Potentially Serious Alcohol–Medication Interactions In Older Adults (POSAMINO)

Based on a systematic review of the literature and a two-round Delphi consensus method, a group of 19 healthcare professionals developed the first set of explicit potentially serious alcohol–medication interactions in older adults (POSAMINO).[1] Pending future validation studies, these criteria may allow for the risk stratification of older adults at the point of prescribing and prioritize alcohol screening and brief alcohol interventions in high-risk groups.

Limitations: The POSAMINO criteria do not apply to older adults diagnosed with alcohol use disorder, as chronic heavy alcohol consumption can substantially increase the activity of the cytochrome P450 metabolizing enzyme CYP2E1. Older adults may also experience chronic illnesses that affect the metabolism of both alcohol and medications. As a result, it is important that healthcare professionals also consider these comorbid diseases when assessing the risk for potential adverse outcomes.

Medications (by physiological categories)	Level of alcohol consumption	Rationale for inclusion in the POSAMINO list
Cardiovascular		
1. Multiple antihypertensive combinations	Heavy*	The concurrent use of alcohol and antihypertensives may increase the risk of orthostatic hypotension.
2. Warfarin (and Phenindione)	Heavy*	Heavy episodic alcohol consumption is associated with an increased risk of major bleeds.
3. Regular use of low-dose aspirin (75mg)	Heavy*	Heavy alcohol consumption combined with aspirin may cause a small increase in gastrointestinal blood loss.
4. Nitrates, both regular and as required (e.g., glyceryl trinitrate, isosorbide dinitrate, and isosorbide mononitrate)	Heavy*	The combined hemodynamic effects of alcohol and nitrates may increase the risk of exaggerated hypotension.
5. Vasodilatory medication nicorandil	Heavy*	The combined hemodynamic effects of alcohol and nicorandil may increase the risk of exaggerated hypotension.
6. Combined use of both nitrates and vasodilator medication (e.g., nicorandil)	Heavy*	The combined hemodynamic effects of alcohol with nitrates and vasodilator drugs may increase the risk of exaggerated hypotension.
7. Diuretics (e.g., loop diuretics (furosemide), thiazide diuretics (bendroflumethiazide) and potassium-sparing diuretics (amiloride))	Heavy*	The concurrent use of alcohol and antihypertensives may increase the risk of orthostatic hypotension.

[1]POtentially Serious Alcohol–Medication INteractions in Older adults criteria, originally published in Holton AE, Gallagher PJ, Ryan C, Fahey T, Cousins G. Consensus validation of the POSAMINO (POtentially Serious Alcohol-Medication INteractions in Older adults) criteria. BMJ Open. 2017 Nov 8; 7(11):e017453, is licensed under CC BY 4.0 with minor content editing and reordering.

*Note: For this analysis, "heavy" alcohol use was defined as approximately 4 or more US standard drinks in one sitting for both women and men, or 8 or more drinks per week for women, or 12 or more drinks per week for men.

Medications (by physiological categories)	Level of alcohol consumption	Rationale for inclusion in the POSAMINO list
8. Alpha blockers (e.g., terazosin)	Heavy*	The concurrent use of alcohol and antihypertensives may increase the risk of orthostatic hypotension.
9. Centrally acting antihypertensives (e.g., clonidine or methyldopa)	Heavy*	Alcohol consumption combined with centrally acting antihypertensives may increase the risk of sedation and/or orthostatic hypotension.
Respiratory system		
1. First-generation antihistamines (e.g., promethazine)	Any	Concurrent alcohol consumption with first-generation antihistamines can increase the risk of sedation.
Central nervous system (CNS)		
1. Benzodiazepines (e.g., diazepam) and benzodiazepine-related medications (e.g., zopiclone)	Heavy*	Alcohol consumption combined with benzodiazepines and benzodiazepine-related medications may enhance CNS depressant effects.
2. Opioids	Heavy*	Alcohol consumption combined with opioids may enhance CNS depressant effects of alcohol.
3. Duloxetine	Heavy*	Heavy alcohol consumption combined with duloxetine may increase the risk of hepatotoxicity.
4. All antipsychotics	Heavy*	Alcohol consumption combined with antipsychotics may increase the risk of sedation.
5. Barbiturates	Any	Alcohol consumption combined with barbiturates may increase the risk of sedation.
6. Antiepileptic drugs (AEDs)	Heavy*	Heavy alcohol consumption can increase the risk of seizures and sedation in patients taking AEDs.
7. Tricyclic antidepressants	Any	Alcohol consumption combined with antidepressants may enhance the CNS depressant effects of alcohol.
8. Tetracyclic antidepressants	Any	Alcohol consumption combined with antidepressants may enhance the CNS depressant effects of alcohol.

[1]POtentially Serious Alcohol–Medication INteractions in Older adults criteria, originally published in Holton AE, Gallagher PJ, Ryan C, Fahey T, Cousins G. Consensus validation of the POSAMINO (POtentially Serious Alcohol-Medication INteractions in Older adults) criteria. BMJ Open. 2017 Nov 8; 7(11):e017453, is licensed under CC BY 4.0 with minor content editing and reordering.

*Note: For this analysis, "heavy" alcohol use was defined as approximately 4 or more US standard drinks in one sitting for both women and men, or 8 or more drinks per week for women, or 12 or more drinks per week for men.

Medications (by physiological categories)	Level of alcohol consumption	Rationale for inclusion in the POSAMINO list
9. Mirtazapine	Any	Alcohol consumption combined with antidepressants may enhance the CNS depressant effects of alcohol.
10. Monoamine Oxidase Inhibitors (MAOIs)	Any	A potentially life-threatening hypertensive reaction can develop in patients taking non-selective MAOIs who consume drinks rich in tyramine (e.g., wines, beers, and non-alcoholic beers).
11. Paracetamol, long-term regular use (e.g.,1g four times a day)	Heavy*	Heavy alcohol consumption may increase the risk of paracetamol hepatotoxicity especially if alcohol intake is abruptly stopped.
12. Alcohol consumption with gabapentin (when used for neuropathic pain)	Heavy*	Alcohol combined with medications for neuropathic pain may increase the risk of sedation.
13. Pramipexole or amantadine	Heavy*	Alcohol combined with pramipexole or amantadine may increase the risk of sedation.
14. Apomorphine	Heavy*	Alcohol combined with apomorphine may increase the risk of orthostatic hypotension.
15. Levodopa (alone or in combination with carbidopa)	Heavy*	Alcohol combined with levodopa (alone or in combination with carbidopa) may increase the risk of orthostatic hypotension.
Endocrine		
1. Insulin	Heavy*	Alcohol consumption may enhance the hypoglycemic effect of insulin.
2. Metformin	Heavy*	Heavy alcohol consumption combined with metformin may increase the risk of lactic acidosis.
3. Sulphonylureas	Heavy*	Alcohol consumption can enhance the hypoglycemic effects of antidiabetics.
4. Meglitinides (e.g., nateglinide)	Heavy*	Alcohol consumption can enhance the hypoglycemic effects of antidiabetics.
5. Thiazolidinediones (e.g., pioglitazone)	Heavy*	Alcohol consumption can enhance the hypoglycemic effects of antidiabetics.

[1]POtentially Serious Alcohol–Medication INteractions in Older adults criteria, originally published in Holton AE, Gallagher PJ, Ryan C, Fahey T, Cousins G. Consensus validation of the POSAMINO (POtentially Serious Alcohol-Medication INteractions in Older adults) criteria. BMJ Open. 2017 Nov 8; 7(11):e017453, is licensed under CC BY 4.0 with minor content editing and reordering.

*Note: For this analysis, "heavy" alcohol use was defined as approximately 4 or more US standard drinks in one sitting for both women and men, or 8 or more drinks per week for women, or 12 or more drinks per week for men.

Medications (by physiological categories)	Level of alcohol consumption	Rationale for inclusion in the POSAMINO list
Musculoskeletal and joint diseases		
1. Any non-steroidal anti-inflammatory drugs (NSAIDs) (including COX-2 inhibitors)	Heavy*	Heavy alcohol consumption and NSAID use carry an increased risk of gastrointestinal bleeds.
2. Methotrexate or leflunomide	Heavy*	Heavy alcohol consumption combined with methotrexate or leflunomide may increase the risk of hepatotoxicity.
3. Oral muscle relaxants (e.g., baclofen)	Heavy*	Concurrent alcohol consumption and muscle relaxants can increase the risk of CNS depression.
Malignant disease and immunosuppression		
1. Procarbazine	Any	A disulfiram-like reaction can occur when alcohol is given with procarbazine.
2. Interferon alpha or interferon beta	Heavy*	Heavy alcohol consumption combined with interferons may increase the risk of hepatotoxicity and reduce the response to treatment with interferon.
Infections		
1. Antimycobacterial medications such as isoniazid, pyrazinamide, ethionamide, and rifampicin (alone or in combination)	Heavy*	Alcohol combined with antimycobacterial medications can increase the risk of hepatotoxicity.
2. Cycloserine	Any	Alcohol consumption may increase the risk of seizures in patients taking cycloserine.
3. Metronidazole or tinidazole	Any	A disulfiram-like reaction can occur when alcohol is given with metronidazole.

[1]POtentially Serious Alcohol–Medication INteractions in Older adults criteria, originally published in Holton AE, Gallagher PJ, Ryan C, Fahey T, Cousins G. Consensus validation of the POSAMINO (POtentially Serious Alcohol-Medication INteractions in Older adults) criteria. BMJ Open. 2017 Nov 8; 7(11):e017453, is licensed under CC BY 4.0 with minor content editing and reordering.

*Note: For this analysis, "heavy" alcohol use was defined as approximately 4 or more US standard drinks in one sitting for both women and men, or 8 or more drinks per week for women, or 12 or more drinks per week for men.