



# CATCH-ON

A HRSA GERIATRIC WORKFORCE ENHANCEMENT PROGRAM  
[www.catch-on.org](http://www.catch-on.org)

## Medication References

1. American Geriatrics Society 2019 Updated AGS Beers Criteria® for Potentially Inappropriate Medication Use in Older Adults. (2019). *Journal of the American Geriatrics Society*, 67(4), 674–694.
2. Anthierens, S., Tansens, A., Petrovic, M., Christiaens, T. (2010). Qualitative insights into general practitioners views on polypharmacy. *BMC Fam Prac*, 11, 65.
3. Budnitz, D.S., Lovegrove, M.C., Shehab, N., et al. (2011). Emergency hospitalizations for adverse drug events in older Americans. *N Engl J Med*, 365(21), 2002-12.
4. Chrischilles, E.A., Carter, B., Lund, B., et al. (2004). Evaluation of the Iowa Medicaid pharmaceutical case management program. *J Am Pharm Assoc*, 3, 337-49.
5. Classen, D. (2003). Medication safety: Moving from illusion to reality. *JAMA*, 289(9), 1154-1156.
6. Cowper, P.A., Weinberger, M., Hanlon, J.T., et al. (1998). The cost effectiveness of a clinical pharmacist intervention among elderly outpatients. *Pharmacotherapy*, 18,(2):327-32.
7. De Vries, E.N., Ramratten, M.A., Smorenburg, S.M., et al. (2008). The incidence and nature of in-hospital adverse events: a systematic review. *Qual Saf Health Care*, 17(3), 216-23.
8. Gnjidic, D., Johnell, K. (2013). Clinical implications from drug–drug and drug–disease interactions in older people. *Clin Exp Pharmacol*, 40, 320–5.
9. Gurwitz, J.H., Field, T.S., Harrold, L.R., et al. (2003). Incidence and preventability of adverse drug events among older persons in the ambulatory setting. *JAMA*, 289, 1107-16.
10. Hanlon, J.T., Weinberger, M., Samsa, G.P., et al. (1996). A randomized, controlled trial of a clinical pharmacist intervention to improve inappropriate prescribing in elderly outpatients with polypharmacy. *Am J Med*, 100(4), 428-37.
11. Hilmer, S.N., Gnjidic, D. (2009). The effects of polypharmacy in older adults. *Clin Pharmacol Ther*, 85(1), 86–8.
12. Hilmer, S.N., Mager, D.E., Simonsick, E.M., et al. (2007). A drug burden index to define the functional burden of medications in older people. *Arch Intern Med*, 167, 781–7.
13. Isetts, B.J., Schondelmeyer, S.W., Artz, M.B., et al. (2008). Clinical and economic outcomes of medication therapy management services: the Minnesota experience. *J Am Pharm Assoc*, 48(2), 203-11.
14. Jansen, J., Naganathan, V., Carter, SM., et al. (2016). Too much medicine in older people? Deprescribing through shared decision making. *BMJ*, 353, i2893.
15. Jou, J., Johnson, P.J. (2016). Nondisclosure of complementary and alternative medicine use to primary care physicians: Findings from the 2012 National Health Interview Survey. *JAMA Intern Med*, 176(4), 545–546.
16. Juurlink, D.N., Mamdani, M., Kopp, A., et al. (2003). Drug-drug interactions among elderly patients hospitalized for drug toxicity. *JAMA*, 289:1652–8.,



# CATCH-ON

A HRSA GERIATRIC WORKFORCE ENHANCEMENT PROGRAM  
[www.catch-on.org](http://www.catch-on.org)

17. Kalisch, L.M., Caughey, G.E., Barratt, J.D., et al. (2012). Prevalence of preventable medication-related hospitalizations in Australia: an opportunity to reduce harm. *Int J Qual Health Care*, 24(3), 239-49.
18. Krska, J., Cromarty, J.A., Arris, F., et al. (2001). Pharmacist-led medication review in patients over 65: a randomized, controlled trial in primary care. *Age Ageing*, 30(3), 205-11.
19. Lenaghan, E., Holland, R., Brooks, A. (2007). Home-based medication review in a high risk elderly population in primary care—the POLYMED randomised controlled trial. *Age Ageing*, 36(3), 292-7.
20. Liu, G.G., Christensen, D.B. (2002). The continuing challenge of inappropriate prescribing in the elderly: an update of the evidence. *J Am Pharm Assoc*, 42(6), 847-57.
21. Masnoon, N., Shakib, S., Kalisch-Ellett, L., et al. (2017). What is polypharmacy? A systematic review of definitions. *BMC Geriatr*, 17(1), 230.
22. McLean, A.J., LeCouteur, D.G. (2004). Aging biology and geriatric clinical pharmacology. *Pharmacol Rev*, 56(2), 163-84.
23. Medication Therapy Management (MTM) Services | American Pharmacists Association. Retrieved April 6, 2020, from <https://www.pharmacist.com/medication-therapy-management-services>
24. Nahin, R., Barnes, P.M., Stussman, B.J., et al. (2009). Costs of complementary and alternative medicine (CAM) and frequency of visits to CAM practitioners: United States, 2007. *Natl Health Stat Report*. 30(18), 1-14.
25. O'Mahony, D., O'Sullivan, D. Byrne, S., et al. (2015). STOPP/START criteria for potentially inappropriate prescribing in older people. *Age and Ageing*, 44(2), 213-218.
26. Qato, D.M., Wilder, J., Schumm, L.P., et al. (2016). Changes in prescription and over-the-counter medication and dietary supplement use among older adults in the United States, 2005 vs 2011. *JAMA Intern Med*, 176(4), 473-482.
27. Reeve, E., Wolff, J.L., Skehan, M., et al. (2018). Assessment of attitudes toward deprescribing in older medicare beneficiaries in the United States. *JAMA Intern Med*, 178(12), 1673-80.
28. Rochon, P.A., Gurwitz, J.H. (1997). Optimising drug treatment for elderly people: the prescribing cascade. *BMJ*, 315(7115), 1096-9.
29. Roughead, E.E., Anderson, B., Gilbert, A.L. (2007). Potentially inappropriate prescribing among Australian veterans and war widows/widowers. *Intern Med J*, 37(6), 402-5.
30. Roughead, E.E., Barratt, J.D., Gilbert, A.L. (2004). Medication-related problems commonly occurring in an Australian community setting. *Pharmacoepidemiol Drug Saf*, 13(2), 83-7.
31. Schmader, K.E., Hanlon, J.T., Pieper, C.F., et al. (2004). Effects of geriatric evaluation and management on adverse drug reactions and suboptimal prescribing in the frail elderly. *Am J Med*, 116(6), 394-401.



# CATCH-ON

A HRSA GERIATRIC WORKFORCE ENHANCEMENT PROGRAM  
[www.catch-on.org](http://www.catch-on.org)

32. Shehab, N., Lovegrove, M.C., Geller, A.I., et al. (2016). US emergency department visits for outpatient adverse drug events, 2013-2014. *JAMA*, 316(20), 2115-2125.
33. Smith, W. (2013). Adverse drug reactions-allergy?, side effect?, intolerance? *Aust Fam Physician*, 42(1-2), 12.6.
34. Scott, I.A., Hilmer, S.N., Reeve, E., et al. (2015). Reducing inappropriate polypharmacy: : the process of deprescribing. *JAMA Intern Med*, 175(5), 827-34.
35. Steinman, M.A., Miao, Y., Boscardin, W.J., et al. (2014). Prescribing quality in older veterans: a multifocal approach. *J Gen Intern Med*, 29(10), 1379-88.
36. Weber, V., White, A., McIlvried, R. (2008). An electronic medical record (EMR)-based intervention to reduce polypharmacy and falls in an ambulatory rural elderly population. *J Gen Intern Med*, 23(4), 399-404.
37. Westburg, S.M., Yarbrough, A., Weinhandl, E.D., et al. (2018). Drug therapy severity following hospitalization and association with 30-day clinical outcomes. *Ann Pharmacother*, 52(12), 1195-1203.
38. Williams, A., Manias, E., Walker, R. (2008). Interventions to improve medication adherence in people with multiple chronic conditions: a systematic review. *J Adv Nurs*, 63(2), 132-143.
39. Wimmer, B., Dent, E., Bell, J.S., et al. (2014). Medication regimen complexity and unplanned hospital readmissions in older people. *Ann Pharmacother*, 48(9), 1120-28.
40. Van der Cammen, T.J., Rajkumar, C., Onder, G., et al (2014). Drug cessation in complex older adults: time for action. *Age Ageing*, 43(1), 20-5.
41. Zhang, M., Holman, C.D., Preen, D.B., et al. (2007). Repeat adverse drug reactions causing hospitalization in older Australians: a population-based longitudinal study. *Br J Clin Pharmacol*, 63(2), 163-70.



# CATCH-ON

A HRSA GERIATRIC WORKFORCE ENHANCEMENT PROGRAM  
[www.catch-on.org](http://www.catch-on.org)

## High Risk Medication Classes and Medication Examples\*\*\*

High Risk Medication Class	Commonly Used Medication Examples***	
Alpha 1 blockers	doxazosin, prazosin, terazosin	
Antiarrhythmic drugs	amiodarone, dronedarone	
Antiparkinson agents	benztropine, trihexyphenidyl	
Antipsychotic agents (atypical and conventional)	chlorpromazine clozapine haloperidol loxapine	olanzapine perphenazine thioridazine trifluoperazine
Antispasmodics	atropine (not ophthalmic) belladonna alkaloids clidinium-chlordiazepoxide dicyclomine homatropine (not ophthalmic)	hyoscyamine propantheline scopolamine (not ophthalmic)
Benzodiazepines	alprazolam chlordiazepoxide clobazam clonazepam clorazepate diazepam estazolam	flurazepam lorazepam midazolam oxazepam quazepam temazepam triazolam
Muscle relaxants	carisoprodol chlorzoxazone cyclobenzaprine	methocarbamol orphenadrine
Cardiac glycoside	digoxin	
CNS acting alpha agonist	clonidine guanfacine	metyldopa reserpine
Hypertensive agents	nifedipine immediate release	
Long acting sulfonylureas	glimepiride, glyburide	
Nonbenzodiazepine hypnotics	eszopiclone, zalepon, zolpidem	
Nonsteroidal Anti-Inflammatory Drugs	diclofenac ibuprofen meloxicam	nabumetone piroxicam tolmentin
Tricyclic antidepressants	amitriptyline clomipramine desipramine doxepin	imipramine nortriptyline protriptyline trimipramine
Sedating antihistamines	brompheniramine carbinoxamine chlorpheniramine clemastine cyproheptadine	dimenhydrinate diphenhydramine doxylamine hydroxyzine meclizine
Urinary anti-infective agent	nitrofurantoin	

\*\*\*This listing is not meant to be all-inclusive, see drug prescribing information for fullest consideration.



# CATCH-ON

A HRSA GERIATRIC WORKFORCE ENHANCEMENT PROGRAM  
[www.catch-on.org](http://www.catch-on.org)

## **Additional Internet-Based Links**

### **Guidelines on Potentially Inappropriate Medications in Older Adults**

1. American Geriatrics Society Beers Criteria  
<https://onlinelibrary.wiley.com/doi/10.1111/jgs.15767>
2. STOPP/START Criteria  
<https://academic.oup.com/ageing/article/44/2/213/2812233>

### **General Approach and Stepwise Approach to Deprescribing**

1. Overview - Reducing Polypharmacy: A Logical Approach  
<https://www.ti.ubc.ca/2014/09/02/reducing-polypharmacy-a-logical-approach/>
2. Review - Stepwise Approach to Deprescribing  
<https://www.ncbi.nlm.nih.gov/pubmed/24661192>

### **Deprescribing Networks and Institutes**

1. United States - <https://deprescribingresearch.org/>
2. Canadian - <https://www.deprescribingnetwork.ca/>
3. Australian - <https://australiandeprescribingnetwork.com/au/>
4. English - <https://www.sps.nhs.uk/networks/english-deprescribing-network/>
5. Bruyere Research Institute - <https://deprescribing.org/>
6. Lown Institute - <https://lowninstitute.org/projects/medication-overload-how-the-drive-to-prescribe-is-harming-older-americans/>

### **Resources for Patients, Consumers and Caretakers**

1. National Library of Medicine – Medline Plus (Drug Look-up)  
<https://www.nlm.nih.gov/medlineplus/>
2. Health in Aging Foundation – (Medications Safety Tip Sheets)  
<https://www.healthinaging.org/medications-older-adults>
3. Health in Aging Foundation – (Age-Friendly Healthcare Tip Sheets)  
<https://www.healthinaging.org/age-friendly-healthcare-you>