

# TIMER<sup>®</sup>: Tool to Improve Medications in the Elderly via Review

Confirm all current medications, including Prescription, Herbal remedies, Vitamins and OTCs, and how patients are taking them.

## A. COST AND COVERAGE (*generic and therapeutic substitution*)

Determine if patient has Rx insurance and consider formulary considerations. Upon review, determine if a lower-cost product would be appropriate.

## B. ADHERENCE (*Determine adherence by asking screening questions and reviewing dispensing records*)

### 1. SCREENING Select from: Never; Rarely; Sometimes; Often; Very often

1. "Everyone forgets to take their medicines. How often does this happen to you?"
2. "Everyone says that they miss out a dose of their medication or adjust it to suit their own needs. "How often do you do this?" "Why?"
3. "Has your physician told you to change how you take any of your medications?"
4. "Has your physician told you to stop taking any of your medications?"

### 2. RECOMMENDATIONS

1. If forgetful, consider adherence aids (medication boxes).
2. If intentional nonadherence, or noncompliance, determine cause and promote patient education.
3. Confirm whether the patient has stopped taking any medications without the knowledge of the physician.

References: Horne R, Weinman J. J Psychosom Res. 1999 Dec; 47(6):555-67. Morisky EE, Green LW, Levine DM. Med. Care 1986;24:67-74.

## C. SAFETY (*Determine if there are any adverse effects or potentially inappropriate medications*)

### 1. ADVERSE DRUG EVENTS

"Describe what side effects, unwanted reactions, or other problems you may have experienced from medications taken in the last six months."

### 2. NEW OR PROBLEMATIC SCREENING FOR SYMPTOMOLOGY

Determine if any symptom is possibly attributable to allergy, side effect or adverse drug events:

- a. "Tell me about any symptoms that you may have been experiencing in the past few months."
- b. "In the past few months have you experienced any of the following?"

Choose from 10 common symptoms due to adverse effects:

- Headache/pain
- Hives/rash
- Problems with sleep
- Dizziness/balance problems
- Incontinence/urinating problems
- Muscle aches
- Fatigue
- Change in mood
- Stomach or gastrointestinal problems
- Sexual problems

If symptoms are present, evaluate if any may be related to medications the patient is taking.

Reference: Weingart SN, et al. Arch Intern Med. 2005 Jan 24; 165(2):234-40.

- ### 3. INDICATIONS:
- (A) DOES EVERY MEDICATION HAVE AN INDICATION?
  - (B) IS EVERY INDICATION BEING TREATED?

### 4. SCREENING FOR POTENTIALLY INAPPROPRIATE MEDICATION OR COMBINATIONS DRUG INTERACTION

Review the patient's medications for potential drug interactions, including these top drug interactions based on prevalence or risk of adverse event .

Object drug	Precipitant Drug	Prevalence <sup>1</sup> (1-10 scale) 1 is most prevalent
Warfarin	NSAIDs	1
Warfarin	Sulfa drugs	2
Warfarin	Macrolides	3
Warfarin	Quinolones	4
Warfarin	Phenytoin	5
ACE inhibitors	Potassium supplements	6
ACE inhibitors	Spironolactone	7
Digoxin	Amiodarone	8
Digoxin	Verapamil	9
Theophylline	Quinolones	10

Reference: <sup>1</sup>M3 Project (Multidisciplinary Medication Management Project), Leshner, BA, "Clinically Important Drug Reactions", Prescriber's Letter 2004 Jun, 11: Detail-Document #: 200601

Object drug	Precipitant Drug	Risk of Adverse Event <sup>2</sup> (1-10 scale) 10 is greatest risk
Carbamazepine	Propoxyphene	8.4
Thiopurines	Allopurinol	8.0
Warfarin	Sulfinpyrazone	7.2
Benzodiazepines	Azole antifungal agents	7.0
Pimozide	Macrolide antibiotics	6.0
Nitrates	Sildenafil	6.0
Warfarin	Fibric acids	6.0
Warfarin	Cimetidine	6.0
Ergot alkaloids	Macrolide antibiotics	5.8
Pimozide	Azole antifungal agents	5.6
Anticoagulants	Salicylates	4.8
Anticoagulants	Thyroid hormones	5.6

Reference: <sup>2</sup>Malone DC, et al. J Am Pharm Assoc (Wash DC). 2004 Mar-Apr; 44(2):142-51.

### 5. DRUGS TO BE AVOIDED IN THE ELDERLY

Review the list "Drugs to be Avoided in the Elderly"

### 6. DUPLICATION SCREENING

Review the patient's medications, including OTCs to confirm that there is no inappropriate therapeutic duplication, paying particular attention to multiple narcotics, multiple NSAIDs, and combination products containing analgesics. Ensure that duplicate usage is consistent with practice.

Reference: PCM and PSC data

## RECOMMENDATION

If any safety indicator is present, (especially important if it is a change within the last 6 months) action is required.

## Potential Course of Action

1. Discontinue drug and recommend alternate drug therapy to physician.
2. Educate patient about what to watch for and what action to take.

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## D. ATTAINING THERAPEUTIC GOALS

### 1. CARDIOVASCULAR RISK MANAGEMENT

#### MAJOR RISK FACTORS FOR CORONARY HEART DISEASE (CHD)(Exclusive of LDL Cholesterol) THAT MODIFY LDL GOALS

**PREDETERMINED:** Increasing age (men >45 years; women >55 years), Male sex (gender), Family history of premature CHD (CHD in male first degree relative <55 years; CHD in female first degree relative <65 years),

**MODIFIABLE:** Tobacco smoke/cigarette smoking, high blood cholesterol, hypertension (BP >140/90 mmHg or on antihypertensive medication), physical inactivity, obesity, diabetes mellitus, Low HDL cholesterol (<40 mg/dL)\*,

\* HDL cholesterol >60 mg/dL counts as a “negative” risk factor; its presence removes one risk factor from the total count.

#### A. EVALUATE TREATMENT GOAL BY RISK CATEGORY. Obtain the following medical history and test results, reviewing accepted clinical values and cardiovascular risk.

Note: The Framingham risk equation, attempts to determine percent risk of a heart attack or stroke over 10 years. The Framingham Risk Calculator is available through NCEP at: <http://hin.nhlbi.nih.gov/atp/iii/calculator.asp?usertype=prof>

CHD Risk Equivalent:: Clinical CHD, Symptomatic carotid artery disease, Peripheral arterial disease, Abdominal aortic aneurysm					
Diagnosis	Cardiovascular Risk Category	Treatment Goal			
		Lipids: LDL	Lipids: Non-HDL (Total – HDL)	Blood Pressure	HbA1c
Diabetic	Diabetes is considered a CHD risk equivalent	<100 mg/dl		<130/80 mmHg	<7.0 %
Non-Diabetic	Coronary Heart Disease (CHD) and CHD Risk Equivalent (10-year risk for CHD >20%)	<100 mg/dl	<130 mg/dl	<140/90 mmHg	
	Multiple (2+) Risk Factors (10-year risk ≤20%)	<130 mg/dl	<160 mg/dl		
	0-1 Risk Factor (10-year Risk Factor <10%)	<160 mg/dl	<190 mg/dl		

Reference: American Diabetes Association, ATPIII Guideline, National Cholesterol Education Program (NCEP), INC-7, American Heart Association.

#### B. RECOMMENDATION

#### Potential Course of Action

If the patient has not achieved the recommended goal, action is required.

1. Consider non-adherence to current therapy and/or under-treatment.

2. Consider need for additional or alternative therapy, and recommend therapy to physician.

### 2. COMPLICATION MANAGEMENT (review potential complications)

A. Determine the presence or absence of syndromes by asking, “Describe how you have been feeling lately?”

B. Review common geriatric syndromes and rule out drug-induced causality.

Common Syndromes	Drug -Induced Causes	Potential Course of Action
<b>Pain*</b> 0-10 Numeric Pain Intensity Scale	Mild 1-3/10	1. Clarify the type of pain the patient is experiencing. 2. Recommend acetaminophen. 3. Nonopioid analgesic, fixed dose***
	Moderate 4-6/10	Opioid (consider adjunct analgesic)
	Severe 7-10/10	Refer to guideline for 24hr and breakthrough pain management ***
<b>Constipation</b> Determine frequency of combinations with drugs producing anti-cholinergic effects.	Opioids, Acetaminophen-NSAID combinations*** Anticholinergics Calcium supplementation**	1. Reduce drug-induced causes 2. Recommend bowel regimen utilizing osmotic laxatives and/or stool softeners, lower dose bulk-forming agents with adequate liquid intake. **
<b>Muscular soreness and stiffness</b>	Statins.	1. Recommend acetaminophen for musculoskeletal pain. 2. Avoid multiple NSAIDs.
<b>Osteoporosis</b>	Corticosteroids.	1. Recommend measure bone density scan and treat accordingly (use supplements to prevent bone loss and rebuild bone). >age 50 need 1200 mg Calcium daily and daily vitamin D at age 51-70 400 IU and >age 70 600 IU. 2. Refer patient to physician.
<b>Falls</b>	Analgesics, antipsychotics, benzodiazepines, anticonvulsants, antiparkinson agents, antidepressants, cardiovascular agents (including diuretics, anti-arrhythmics***), oral hypoglycemics**	1. Identify individuals likely to fall, based upon review of inappropriate medication or combination screening. 2. Discontinue or modify drug regimen. 3. Utilize assistive devices, fall prevention programs, exercise to improve strength.

#### C. RECOMMENDATION

#### Potential Course of Action

If drug-induced causes, action must be taken.

1. Discontinue drug and recommend alternate drug therapy to physician.

2. Educate patient about what to watch for and what action to take.

**Reference:** Core competencies for the care of older patients: recommendations of the American Geriatrics Society. The Education Committee Writing Group of the American Geriatrics Society. Acad Med. 2000 Mar;75(3):252-5. \*Koda-Kimble, Mary Anne, Yee Young, Lloyd, Kradjan, Wayne A., Guglielmo, B. Joseph, Alldredge, Brian K., Corelli, Robin L., 2005, *Applied Therapeutics: The Clinical Use of Drugs*, 8th Edition, Lippincott Williams & Wilkins, Philadelphia. \*\* Delafuente JC, Stewart RB, eds. Therapeutics in the elderly. 3rd ed. Cincinnati:Harvey Whitney Books Co., 2001. \*\*\* J Am Geriatr Soc. 1998 May;46(5):635-51. The management of chronic pain in older persons: AGS Panel on Chronic Pain in Older Persons. American Geriatrics Society.

**Drugs to be Avoided in the Elderly**  
**2002 Criteria for Potentially Inappropriate Medication Use in Older Adults: Independent of Diagnoses or Conditions**

<b>Drug</b>	<b>Concern</b>
Gastrointestinal antispasmodic drugs: dicyclomine (Bentyl), hyoscyamine (Levsin and Levsinex), propantheline (Pro-Banthine), belladonna alkaloids (Donnatal and others), and clidinium-chlordiazepoxide (Librax)	GI antispasmodic drugs are highly anticholinergic and have uncertain effectiveness. These drugs should be avoided (especially for long-term use).
Anticholinergics and antihistamines: chlorpheniramine (Chlor-Trimeton), diphenhydramine (Benadryl), hydroxyzine (Vistaril and Atarax), cyproheptadine (Periactin), promethazine (Phenergan), tripeleminamine, dexchlorpheniramine (Polaramine)	All nonprescription and many prescription antihistamines may have potent anticholinergic properties. Nonanticholinergic antihistamines are preferred in elderly patients when treating allergic reactions.
Diphenhydramine (Benadryl)	May cause confusion and sedation. Should not be used as a hypnotic, and when used to treat emergency allergic reactions, it should be used in the smallest possible dose.
Ergot mesyloids (Hydergine) and cyclandelate (Cyclospasmol)	Have not been shown to be effective in the doses studied.
Ferrous sulfate >325 mg/d	Doses >325 mg/d do not dramatically increase the amount absorbed but greatly increase the incidence of constipation.
All barbiturates (except phenobarbital) except when used to control seizures	Are highly addictive and cause more adverse effects than most sedative or hypnotic drugs in elderly patients.
Meperidine (Demerol)	Not an effective oral analgesic in doses commonly used. May cause confusion and has many disadvantages to other narcotic drugs.
Ticlopidine (Ticlid)	Has been shown to be no better than aspirin in preventing clotting and may be considerably more toxic. Safer, more effective alternatives exist.
Ketorolac (Toradol)	Immediate and long-term use should be avoided in older persons, since a significant number have asymptomatic GI pathologic conditions.
Amphetamines and anorexic agents	These drugs have potential for causing dependence, hypertension, angina, and myocardial infarction.
Long-term use of full-dosage, longer half-life, non-COX-selective NSAIDs: naproxen (Naprosyn, Avaprox, and Aleve), oxaprozin (Daypro), and piroxicam (Feldene)	Have the potential to produce GI bleeding, renal failure, high blood pressure, and heart failure.
Daily fluoxetine (Prozac)	Long half-life of drug and risk of producing excessive CNS stimulation, sleep disturbances, and increasing agitation. Safer alternatives exist.
Long-term use of stimulant laxatives: bisacodyl (Dulcolax), cascara sagrada, and Neoloid except in the presence of opiate analgesic use	May exacerbate bowel dysfunction.
Amiodarone (Cordarone)	Associated with QT interval problems and risk of provoking torsades de pointes. Lack of efficacy in older adults.
Orphenadrine (Norflex)	Causes more sedation and anticholinergic adverse effects than safer alternatives.
Guanethidine (Ismelin)	May cause orthostatic hypotension. Safer alternatives exist.
Guanadrel (Hylorel)	May cause orthostatic hypotension.
Cyclandelate (Cyclospasmol)	Lack of efficacy.
Isoxsuprine (Vasodilan)	Lack of efficacy.
Nitrofurantoin (Macrochantin)	Potential for renal impairment. Safer alternatives available.
Doxazosin (Cardura)	Potential for hypotension, dry mouth, and urinary problems.
Methyltestosterone (Android, Virilon, and Testrad)	Potential for prostatic hypertrophy and cardiac problems.
Thioridazine (Mellaril)	Greater potential for CNS and extrapyramidal adverse effects.
Mesoridazine (Serentil)	CNS and extrapyramidal adverse effects
Short acting nifedipine (Procardia and Adalat)	Potential for hypotension and constipation.
Clonidine (Catapres)	Potential for orthostatic hypotension and CNS adverse effects.
Mineral oil	Potential for aspiration and adverse effects. Safer alternatives available.
Cimetidine (Tagamet)	CNS adverse effects including confusion.
Ethacrynic acid (Edecrin)	Potential for hypertension and fluid imbalances. Safer alternatives available.

Drug	Concern
Desiccated thyroid	Concerns about cardiac effects. Safer alternatives available.
Amphetamines (excluding methylphenidate hydrochloride and anorexics)	CNS stimulant adverse effects.
Estrogens only (oral)	Evidence of the carcinogenic (breast and endometrial cancer) potential of these agents and lack of cardioprotective effect in older women.
Propoxyphene (Darvon) and combination products (Darvon with ASA, Darvon-N, and Darvocet-N)	Offers few analgesic advantages over acetaminophen, yet has the adverse effects of other narcotic drugs.
Indomethacin (Indocin and Indocin SR)	Of all available nonsteroidal anti-inflammatory drugs, this drug produces the most CNS adverse effects.
Pentazocine (Talwin)	Narcotic analgesic that causes more CNS adverse effects, including confusion and hallucinations, more commonly than other narcotic drugs. Additionally, it is a mixed agonist and antagonist.
Trimethobenzamide (Tigan)	One of the least effective antiemetic drugs, yet it can cause extrapyramidal adverse effects.
Muscle relaxants and antispasmodics: methocarbamol (Robaxin), carisoprodol (Soma), chlorzoxazone (Paraflex), metaxalone (Skelaxin), cyclobenzaprine (Flexeril), and oxybutynin (Ditropan). Do not consider the extended-release Ditropan XL.	Most muscle relaxants and antispasmodic drugs are poorly tolerated by elderly patients, since these cause anticholinergic adverse effects, sedation, and weakness. Additionally, their effectiveness at doses tolerated by elderly patients is questionable.
Flurazepam (Dalmane)	This benzodiazepine hypnotic has an extremely long half-life in elderly patients (often days), producing prolonged sedation and increasing the incidence of falls and fracture. Medium- or short-acting benzodiazepines are preferable.
Amitriptyline (Elavil), chlordiazepoxide-amitriptyline (Limbitrol), and perphenazine-amitriptyline (Triavil)	Because of its strong anticholinergic and sedation properties, amitriptyline is rarely the antidepressant of choice for elderly patients.
Doxepin (Sinequan)	Because of its strong anticholinergic and sedating properties, doxepin is rarely the antidepressant of choice for elderly patients.
Meprobamate (Miltown and Equanil)	This is a highly addictive and sedating anxiolytic. Those using meprobamate for prolonged periods may become addicted and may need to be withdrawn slowly.
Doses of short-acting benzodiazepines: doses greater than lorazepam (Ativan), 3 mg; oxazepam (Serax), 60 mg; alprazolam (Xanax), 2 mg; temazepam (Restoril), 15 mg; and triazolam (Halcion), 0.25 mg	Because of increased sensitivity to benzodiazepines in elderly patients, smaller doses may be effective as well as safer. Total daily doses should rarely exceed the suggested maximums.
Long-acting benzodiazepines: chlordiazepoxide (Librium), chlordiazepoxide-amitriptyline (Limbitrol), clidinium-chlordiazepoxide (Librax), diazepam (Valium), quazepam (Doral), halazepam (Paxipam), and chlorazepate (Tranxene)	These drugs have a long half-life in elderly patients (often several days), producing prolonged sedation and increasing the risk of falls and fractures. Short- and intermediate-acting benzodiazepines are preferred if a benzodiazepine is required.
Disopyramide (Norpace and Norpace CR)	Of all antiarrhythmic drugs, this is the most potent negative inotrope and therefore may induce heart failure in elderly patients. It is also strongly anticholinergic. Other antiarrhythmic drugs should be used.
Digoxin (Lanoxin) (should not exceed >0.125 mg/d except when treating atrial arrhythmias)	Decreased renal clearance may lead to increased risk of toxic effects.
Short-acting dipyridamole (Persantine). Do not consider the long-acting dipyridamole (which has better properties than the short-acting in older adults) except with patients with artificial heart valves	May cause orthostatic hypotension.
Methyldopa (Aldomet) and methyldopa-hydrochlorothiazide (Aldoril)	May cause bradycardia and exacerbate depression in elderly patient.
Reserpine at doses >0.25 mg	May induce depression, impotence, sedation, and orthostatic hypotension.
Chlorpropamide (Diabinese)	It has a prolonged half-life in elderly patients and could cause prolonged hypoglycemia. Additionally, it is the only oral hypoglycemic agent that causes SIADH.

Reference: Fick DM, Cooper JW, Wade WE, Waller JL, Maclean JR, Beers MH. Updating the Beers Criteria for Potentially Inappropriate Medication Use in Older Adults: Results of a US Consensus Panel of Experts. *Arch Intern Med.* 2003;163:2716-2724.