Community Pharmacy or Mail Order?
Role of a Pharmacy Technician in Tobacco Cessation
Driving Under the Influence
Motor vehicles crashes are a leading cause of death in the US, with 33,561 fatalities in 2012. Prescribed medications, over-the-counter (OTC) medications, and abused drugs, including alcohol, have the potential to interfere with the ability to drive safely,\(^1,2\) with the risk increasing with the number of medications.\(^3\) Pharmacists have a responsibility to patients and the public to minimize this risk through their dispensing and counseling practices. In a 2003 professional standard statement, the International Pharmaceutical Federation provided guidance to pharmacists and reiterated that pharmaceutical organizations should provide clear guidelines on the side effects of medications with regard to driving and the operation of machinery.\(^4\)

The potential for impaired driving due to medication can occur at any age, though older adults are more likely to be taking prescribed medication, including multiple pharmaceuticals, and could experience drug interactions. A study by the AAA Foundation for Traffic Safety found that over 90% of older drivers take prescription medications, and over two-thirds of those taking any medication take multiple medications.\(^5\) In an earlier study, AAA found that only half of these drivers (52%; 58% of women vs. 46% of men) on prescription medication talked to a health care provider about the possible effect of these drugs on their ability to drive.\(^6\) In addition, increased age, low education, and widowhood are associated with less awareness, experience, and health professional warnings.\(^7\) However, studies have found that medical profession-

Abstract: Motor vehicle crashes are a major cause of morbidity and mortality in the United States. Medical conditions and medications have the potential to increase crash risk. While medications can affect drivers of any age, older adults are more likely to be taking prescription medications. Pharmacists have an important role in educating patients on medication side effects that could affect driving. This report reviews the major prescription medications that affect driving and provides guidance on counseling.

Objectives:
- Understand the effect prescription drugs can have on driving performance
- Demonstrate the importance of including the effects on driving as part of a consultation
- Understand the key classes of prescription drugs which can impair driving skills
als are generally unaware of medicines’ effects on driving and are reluctant to discuss them with patients.

The classes of prescription drugs and their potential side effects are outlined in Table 1. The main side effects that impair driving skills include drowsiness, confusion, hypotension and possible associated syncope, hypoglycemia, and poor muscle tone or incoordination. Less common are problems such as double vision, nausea, blurred vision, and memory impairment. Specific drug effects on driving are reviewed here.

**Anticonvulsants**

Seizure disorders, when uncontrolled, can interfere with driving, though the risk may have been overestimated. Anticonvulsants may cause drowsiness, confusion, ataxia, nausea, and double vision. The response to the medication varies by individual and may not always be linearly correlated with dosage. Checking patients’ blood drug levels is helpful with some drugs, such as phenytoin, where high blood levels are correlated with ataxia.

**Antidepressants**

Antidepressants are the second most frequently prescribed medications, according to the Institute for Health Care Informatics. There is evidence that the crash rate in individuals with depression is three times higher than unaffected individuals. However, the treatments for depression may be associated with side effects that interfere with driving as well. Even one psychotropic prescription drug increased the crash risk more than twofold for drivers over 45 years old, with dramatic increases to eightfold for more than two CNS-affecting drugs. The tricyclic antidepressants have higher rates of hypotension and drowsiness, one of the reasons they are prescribed at night to help with depression-associated insomnia. They have been associated with a more than twofold crash risk in the elderly.

**Anxiolytics**

Benzodiazepines can cause drowsiness, confusion, and amnesia, and may interfere with muscle tone and coordination. Ten mg of Valium has been found to be equivalent to a blood alcohol concentration (BAC) of 0.10%. Benzodiazepines were shown to increase crash risk 60% in one study, and another case control study found an odds ratio of 5:2 with benzodiazepines in drivers 65 and older. Some studies have shown an effect for intermediate and long-acting benzodiazepines, but not short-acting ones.

**Antipsychotics**

Both antipsychotics and psychosis can affect judgment, with the drugs causing nausea and drowsiness. Psychosis can impair driving due to lapses in judgment, impulsivity, and inattention. In one study, persons with schizophrenia were examined before discharge. Only 32% of these persons passed reaction testing prior to discharge. Persons on atypical antipsychotics and clozapine performed better than those on older antipsychotics.

**Stimulants**

This class of drugs is used to treat a variety of conditions, including hyperactivity. In a small study of attention deficit hyperactivity disorder (ADHD) subjects, they self-reported higher rates of crashes and citations, performed worse than non-ADHD subjects on the simulator, but they improved when taking Ritalin. Another study found increased crash rates in ADHD patients, with medications reducing the crash risk.

**Somniacs**

Medications for sleep also have the potential to interfere with driving. Zopiclone (the stereoisomer eszopiclone (Lunesta)) is marketed in the US and was found to impair driving manyfold over zaleplon. Another study found residual effects at eight-12 hours with zopiclone, but not with zolpidem or midazolam. In a 2011 survey of drivers over 65, 22-27% of men took sleep medications, as did 33-35% of women. The use of pain medications was reported by 50-58% of men and 59-71% of women. However, the vast majority of respondents reported taking multiple medications, leading to the potential for drug potentiation and interaction.

**Antihistamines**

This class of drugs also impairs driving performance. This has been demonstrated in multiple studies, with one finding diphenhydramine more impairing than alcohol. Only third-generation antihistamines, fexofenadine and levocetirizine, did not impair performance.

**Hypoglycemics**

With the increasing rates of diabetes, hypoglycemics are currently the sixth most commonly prescribed class of drugs. Type 1 diabetics are at highest risk of driving impairment due to hypoglycemia. Hypoglycemia can impair cognitive and motor skills, and diabetics should be cautioned to check their sugar before driving, as well as periodically on long trips.

While hypoglycemia is especially a risk during medication adjustments, it can occur at any time with changes in food intake, activity, or acute illnesses. Diabetic drugs have many interactions with other medication that can potentiate their hypoglycemic effects. In addition, diabetic patients are at risk of eye diseases, including retinopathy, cataracts, and glaucoma, with the potential to affect vision and driving safety.

**Chemotherapy**

Chemotherapeutics can also impair driving skills due to side effects that include nausea, confusion, drowsiness, poor muscle tone, and dehydration, with associated hypotension and syncope. The frailness alone associated with cancer and chemotherapy (and other treatments) alone reduces driving skill and increases crash risk. Individuals under acute care for cancer should be advised to find alternative transportation when the chemotherapy is associated with these common side effects.

**Narcotic analgesics**

Prescription narcotics, especially but not exclusively in the acute setting, are associated with impaired judgment, confusion, drowsiness, and nausea,
Table 1: Side Effects of Prescription Medications with the Potential to Impair Driving

<table>
<thead>
<tr>
<th>Drug Class</th>
<th>Drowsiness</th>
<th>Confusion, poor judgment</th>
<th>Syncope, hypotension</th>
<th>Hypoglycemia</th>
<th>Other side effects</th>
<th>Offending agents</th>
<th>Recommended alternatives</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anticonvulsants</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td>class effect</td>
<td></td>
</tr>
<tr>
<td>Antidepressants</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td>tricyclics, trazodone, mirtazapine, MAOIs</td>
<td>SSRIs, SNRIs, bupropion</td>
</tr>
<tr>
<td>Antiemetics</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
<td>Blurred vision</td>
<td>promethazine, metoclopramide, prochlorperazine, chlorpromazine</td>
<td>Ondansetron</td>
</tr>
<tr>
<td>Antihistamines</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td>Blurred vision, hyperkinesia</td>
<td>diphenhydramine, chlorpheniramine, hydroxyzine, dimenhydriante, meclizine</td>
<td>Loratadine, cetirizine, fexofenadine</td>
</tr>
<tr>
<td>Anticholinergics</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>atropine/diphenoxylate, benzotropine, oxybutynin, trihexyphenidyl, dicyclomine, belladonna alkaloids</td>
<td></td>
</tr>
<tr>
<td>Antihypertensives</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>b blockers, calcium channel blockers, clonidine</td>
<td>ACEIs, ARBs, thiazide</td>
</tr>
<tr>
<td>Antiparkinsonians</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
<td>Dizziness, nausea, headache</td>
<td>trihexyphenidyl, benzotropine, selegiline, rasagline, ropinirole, pramipexole, rotigotine</td>
<td>Entacapone, tolcapone, amantadine</td>
</tr>
<tr>
<td>Antipsychotics</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
<td>Tremors, nausea</td>
<td>class effect</td>
<td></td>
</tr>
<tr>
<td>Anxiolytics</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td>Memory impairment</td>
<td>benzodiazepines, buspiron</td>
<td></td>
</tr>
<tr>
<td>Chemotherapy</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td>Nausea, weakness</td>
<td>class effect</td>
<td></td>
</tr>
<tr>
<td>Muscle relaxants</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
<td>Dizziness, nausea</td>
<td>class effect</td>
<td></td>
</tr>
<tr>
<td>Narcotic analgesics</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
<td>Nausea</td>
<td>class effect</td>
<td></td>
</tr>
<tr>
<td>Stimulants</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Emotional labiality, tremors</td>
<td>amphetamine, methylphenidate</td>
<td></td>
</tr>
<tr>
<td>Antidiabetics</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Nausea</td>
<td>insulin, sulfonyurea, glinides (repaglinide, nateglinide), exenatide, liraglutide</td>
<td>Metformin, gliptins (sitagliptin, saxagliptin, linagliptin), TZDs (pioglitazone, rosiglitazone)</td>
</tr>
<tr>
<td>α1 antagonist</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>prazosin, terazosin, doxazosin</td>
<td>Tamsulosin, silodosin</td>
</tr>
<tr>
<td>PDE-5 inhibitors</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>class effect</td>
<td></td>
</tr>
<tr>
<td>Marijuana</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td>marijuana, dronabinol</td>
<td></td>
</tr>
</tbody>
</table>

All with the potential to impair driving safety. Individuals with these side effects are at risk of being charged with driving under the influence if stopped by law enforcement, even if they have prescriptions for these drugs. Driving should be stopped when narcotics are first prescribed, and only resumed once the level of impairment is felt to be low enough not to interfere with safe driving. A large epidemiologic analysis found the crash rate in people taking narcotic analgesics increased by 1.7-2.4. A recent analysis of fatal crashes found an association between opiates and crashes in middle-aged but not older adults.30

**Alcohol**
The effect of alcohol on driving safety is profound, due to both the
level of impairment and the high prevalence of use. Alcohol is estimated to be implicated in 60% of traffic fatalities, a greater influence than any other substance. Alcohol further impairs driving in persons taking many pharmaceuticals. While it is beyond the scope of practice of most pharmacists to counsel on isolated alcohol use, discussion of the accentuating effects of alcohol is appropriate.

Reporting and Support Systems
California is one of nine states requiring physician-mandated reporting to the Department of Health Services (DHS) for lapses of consciousness associated with an underlying condition. Lapses include loss of consciousness, dementia, seizures, or other conditions, including medication side effects that cause a reduction in alertness. Pharmacists are not mandated reporters; however, any healthcare professional or citizen can report concerns to the DMV. DMV websites provide forms online for reporting. Pharmacists can help patients manage their medications and drug interactions by guiding them to online databases or paper systems, such as AAA’s Roadwise program, Consumer Reports’ My Medication Tracker app, ConsumerMedSafety.org, and Safe-Medication.com.

Conclusions
Pharmacists should discuss possible drug interactions and side effects with all patients on one or more prescription medications. A counseling checklist is provided in Figure 1. Patients should be educated about the medications they are taking and whether these medications, in conjunction with their condition and OTC medications, can impair driving ability. Resources for further information on the topic of medication, medical conditions, and driving include:
- Roadwise Rx: http://www.roadwisexr.com/, sponsored by AAA.

About the Author
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References

<table>
<thead>
<tr>
<th>Provide driving counseling as follows:</th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>Provide health education about side effects both verbally and in writing.</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Advise against driving until side effects are known and manageable, especially when starting medications.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Counsel diabetics to check their sugar before driving and during long trips.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Report lapses of consciousness or other driving concerns to the Department of Motor Vehicles</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

| The patient is on a medication with side effects that impair driving. | X | X |
| The patient is on two drugs that may interact to impair driving. | X | X |
| The patient is on a medication where alcohol may potentiate the side effects. | “Avoid alcohol” | |
| The patient is over 65 years old. | X | X |
| The patient reports a recent seizure or lapse of consciousness. | | X |
| The patient has diabetes. | X | |
1. Motor Vehicle accidents are the leading cause of death in the United States.
   a. True
   b. False

2. Pharmacists:
   a. Are responsible to educate the public on the effect on driving of only prescription drugs
   b. Can provide clear guidelines on effects of medications in regards to operation of machinery
   c. Have no impact on the minimizing the risk of persons driving under the influence through consultation
   d. All the Above

3. Potential for impaired driving due to medication only occurs with older adults since they take more medication.
   a. True
   b. False

4. Antidepressants:
   a. Can increase crash risk twofold.
   b. Are the most frequently prescribed drug which increases crash risks
   c. Evidence that crash rate is higher in individuals with depression than unaffected individuals
   d. a and c
   e. All of the above

5. The response to anticonvulsant medication varies by individual and may not always be linearly correlated with dosage.
   a. True
   b. False

6. AAA found that:
   a. Only about half of the drivers on medications talked to a health profession about the effects of their medication on their ability to drive
   b. Increased age, low education and widowhood was associated with less awareness of the effect of medication on the ability to drive
   c. Medical professionals are generally unaware of medicine’s effects on driving and reluctant to discuss them with their patients.
   d. All of the Above

7. Benzodiazepines:
   a. Interfere with muscle tone and relax the driver to help with coordination
   b. 5 mg of Valium is equivalent to a blood alcohol level of 0.10%
   c. Can increase crash risk 60%
   d. Increase crash risk only in those 65 years and older

8. Hypoglucomens:
   a. Type 1 diabetics are at highest risk of driving impairment due to hyperglycemia
   b. Hypoglycemia can impair cognitive and motor skills
   c. Diabetic drugs seldom interact with other drugs, so there is no worry about additive effects
   d. Eye diseases associated with diabetes does not affect driving safety
   e. All of the above

9. Alcohol:
   a. Is the number one substance implicated in traffic fatalities
   b. Alcohol further impairs driving in persons taking prescription medication
   c. Pharmacist should include in their consultation the accentuating effects of alcohol
   d. All of the above

10. Pharmacist should educate patients about the impact of their medication on their ability to drive.
    a. True
    b. False

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