Alcohol and Drug Interactions

Many drugs interact with alcohol to some extent. There are two main types of alcohol-drug interactions: pharmacokinetic and pharmacodynamic. Pharmacokinetic interactions occur when alcohol alters the metabolism or excretion of the drug or vice versa. Pharmacodynamic interactions refer to additive effects of alcohol and certain drugs, particularly in the central nervous system (e.g., sedation). 1 Alcohol is primarily metabolized in the liver by several enzymes. The most important enzymes are aldehyde dehydrogenase and CYP2E1. In people consuming alcohol occasionally, CYP2E1 metabolizes only a small fraction of the ingested alcohol. In contrast, chronic heavy drinking can increase CYP2E1 activity up to ten-fold, resulting in higher proportion of alcohol being metabolized by CYP2E1 rather than alcohol dehydrogenase. Therefore, the effect of alcohol on the interacting drug may be different depending on chronic or acute alcohol use. 2 Alcohol can also increase the risk of hepatotoxicity with some drugs. See our PL Chart, Liver Function Test Scheduling, for more on drugs that require liver function monitoring. Alcohol is contraindicated with a number of extended-release formulations (e.g., Opana ER [U.S.], various other opioids) due to the risk of dose dumping of the formulation or increased availability of the drug and potential overdose. 3 Many other extended-release formulations also have warnings about alcohol such as Ritalin LA (U.S.), Gralise (U.S.), Durlaza (U.S.), etc. 4, 15, 26 In general, be cognizant of patients who are using extended-release formulations and counsel on the potential risks associated with alcohol consumption. In addition, remind patients that some OTC meds (e.g., cough syrups, laxatives) may contain up to 10% alcohol. 8 Finally, it is important to note that the elderly may be at higher risk with alcohol-drug interactions, due to the fact that alcohol metabolism may be slowed and alcohol itself may increase the risk of falls, serious injury, etc. 8 This chart includes selected alcohol-drug interactions and recommendations for alcohol consumption. Note that the chart is not all-inclusive and that product labeling for meds may advise avoiding use with alcohol due to the potential for additive CNS effects. In addition, comorbidities related to alcoholism such as cirrhosis, GI effects, etc, may require additional considerations related to drug therapy.

Abbreviations: CNS=central nervous system; GI=gastrointestinal; MAOIs=monoamine oxidase inhibitors; NSAIDs= nonsteroidal anti-inflammatory drugs; PDE-5=phosphodiesterase-5; TCAs=tricyclic antidepressants.

<table>
<thead>
<tr>
<th>Drug or Drug Class</th>
<th>Clinical Effects and Possible Mechanisms</th>
<th>Recommendations and Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Analgesics (Non-Opioids)</td>
<td>• Chronic alcohol use can increase blood levels of the acetaminophen metabolite, N-acetyl-p-benzoquinoneimine (NAPQ), which is hepatotoxic, and reduce blood levels of acetaminophen. The mechanism is increased metabolism of acetaminophen by CYP2E1. 1, 5 It may also increase the risk of kidney disease through an unknown mechanism. 6 • Acute alcohol use in large amounts may increase the risk of liver toxicity with acetaminophen similar to chronic alcohol use. 5</td>
<td>• U.S. product labeling for acetaminophen products states that severe liver damage may occur in adults who have ≥3 alcoholic drinks/day while taking acetaminophen 7</td>
</tr>
<tr>
<td>Drug or Drug Class</td>
<td>Clinical Effects and Possible Mechanisms</td>
<td>Recommendations and Comments</td>
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</tr>
<tr>
<td><strong>Analgesics (Non-Opioids), continued</strong></td>
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<tr>
<td>Aspirin NSAIDs</td>
<td>• Aspirin or NSAIDs and alcohol may have additive or synergistic damaging effects on the gastric mucosal barrier leading to an increased risk of GI hemorrhage, in a dose-dependent manner$^{1,3,7,8}$</td>
<td>• Advise against chronic NSAID use in regular drinkers, especially in heavy drinkers (e.g., ≥3 alcoholic drinks/day)$^9$ • Product labeling for aspirin extended-release capsules (Durlaza) recommend not taking the drug within 2 hours prior or 1 hour following consumption of alcohol due to possible interference of alcohol with the controlled-release property of the formulation$^{26}$</td>
</tr>
</tbody>
</table>

**Analgesics (Opioids): In addition to enhanced sedative effects, concurrent use of alcohol and opioids increases the risk of fatal overdose due to respiratory depression.$^{1,8,10}$**

| Extended-release opioids | • Co-ingestion of alcohol and some extended-release opioids may lead to “dose dumping” or delivery of a potentially fatal dose of the opioid$^7$ | • In general, advise against concomitant use of alcohol and all opioids$^{22}$ • Extended-release formulations that are known to be adversely affected by alcohol include Nucynta ER, Opana ER (U.S.), Embeda (U.S.), Kadian, and Zohydro ER (U.S.)$^{2,7,30,35,36}$ |
| Methadone | • Chronic alcohol use reduces the effects of methadone due to increased hepatic metabolism of methadone$^7$ • Acute alcohol ingestion increases the effects of methadone due to decreased hepatic metabolism of methadone$^7$ | • Warn patients about the potential effects of alcohol on methadone, such as an increased risk of fatal overdose. In general, advise against concomitant use of alcohol and opioids.$^{7,22}$ |

**Anticoagulants/Antiplatelets: Alcohol may increase the risk of falls, and therefore the risk of bleeding, with anticoagulants/antiplatelets.$^{12}$**

<p>| Warfarin | • Acute ingestion of alcohol may reduce metabolism of warfarin,$^{10}$ although small to moderate amounts (2 to 3 drinks) don’t seem to have an effect$^{15}$ • Chronic use of alcohol has been associated with both increases and decreases in the effects of warfarin and there are conflicting data.$^{5,10,11}$ Patients with liver disease may be more likely to have potentiation of warfarin’s effects with alcohol use.$^{12}$ | • Advise patients about the potential effects of alcohol use on the effects of warfarin, and monitor more frequently if dietary habits, including alcohol consumption, change$^{12}$ |</p>
<table>
<thead>
<tr>
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<tr>
<td><strong>Antidepressants</strong></td>
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</table>
| Bupropion          | • Bupropion may reduce alcohol tolerance$^{7,10}$  
• Both acute alcohol ingestion and abrupt discontinuation of alcohol use can increase the risk for seizures, and bupropion can also reduce the seizure threshold$^{10}$ | • Advise patients to minimize or avoid the use of alcohol with bupropion$^{10}$ |
| MAOIs              | • Tyramine, which is found in some beers and wines, interacts with MAOI inhibitors leading to severe hypertension.$^{10,13}$  
• Alcohol and MAOIs may have additive CNS effects$^{10}$ | • Advise patients to avoid the use of alcohol with MAOIs$^1$  
• In general, dietary restrictions for MAOIs should be followed for at least two weeks following discontinuation of MAOIs$^{10}$ |
| TCAs               | • Alcohol may increase the sedative effects of tricyclic antidepressants, their blood levels (e.g., amitriptyline), and the risk of orthostatic hypotension.$^{1,3,7,12,13}$ | • Consider the use of SNRIs or SSRIs for patients who consume alcohol, as the risk for an interaction appears to be limited$^1$  
• Alcohol-enhanced CNS depression may be more prevalent in the first week of TCA therapy$^7$ |
| **Antidiabetics:** Alcohol suppresses gluconeogenesis and may generally increase the risk of hypoglycemia.$^1$ However, there may also be a risk that calories from alcohol consumption can worsen glycemic control.$^{10,14}$ |                                          |                             |
| Sulfonylureas       | • Alcohol may cause a disulfiram-like reaction in patients who are taking chlorpropamide, glyburide, tolazamide, or tolibutamide$^{1,8}$ | • Advise patients taking sulfonylureas against heavy alcohol consumption and to avoid alcohol completely during the fasting state or if symptoms of hypoglycemia occur after any consumption$^{14}$ |
| Insulins            | • Alcohol ingestion may cause severe and unpredictable effects of insulin on blood sugar due to its effects on gluconeogenesis$^{14}$ | • Advise patients using insulin against heavy alcohol consumption and to avoid consumption of alcohol on an empty stomach$^{14}$ |
| Metformin           | • Concomitant ingestion of alcohol and metformin may cause nausea and weakness$^8$  
• Alcohol ingestion may lead to increased blood levels of lactic acid with metformin use$^{1,25}$ | • Advise patients taking metformin against heavy alcohol consumption, either acute or chronic, and to monitor for signs and symptoms of lactic acidosis (e.g., muscle or stomach pain, slowed heart rate, dizziness) if alcohol is consumed$^{25}$ |
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<tbody>
<tr>
<td><strong>Antiepileptics:</strong></td>
<td>Moderate social drinking does not seem to cause a clinically relevant interaction in most cases, although additive sedation can be an issue.(^7,10)</td>
<td></td>
</tr>
<tr>
<td>Perampanel <em>Fycompa</em></td>
<td>• Concomitant use of alcohol and perampanel (especially high doses) can lead to an increased risk of CNS depression and psychiatric effects such as anger, confusion, and depression(^10)</td>
<td>• Advise patients about possible effects of alcohol and perampanel, and recommend limiting activity until the effects of concomitant use are known for each individual.(^10) (Avoid use of alcohol per Canadian labeling.)(^31)</td>
</tr>
<tr>
<td>Phenytoin</td>
<td>• Acute alcoholic intake may increase phenytoin levels, while chronic alcohol use may decrease levels(^33)</td>
<td>• Advise patients about possible effects of alcohol and phenytoin</td>
</tr>
<tr>
<td><strong>Antihistamines:</strong></td>
<td>Drowsiness may be increased when antihistamines are used with alcohol, and psychomotor effects such as on driving abilities may be significantly impacted, especially with sedating antihistamines.(^7)</td>
<td></td>
</tr>
<tr>
<td>First-generation antihistamines</td>
<td>• Alcohol may increase sedation and dizziness associated with first-generation antihistamines, especially in older adults, due to additive CNS effects(^1,8,13)</td>
<td>• Advise against alcohol consumption with first-generation antihistamines.(^22) Consider recommending a non-sedating antihistamine instead of a first-generation antihistamine, but warn patients about the possibility of an interaction since responses may differ between individuals.(^7)</td>
</tr>
<tr>
<td><strong>Antihypertensives:</strong></td>
<td>Moderate to heavy chronic drinking (&gt;2 drinks/day) increases blood pressure.(^11,16) In addition, alcohol consumption can acutely lead to hypotension and additive effects with vasodilators.</td>
<td></td>
</tr>
<tr>
<td>Alpha-1-adrenergic blockers</td>
<td>• Alcohol may increase the risk of postural hypotension with alpha-blockers, shortly after its ingestion(^8)</td>
<td>• Advise patients about possible effects of alcohol and alpha-blockers</td>
</tr>
<tr>
<td>Beta-blockers</td>
<td>• Alcohol may increase the hypotensive effects of beta-blockers(^7)</td>
<td>• Advise patients about possible effects of alcohol and beta-blockers</td>
</tr>
<tr>
<td>Calcium channel blockers</td>
<td>• Alcohol may increase the risk of postural hypotension with calcium channel blockers, shortly after its consumption(^5,7)</td>
<td>• Advise patients about possible effects of alcohol and calcium channel blockers</td>
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<tr>
<td></td>
<td>• Chronic use of verapamil may increase blood levels of alcohol and reduce its rate of metabolism(^7)</td>
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<td></td>
<td>• Alcohol may increase blood levels of nifedipine(^5)</td>
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<tr>
<td><strong>Antimicrobials</strong></td>
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| Doxycycline       | • Chronic heavy use of alcohol may lead to subtherapeutic levels of doxycycline due to an increase in its rate of metabolism<sup>7</sup> | • Consider doubling the dose of doxycycline in alcoholic patients or substitute a non-interacting drug for doxycycline<sup>7</sup>  
• Note that concurrent ingestion of ethanol and tetracycline may slightly increase blood levels of tetracycline<sup>10</sup> |
| Griseofulvin (U.S.) | • Griseofulvin may increase the effects of alcohol, such as nausea, vomiting, tachycardia, and severe hypotension<sup>8,17,22</sup> | • Advise patients to avoid alcohol while taking griseofulvin<sup>22</sup> |
| Isoniazid         | • Heavy or chronic alcohol ingestion (i.e., daily) may increase the risk of hepatotoxicity with isoniazid and increase the clearance of isoniazid<sup>7,8,10,22</sup> | • Advise patients to avoid alcohol while taking isoniazid<sup>10,22,24</sup> |
| Ketoconazole      | • Alcohol may increase the risk of a disulfiram-like reaction with oral ketoconazole<sup>7</sup>  
• Alcohol may increase the risk of hepatotoxicity with oral ketoconazole<sup>24</sup> | • Advise patients to avoid alcohol while taking ketoconazole<sup>7</sup> |
| Metronidazole     | • Alcohol may increase the risk of a disulfiram-like reaction with metronidazole. There may also be a risk with vaginal metronidazole formulations due to small amounts of systemic absorption, although it appears to be small.<sup>7</sup> | • The risk may be low, but advise patients to avoid alcohol while taking metronidazole and for 72 hours after metronidazole has been stopped<sup>7,22</sup> |
| Tinidazole (U.S.) | • Alcohol may increase the risk of a disulfiram-like reaction with tinidazole<sup>7</sup> | • The risk may be low, but advise patients to avoid alcohol while taking tinidazole and for 72 hours after it has been stopped<sup>7,22</sup> |
| **Antipsychotics** |                                        |                                  |
| Atypicals         | • Concomitant use of alcohol and atypical antipsychotics can lead to additive CNS effects and postural hypotension, especially with olanzapine and quetiapine<sup>7</sup> | • Advise patients to avoid alcohol while taking antipsychotics<sup>7,22</sup> |
| Phenothiazines    | • Concomitant use of alcohol and phenothiazines can lead to an increased risk of sedation<sup>13</sup>  
• May increase the risk of extrapyramidal side effects<sup>7</sup> | • Advise patients to avoid alcohol while taking antipsychotics<sup>22</sup> |
<table>
<thead>
<tr>
<th>Drug or Drug Class</th>
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</thead>
<tbody>
<tr>
<td>Muscle Relaxants:</td>
<td>Concurrent use of muscle relaxants and even small amounts of alcohol can lead to additive CNS depressant effects.³</td>
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<tr>
<td>Sedative-Hypnotics</td>
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<tr>
<td>Barbiturates</td>
<td>• Concomitant use of barbiturates and even small amounts of alcohol can lead to additive CNS effects³</td>
<td>• Warn patients of possible effects, such as increased sedation and impaired psychomotor skills, as well as the potential for hangover effects where a barbiturate could continue to interact with alcohol the next day³</td>
</tr>
<tr>
<td>Benzodiazepines</td>
<td>• Concomitant use of benzodiazepines and alcohol can lead to additive CNS effects. This is especially true with long-acting benzodiazepines or with greater amounts of alcohol⁷,¹⁰</td>
<td>• Warn patients of possible effects, such as increased sedation and impaired psychomotor skills.³ Consider advising against concomitant use of alcohol and benzodiazepines.²²</td>
</tr>
<tr>
<td>Non-benzodiazepine</td>
<td>• Concomitant use of alcohol and non-benzodiazepine hypnotics can lead to additive CNS effects and risk of “complex behaviors” (e.g., sleep-driving, etc)⁵,²³</td>
<td>• Advise against the use of alcohol with non-benzodiazepine hypnotics.²² Besides interacting with these drugs, alcohol is associated with insomnia.¹⁸</td>
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<tr>
<td>hypnotics (e.g., “Z drugs,” ramelteon, suvorexant [Belsomra])</td>
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<tr>
<td>Chloral hydrate</td>
<td>• Concomitant use of alcohol and chloral hydrate can lead to additive CNS effects in addition to reduced metabolism of both agents¹⁰</td>
<td>• Advise patients to separate consumption of significant amounts of alcohol from the use of chloral hydrate by 12 to 24 hours¹⁰</td>
</tr>
<tr>
<td>Meprobamate (U.S.)</td>
<td>• Meprobamate can increase alcohol-associated intoxication³</td>
<td>• Advise patients to avoid alcohol while taking meprobamate³</td>
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<tr>
<td>Sexual Dysfunction</td>
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<tr>
<td>Treatments</td>
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<tr>
<td>Flibanserin (U.S.) (Addyi)</td>
<td>• Concomitant use of alcohol and flibanserin may lead to severe hypotension and syncope¹⁹</td>
<td>• Advise patients to abstain from alcohol (from any source) during treatment with flibanserin and for 2 days after discontinuation.¹⁹</td>
</tr>
<tr>
<td>PDE5 inhibitors (e.g., sildenafil, etc)</td>
<td>• Concomitant use of alcohol and PDE-5 inhibitors may rarely increase the risk of postural hypotension and increased heart rate (seen with tadalafil), especially when several drinks are consumed⁷</td>
<td>• Advise patients about the possible effects of alcohol and PDE-5 inhibitors, and remind them that alcohol can worsen erection difficulties as well⁷</td>
</tr>
<tr>
<td>Drug or Drug Class</td>
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<tr>
<td><strong>Statins</strong>: Alcohol abuse may increase the risk of side effects with statins.</td>
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<tr>
<td><strong>Miscellaneous Agents</strong></td>
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</table>
| Acitretin | • Increased duration of teratogenic potential in women\(^{10}\)  
• Alcohol increases the transesterification of acitretin to etretinate, a teratogen which can remain in the body for years\(^{10}\) | • Tell women of reproductive potential to completely avoid alcohol and alcohol-containing drugs while taking acitretin and for 2 months after the drug is stopped\(^{10}\) |
| Methotrexate | • Ingestion of ~2 or more alcoholic drinks per week may increase the risk of methotrexate-induced liver toxicity.\(^{7}\) Patients being treated for psoriasis may be at higher risk than those being treated for rheumatoid arthritis.\(^{20}\) | • Consider advising patients against consumption of alcohol during treatment with methotrexate.\(^{7}\) See our PL Detail-Document, Using Methotrexate Safely for Rheumatoid Arthritis, for more information. |
| Metoclopramide | • Concomitant use of alcohol and metoclopramide can lead to additive CNS effects\(^{7}\)  
• Metoclopramide may increase blood levels of alcohol due to increased gastric emptying\(^{7}\) | • Consider advising patients to avoid alcohol while taking metoclopramide\(^{21}\) |
| Varenicline  
*Champix-Canada, Chantix-U.S.* | • Concomitant use of alcohol may increase alcohol-associated intoxication, and increase the risk of unusual or aggressive behavior\(^{10}\) (per Canadian labeling, increased risk of psychiatric adverse events).\(^{32}\) | • Advise patients about possible effects of alcohol and varenicline, and recommend limiting alcohol intake until the effects of concomitant use are known for each individual\(^{10,32}\) |

Users of this PL Detail-Document are cautioned to use their own professional judgment and consult any other necessary or appropriate sources prior to making clinical judgments based on the content of this document. Our editors have researched the information with input from experts, government agencies, and national organizations. Information and internet links in this article were current as of the date of publication.
References

Evidence and Recommendations You Can Trust…

Vaccine Administration Strategies

Patients often avoid vaccine recommendations due to fears of pain, injury, and/or needles. Those administering vaccines can do a lot to alleviate these concerns for patients. And, this can help increase rates of vaccination, providing benefit to both individuals and the community. A positive vaccination experience can also help prevent patients from developing anxiety that could transfer to a general fear of needles/injections with repercussions into other areas of their health care. Below you will find various strategies to help reduce a patient’s fears, prevent injuries, and make the injections less painful. Training on such strategies should be provided to everyone who administers vaccines. It is also important to involve and train patients and caregivers on some of these strategies, beginning prior to the day of vaccination if possible (e.g., providing information prenatally, at well-child visits, at routine check-ups, etc). For more information on the administration of vaccines, see our PL Self-Study Course, Immunization Update 2015 Part 3: Vaccine Storage and Handling, Administration, and Adverse Events.

**Abbreviations:** IM = intramuscular; Subcut = subcutaneous

<table>
<thead>
<tr>
<th>Suggested Checklist to Minimize Patient Anxiety</th>
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<tbody>
<tr>
<td>Be calm, collaborative, and well-informed.</td>
</tr>
<tr>
<td>Let anxious patients/caregivers know what will happen, how it will feel, and what they can do. Provide information in advance if possible.</td>
</tr>
<tr>
<td>Use neutral phrases like “Here I go.” rather than “Here comes the sting.”</td>
</tr>
<tr>
<td>Be truthful with the patient to promote trust.</td>
</tr>
<tr>
<td>Ensure privacy to help decrease anxiety.</td>
</tr>
<tr>
<td>Suggest anyone with a history of fainting to lie down for the injection, when possible.</td>
</tr>
<tr>
<td>Let caregivers know that their behavior can influence a child’s response and distress. Give them information and tools to help them remain calm. Let caregivers know they should never threaten or scare a child about injections.</td>
</tr>
<tr>
<td>Make sure caregivers remain present with children, especially if less than ten years.</td>
</tr>
</tbody>
</table>

More...
Suggest infants and children sit on their caregivers' lap to calm them, and help hold their arms if necessary. But, do not forcibly restrain a child as this will increase their fear. Sitting provides a stronger sense of control.\textsuperscript{1,2}

Consider having patients hold neonates with skin-to-skin contact to reduce acute stress.\textsuperscript{1}

Recommend breastfeeding infants, if acceptable to caregiver, during or shortly after injections.\textsuperscript{1,2} This can reduce stress with physical comfort, sucking distraction, and sweet-tasting ingestion.\textsuperscript{1} Bottle feeding throughout may provide some benefit as well.\textsuperscript{2}

Use distraction to divert attention, particularly in children less than six years, with toys, music, or conversation with an adult.\textsuperscript{2} Encourage caregivers to bring a child’s favorite toy, book, blanket, or other comfort item.\textsuperscript{3}

**Suggested Checklist to Minimize Pain**

<table>
<thead>
<tr>
<th>Choose the proper needle size based on type of injection (IM vs Subcut) and your patient (i.e., age and weight). See our <em>PL Chart, Choosing the Correct Needle Size</em>.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Select a 23 to 25 gauge needle for Subcut administration to decrease discomfort.\textsuperscript{4}</td>
</tr>
<tr>
<td>Consider topical anesthetic creams, gels, or patches, particularly in children under 12 years if there is significant anxiety or fear of pain.\textsuperscript{1} Application must be done in advance (exact time will depend on the product chosen) and cost may be a barrier for some patients.\textsuperscript{1,2}</td>
</tr>
<tr>
<td>Topical ethyl chloride and other vapocoolants are not generally recommended due to lack of proven effectiveness.\textsuperscript{3}</td>
</tr>
<tr>
<td>Don’t recommend oral analgesics, such as acetaminophen, prior to injections.\textsuperscript{2} They likely don’t help and it has been suggested that they could decrease the immune response.\textsuperscript{5,6,7} Save for after the injections for fever or discomfort.\textsuperscript{2}</td>
</tr>
<tr>
<td>Sucrose (e.g., <em>TootSweet</em>) is recommended in infants less than two years if they are not breastfed during vaccination for pain control. Give 2 mL of a 24% to 50% solution one to two minutes before the injection. Give rotavirus oral vaccine first if using as it contains sucrose.\textsuperscript{1}</td>
</tr>
<tr>
<td>Encourage deep breaths, then give shot during exhalation when muscles are most relaxed. Have adults take deep breaths and children can blow out into a toy pinwheel, party blower, or bubble blower.\textsuperscript{8} Adults can also give a slight cough as you inject the vaccine, being sure that the cough doesn’t cause any arm movement or result in them holding their breath.\textsuperscript{2}</td>
</tr>
<tr>
<td>Don’t pull back the plunger with IM administration.\textsuperscript{1,2,4} This technique is unnecessary and increases pain due to longer needle contact/dwell time and the lateral movement/wiggling of the needle.\textsuperscript{1,2}</td>
</tr>
</tbody>
</table>

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Consider **Buzzy**, a $40 device that combines vibration and cold to decrease pain. Small studies done mostly in children undergoing venipuncture show some benefit in pain reduction.\(^9,10\)

You may hear about **ShotBlocker**, a disposable plastic disk that is placed to surround the injection site. The device has many blunt contact points that press into the patient’s skin to “saturate the sensory signals” near the injection site to reduce perceived pain. Studies are small and many do not show decreased pain in patients getting injections.\(^11,12\)

**DO NOT** warm the vaccine (rubbing between your hands), rub or pinch the injection site (manual stimulation), rub the skin adjacent to the injection site, or apply pressure prior to the injection.\(^13\)

### Suggested Checklist to Reduce Injury

A rare vaccine-related injury, Shoulder Injury Related to Vaccine Administration (SIRVA), is believed occur as a result of inappropriate administration of IM vaccines.\(^14-16\) This particular injury appears to be more than trauma to the tissues and is thought to be an inflammatory response to the injection of antigenic material into the synovial tissues.\(^15\) This can occur when an IM vaccine is administered too high on the arm and goes into the subdeltoid bursa. Resultant symptoms can include permanent pain, lack of motion, weakness, and impaired mobility/functionality.\(^15\)

Inject **IM vaccines** into the central, thickest part of the deltoid. Injection that are too high (i.e., upper third of the arm) have been associated with severe shoulder injuries such as rotator cuff tears, bursitis, and tendonitis that could require surgery or permanent injury.\(^4,15\)

Choose the correct needle size for the size of your patient. Short needles risk underpenetration with potential for skin reactions and decreased immunogenicity.\(^14\) Long needles risk overpenetration with potential for injection into the synovial tissue with possible pain and injury.\(^14\) See our **PL Chart, Choosing the Correct Needle Size**.

Don’t rely on the “Three finger rule” (i.e., inject IM vaccines three finger widths below the upper crest of the arm or acromion process) to find the right spot for injection. This “rule” won’t always guide you to the correct place (i.e., the thickest part of the deltotoid muscle).

Take the same position as recipient (both would usually sit). This helps to give the injection into the correct area of the deltotoid.\(^15\)

Avoid lowering a patient’s shirt down over their shoulder for administration, this can lead to the injection being given too high.\(^17\)
Users of this PL Detail-Document are cautioned to use their own professional judgment and consult any other necessary or appropriate sources prior to making clinical judgments based on the content of this document. Our editors have researched the information with input from experts, government agencies, and national organizations. Information and Internet links in this article were current as of the date of publication.

Project Leader in preparation of this PL Detail-Document: Annette Murray, BScPharm

References

There are several Star Ratings quality measures that are related to improving care for patients with diabetes. These include adherence to diabetes medications, statins, and ACE inhibitors or ARBs; controlling blood glucose and blood pressure levels; vaccinations; annual eye exams; and improving physical activity. Use this sheet as a guide to start conversations with your diabetes patients during comprehensive medication reviews (CMRs), medication synchronization appointments, or during any patient interaction. Tackle one or two topics at a time, but don’t overwhelm your patients or yourself by doing too much too fast. Start with these ideas and build on the topics below.

1. **Assess adherence to diabetes medications and emphasize importance.** *(Date discussed: __________)*
   - Ask open-ended questions, such as:
     - I know it must be difficult to take all your medicines regularly. How many doses did you miss in the past week?
     - How do you think these medicines are working?
     - What are your biggest challenges with taking your medicines?
   - Have patients explain how they take their medications and make sure your records match.
   - Look at prescription refill information to help assess adherence.
   - Assess barriers to adherence: cost, lack of patient buy-in or understanding, forgetfulness, etc.

2. **Ensure recommended vaccinations are up to date.** *(Date discussed: __________)*
   - Annual flu shot
   - Pneumococcal vaccination with Pneumovax 23 for immunocompetent adult diabetes patients aged 19 to 64 years. Then at age 65 years, give Prevnar 13 (if not previously given) followed by a 2nd shot of Pneumovax 23 at least one year later (and at least five years after previous dose).
   - Hepatitis B vaccination is recommended for patients with diabetes younger than 60 years of age.

3. **Talk about the importance of optimizing glucose control.** *(Date discussed: __________)*
   - A1C goal should be individualized (6.5% to 8%). Aim for <7% for most patients. Consider 7.5% to 8% for those with a history of severe hypoglycemia, limited life expectancy, advanced diabetes complications, or excessive comorbid complications.
   - Optimal A1C slows progression of microvascular complications such as kidney disease, retinopathy, neuropathy, etc.

4. **Discuss prevention of cardiovascular complications.** *(Date discussed: __________)*
   - Blood pressure goal of <140/90 mmHg for most. Recommend an ACEI or ARB if appropriate.
   - Moderate- to high-intensity statin therapy is recommended for all diabetes patients age 40 to 75 years. Consider a high-intensity statin dose for patients with cardiovascular disease or additional risk factors.
   - Ensure patient is a nonsmoker or support kicking the habit.
   - Consider aspirin 75 to 162 mg once daily in those with increased cardiovascular risk.

5. **Discuss self-management.** *(Date discussed: __________)*
   - Encourage regular examination of feet, proper care of nails and skin, and appropriate footwear.
   - Recommend home glucose monitoring for all type 1s and some type 2 diabetes patients, especially if newly diagnosed, changing medications, have an acute illness, or are pregnant.
   - Discuss signs and symptoms of hypoglycemia (e.g., tremor, palpitations, sweating, etc), and review treatment (e.g., taking 15 to 20 g of simple carbs) and prevention strategies.
   - Advise getting an annual dilated eye exam.

6. **Discuss healthy lifestyle choices (e.g., diet, physical activity, etc).** *(Date discussed: __________)*
   - Even modest weight loss (5% to 10%) can provide clinical benefits.
   - Seven hours of brisk walking per week may reduce seven-year mortality by 50%.
   - Encourage patients to eat vegetables, drink water rather than soda, and limit sweets and sodium.
   - Carbohydrate intake monitoring is critical to achieving glycemic control.
Frequently Asked Questions About MedGuides

Introduction

The concept of Medication Guides, commonly called MedGuides, seems simple enough at first glance. These FDA-approved patient education handouts are considered part of a drug’s labeling. In place for over a decade, they are required for a growing list of drugs. As one encounters different situations in practice, some interesting questions pop up. This document provides answers to a variety of questions about MedGuides.

Questions and Answers About MedGuides

Are MedGuides available in other languages? What should you give to a non-English speaking patient?

MedGuides are part of a drug’s labeling.1 As part of the drug’s labeling, MedGuides are only required to be available in English in most locales. The exception to this is for drug products that are distributed solely in the Commonwealth of Puerto Rico or in a Territory where the predominant language is a language other than English.2 In that case, the predominant language may be substituted for English.2

Dual-language (English and a foreign language) MedGuides may be marketed anywhere in the United States and its territories. FDA does not review the foreign language version of the MedGuide. Manufacturers submit certifications to FDA that the foreign-language labeling is a complete and accurate translation of the MedGuide.3

If a patient does not speak English and/or is not able to read the MedGuide, consider an alternate mechanism for providing important information, if possible. For tips on what to do in these situations, get our PL CE, Enhancing Patient Counseling with Effective Communication Skills.

Is the MedGuide content for a brand drug and its generics the same? Can you use the MedGuide for a brand name product when the generic is dispensed, if a MedGuide for the generic product is not readily available? You do need to dispense MedGuides with generics of “MedGuide drugs.” The content of a generic drug’s MedGuide is the same as the content of the brand drug’s MedGuide. The exception to this might be for a short window of time immediately following a labeling change to a brand product, when the generic product labeling has not yet been updated. The MedGuides for brand name and generic products are each to be distributed with the product that they are intended for.4 If for some reason you do not have the MedGuide for a generic medication, it may be available for download from DailyMed at http://dailymed.nlm.nih.gov/dailymed/index.cfm, or the generic manufacturer’s web site. Alternatively, you could call the generic manufacturer for an electronic or paper copy.

Must MedGuides be provided with samples dispensed from doctors’ offices? Must prescribers who dispense drugs in a clinic provide MedGuides? Yes, MedGuides must be dispensed with samples and with other drugs that are dispensed from a clinic to outpatients, if a MedGuide is required for that particular drug.1

Can a prescriber request that a patient NOT receive a MedGuide? Yes, a prescriber can request that a MedGuide NOT be dispensed to a patient. However, if the patient asks for information when the drug is dispensed, the MedGuide must be dispensed, regardless of the request by the prescriber.5

Is the pharmacist allowed to edit the content of a MedGuide to shorten it? MedGuides contain FDA-approved wording. In addition FDA has certain other requirements, such as a minimum font size of ten point.6 Therefore, they should not be altered.4

Are MedGuides required with prescription refills? Yes, MedGuides must be dispensed with prescription refills.1

Are MedGuides required for inpatients? What about other settings, like nursing homes, infusion centers, etc? FDA has determined that More...
MedGuides are generally NOT required for INpatients (hospital or nursing home) because the medication is being dispensed to a health care professional for administration to the patient. In inpatient settings, health care professionals are readily available to provide information and answer patients’ questions. However, a MedGuide should be made available to the inpatient or their representative if they request it.

Another circumstance in which a MedGuide must be dispensed to an inpatient is when a drug is subject to a REMS (Risk Evaluation and Mitigation Strategy) that includes specific requirements for reviewing or providing a Medication Guide as part of an ETASU (Element to Assure Safe Use). Dofetilide (Tikosyn) is an example. A list of drugs with REMS and ETASUs, with an overview of their requirements, can be found at: http://www.accessdata.fda.gov/scripts/cder/rems/index.cfm.

Patients in OUTpatient clinics, dialysis centers, infusion centers, etc SHOULD be given MedGuides the first time the patient receives the medication, whenever the medication guide materially changes, or as specified in an ETASU.

As in the inpatient setting, the MedGuide should be provided if the patient or his/her representative requests it.


What’s the difference between a MedGuide and a Patient Package Insert?

MedGuides may sometimes be confused with Patient Package Inserts (PPIs). PPIs are another form of patient product information approved by FDA. Some drugs, by regulation, are required to have PPIs that must be distributed to patients (i.e., oral contraceptives and estrogens). The PPIs for oral contraceptives and estrogen products are intended to fully inform the patient of the benefits and risks associated with the use of these drugs. Other drugs are approved on the condition that the drug is packaged so that patients receive a PPI when receiving their prescription (e.g., unit-of-use packaging). Some drugs have PPIs, but the PPIs are not required to be dispensed to a patient (e.g., Fosamax [alendronate]).


Blood pressure medicines are some of the most commonly used drugs. However, about one-quarter of people who take meds to lower their blood pressure stop taking them within six months. Up to one-half stop taking them within one year.

**Why are blood pressure medicines so important?**
Keeping your blood pressure normal can help you stay healthy. People with high blood pressure are more likely to be sent to the hospital, to have strokes or heart attacks, and have other health problems than those who keep their blood pressure normal.

**Why do people stop taking their blood pressure medicines?**
Like most drugs, blood pressure meds can have side effects. Around two-thirds of people who take blood pressure meds will have a side effect when the drugs are first started. For example, diuretics (or “water pills”) can increase how often you need to pee. Cutting back on the amount of salt in your diet will help to reduce this side effect and make the water pill work better. Water pills can also cause dizziness or make you feel light-headed when you stand up too fast. Other blood pressure drugs might make you feel tired. Be sure to ask your prescriber or pharmacist what types of side effects you can expect with your blood pressure drugs and how long the side effects will last.

Another reason people stop taking blood pressure meds is that they forget to take them. Some drugs must be taken more than once each day. If you have trouble remembering to take your medicine, tell your prescriber or pharmacist. He or she can help you get a medicine that fits best with your lifestyle.

Some drugs can cost a lot of money. However, there is at least one generic drug available for every type of blood pressure medicine. If you have trouble paying for your blood pressure drugs (or any type of drug), let your prescriber or pharmacist know. He or she can help you get a drug that costs less and/or recommend a patient assistance program to help you pay for your medicine.

**What can happen if I stop taking my blood pressure medicine?**
Besides increasing your chance for a heart attack or stroke, there are other things that can happen if you stop taking your blood pressure drugs. When you re-start your drug, your dose may have to be lowered for a time to help prevent some side effects. Your prescriber will tell you how to slowly work your way back up to your usual dose.

If you stop taking some blood pressure meds all at once (or “cold turkey”) your blood pressure can get too high.

**What should I do if I have a problem with my blood pressure medicines?**
Never stop taking your blood pressure meds without letting your prescriber know. Speak with your prescriber and/or pharmacist to let them know about any problems you’re having. Then together you can make sure your blood pressure meds are the best ones for you.

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