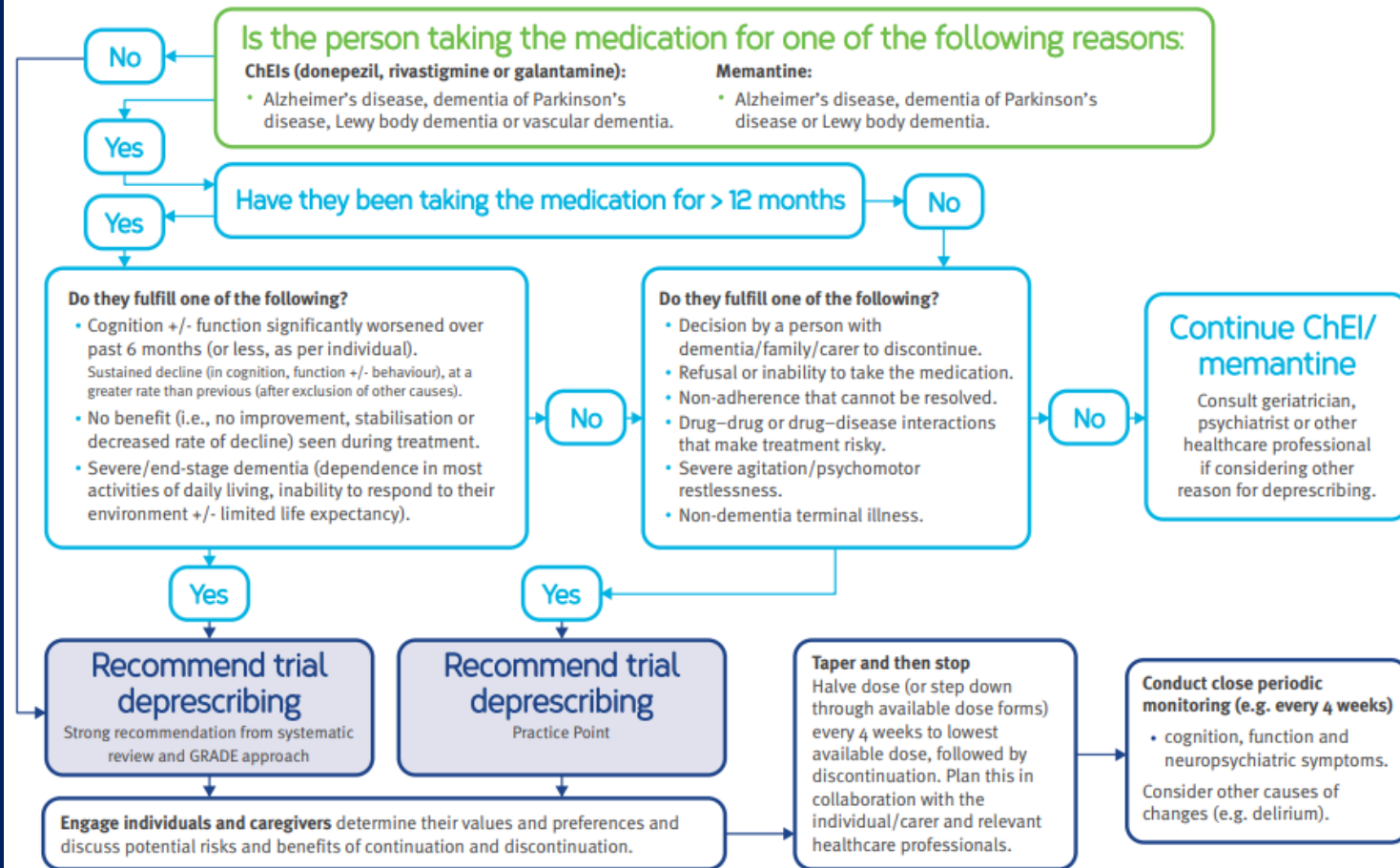
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Monitoring during tapering and after discontinuation

Timing of symptoms after dose reduction/ discontinuation	Types of symptoms	Action to be taken by family/nurses/ care staff	Possible cause*
Less than 1 week	Severe symptoms, including agitation, aggression, hallucinations or reduced consciousness	Restart previous dose immediately and contact responsible healthcare professional as soon as possible	Adverse drug withdrawal reaction
2 to 6 weeks	Worsening of cognition, behavioural or psychological symptoms or function	Contact responsible healthcare professional and consider restarting previous dose and/or make an appointment to see responsible healthcare professional at the next available time	Re-emergence of symptoms that were being treated by ChEI/ memantine
6 weeks to 3 months	Worsening of cognition, behavioural or psychological symptoms or function	Contact responsible healthcare professional at the next available time to make an appointment	Likely progression of condition or possible re-emergence of symptoms that were being treated by ChEI/memantine
> 3 months	Any	As per usual care	Progression of condition

- * Exclude other causes of change in condition (e.g. infection or dehydration) first.
- Discuss monitoring plan with the individual/family/carer and write it down for them (e.g. frequency and type of follow-up). Ensure they have a way to contact a clinician if needed.

Engaging individuals and family/carers

Determining suitability for deprescribing

- Discuss treatment goals – what do they value the most (cognition, quality of life, remaining independent)?
- Ask about experience with dementia symptoms when treatment started and over last 6 months.
- Ask about side effects.

Helping the individual and family/carers to make an informed decision

- Deprescribing is a trial – medication can be restarted if appropriate.
- There are uncertain benefits and harms to both continuing and discontinuing the medication.
- Tailor discussion about benefits and harms to the individual.
- Explore fears and concerns about deprescribing.
- Consider medication costs and local reimbursement/subsidisation criteria.
- If the recommendation to deprescribe is being made due to progression of dementia, remind family/carers that the person with dementia may continue to decline after deprescribing, and explain why.

Non-pharmacological management and ongoing care after deprescribing

See (<http://sydney.edu.au/medicine/cdpc/resources/dementia-guidelines.php>) for Australian guidelines on care of people with dementia, including behavioural and psychological symptoms.

ChEI and memantine availability (Australia)

Drug	Strength
Donepezil (Aricept [®] , Aridon [®] , Arazil [®])	Tablet – 5mg, 10mg
Galantamine (Galantyl [®] , Gamine XR [®] , Reminyl [®])	Controlled release capsule – 8mg, 16mg, 24mg
Rivastigmine (Exelon [®])	Capsule – 1.5mg, 3mg, 4.5mg, 6mg Patch – 4.6mg/24 hours, 9.5mg/24 hours, 13.3mg/24 hours
Memantine (Ebixa [®] , Memanxa [®])	Tablet – 10mg, 20mg

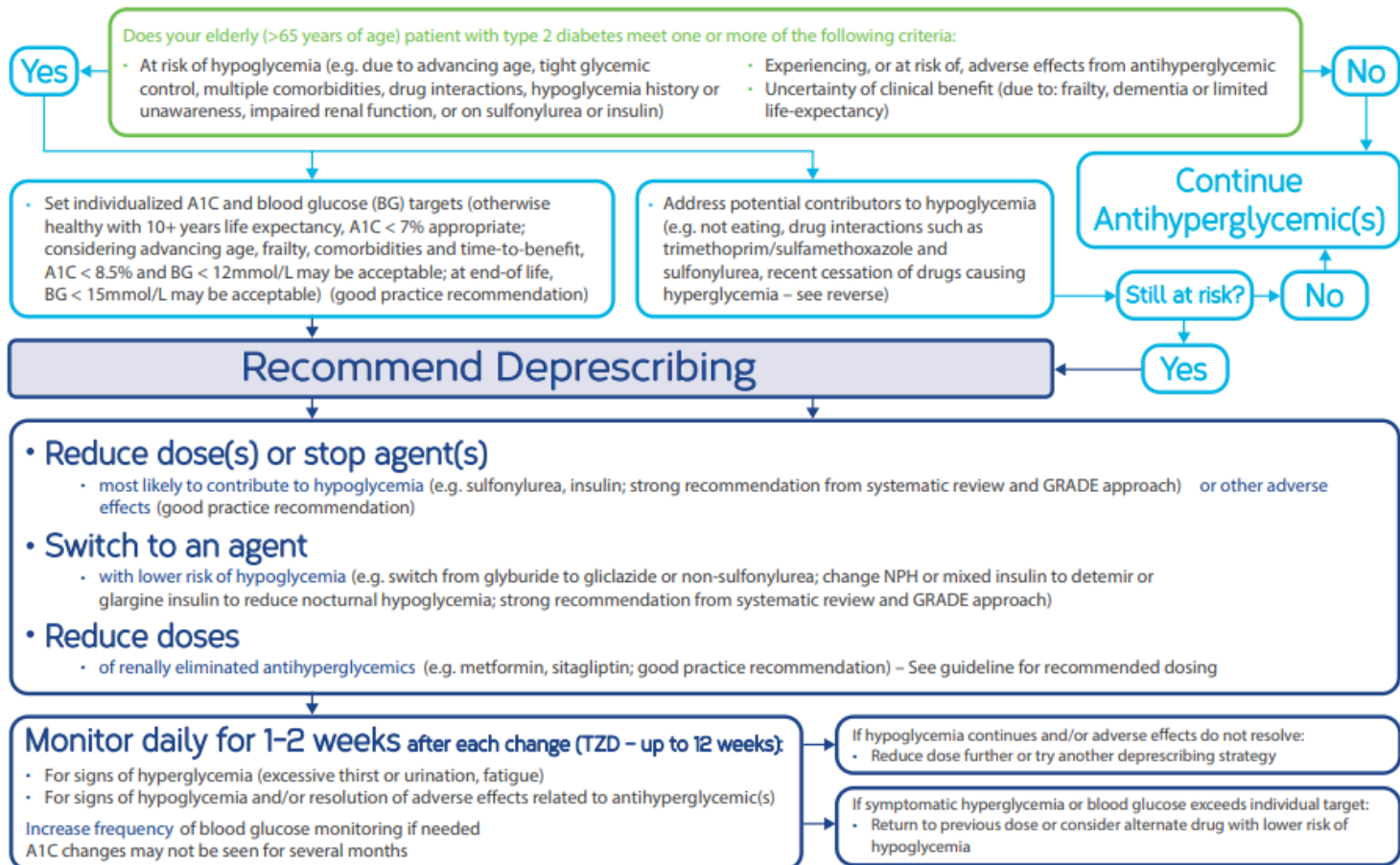
ChEI and memantine side effects

- Common: include gastrointestinal effects, dizziness, confusion, headache, insomnia, agitation, weight loss and falls.
- Rare (ChEI): may include urinary, cardiovascular (e.g. bradycardia), pulmonary and dermatological (e.g. Stevens-Johnson syndrome) complications, Pisa syndrome, seizures, gastrointestinal haemorrhage and rhabdomyolysis.
- Lack of evidence of potential harms in complex older adults.



Utilizing Beers Criteria

Therapeutic Category	Rationale
Estrogen +/- Progestin	Carcinogenic, lack of cardio or cognitive protection (Avoid oral and transdermal) Vaginal formulations can be used for GU symptoms
Testosterone	Avoid unless confirmed hypogonadism with symptoms: May increase risk for cardiac issues- CI in hx of prostate cancer
Insulin sliding scale	Increase hypoglycemia without improvement in hyperglycemia
Sulfonylureas	Hypoglycemia: Avoid glyburide, glimepiride, chlorpropamide
TZDs	Avoid in HF
Proton-pump inhibitors	Risk of <i>C. diff</i> and bone fractures. Avoid for >8 weeks unless high risk patient
H2 Blockers	Safe to use except in those with delirium





Antihyperglycemics and Hypoglycemia Risk

Drug	Causes hypoglycemia?
Alpha-glucosidase inhibitor	No
Dipeptidyl peptidase-4 (DPP-4) inhibitors	No
Glucagon-like peptide-1 (GLP-1) agonists	No
Insulin	Yes (highest risk with regular insulin and NPH insulin)
Meglitinides	Yes (low risk)
Metformin	No
Sodium-glucose linked transporter 2 (SGLT2) inhibitors	No
Sulfonylureas	Yes (highest risk with glyburide and lower risk with glimepiride)
Thiazolidinediones (TZDs)	No

Drugs affecting glycemic control

- Drugs reported to cause hyperglycemia (when these drugs stopped, can result in hypoglycemia from antihyperglycemic drugs) e.g. quinolones (especially gatifloxacin), beta-blockers (except carvedilol), thiazides, atypical antipsychotics (especially olanzapine and clozapine), corticosteroids, calcineurin inhibitors (such as cyclosporine, sirolimus, tacrolimus), protease inhibitors
- Drugs that interact with antihyperglycemics (e.g. trimethoprim/sulfamethoxazole with sulfonylureas)
- Drugs reported to cause hypoglycemia (e.g. alcohol, MAOIs, salicylates, quinolones, quinine, beta-blockers, ACEIs, pentamidine)

Engaging patients and caregivers

- Some older adults prefer less intensive therapy, especially if burdensome or increases risk of hypoglycemia
- Patients and/or caregivers may be more likely to engage in discussion about changing targets or considering deprescribing if they understand the rationale:
 - Risks of hypoglycemia and other side effects
 - Risks of tight glucose control (no benefit and possible harm with A1C < 6%)
 - Time to benefit of tight glucose control
 - Reduced certainty about benefit of treatment with frailty, dementia or at end-of-life
- Goals of care: avoid hyperglycemic symptoms (thirst, dehydration, frequency, falls, fatigue, renal insufficiency) and prevent complications (5-10 years of treatment needed)
- Many countries agree on less aggressive treatment of diabetes in older persons
- Reviewing options for deprescribing, as well as the planned process for monitoring and thresholds for returning to previous doses will help engage patients and caregivers

Hypoglycemia information for patients and caregivers

- Older frail adults are at higher risk of hypoglycemia
- There is a greater risk of hypoglycemia with tight control
- Symptoms of hypoglycemia include: sweating, tachycardia, tremor BUT older patients may not typically have these
- Cognitive or physical impairments may limit older patient's ability to respond to hypoglycemia symptoms
- Some drugs can mask the symptoms of hypoglycemia (e.g. beta blockers)
- Harms of hypoglycemia may be severe and include: impaired cognitive and physical function, falls and fractures, seizures, emergency room visits and hospitalizations

Tapering advice

- Set blood glucose & A1C targets, plus thresholds for returning to previous dose, restarting a drug or maintaining a dose
- Develop tapering plan with patient/caregiver (no evidence for one best tapering approach; can stop oral antihyperglycemics, switch drugs, or lower doses gradually e.g. changes every 1-4 weeks, to the minimum dose available prior to discontinuation, or simply deplete patient's supply)
- Doses may be increased or medication restarted any time if blood glucose persists above individual target (12-15 mmol/L) or symptomatic hyperglycemia returns

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Utilizing Beers Criteria

Therapeutic Category, Drugs	Rationale
Nonselective NSAIDs (example, aspirin >325 mg/day, ibuprofen, meloxicam, naproxen)	Increased risk of GI bleeding, peptic ulcer; avoid chronic use unless patient cannot tolerate alternatives and patient can take a GI protective agents (PPI, misoprostol)
Muscle relaxants: (example carisoprodol, methocarbamol)	Poorly tolerated (anticholinergic effects), increase in fractures

Medication Appropriateness Index: Questions to Consider

- Is there an indication for the drug?
- Is the medication effective for the condition?
- Is the dosage correct?
- Are the directions correct?
- Are the directions practical?
- Are there drug-drug interactions?
- Are there drug-disease interactions?
- Is there unnecessary duplication?
- Is the duration of therapy acceptable?
- Is this drug the least expensive alternative?

Resources

- Primary literature
- Guidelines
- Drug information resources
- Stay current

In summary

- Prioritize appropriately
- Streamline medications
- Consider cost
- Adjust doses appropriately
- Make monitoring parameters clear to patient
- Monitor for ADEs
- Utilize adherence tools
- Assess health literacy and numeracy
- Understand cultural differences

Thank you for completing the following:

You may open the survey in your web browser by clicking the link below:

<https://redcap.nova.edu/redcap/surveys/?s=CHETXK48Y4>

If the link above does not work, try scanning the QR code:



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