2016/2017

Top 300 Pharmacy Drug Cards

The best and easiest way to learn essential information about the top 300 drugs

Jill Kolesar • Lee Vermeulen

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Introduction

The selection of the most commonly prescribed medications was based on a number of reports evaluating medication use based on the number of prescriptions filled in the United States and the cost of those prescriptions.[1-3] Most estimates rely on data from IMS Health, using data from their National Prescription Audit. In addition to these sources, additional information was drawn from a wide range of professional journals to select the most relevant medications to include in this set of cards. Information on medication safety was drawn from multiple sources, but relied on a number of documents maintained by the Institute for Safe Medication Practices (ISMP), which can be found at www.ismp.org. Photographs were taken by the editors at the University of Wisconsin Hospital and Clinics pharmacies, as well as at Target Pharmacy in Madison, Wisconsin. Products with generic versions available in the US market have a representative generic product pictured. Brand name products are generally pictured if a generic version is not yet available in the United States.

It should be noted that these cards include multiple agents in some drug classes, and the information on those cards is very similar. While redundancy is considered a flaw in textbooks and other educational material, repeating information in these crowded classes of drugs is essential for the successful use of flash cards as a learning tool.

1. Brooks M. Top 100 Selling Drugs of 2013. 2014, Jan 30. Medscape. Available at http://www.medscape.com/viewarticle/820011#1. Accessed November 29, 2014.

2. Barthalow M. Top drugs of 2013. *Drug Topics*. Available at http://www.pharmacytimes.com/publications/issue/2014/July2014/Top-Drugs-of-2013. Accessed November 29, 2014.

3. Schumock GT, Li EC, Suda KJ, Matusiak LM, Hunkler RJ, Vermeulen LC, Hoffman JM. National trends in prescription drug expenditures and projections for 2014. *Am J Health Syst Pharm.* 2014;71(6):482-499.

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Preface A: Anatomy of a Flash Card

Medication Name

Both generic and common brand names are listed.

Class

Medications are grouped into classes ("families") based on their chemical, pharmacological, or clinical properties. It is often useful to study medications on a class-by-class basis, identifying similarities and differences among members of each class.

Controlled Substance Schedule

Title 21 of the United States Code (USC) is the Controlled Substances Act of 1970. It regulates medications with potential for abuse. These Federal regulations are overseen by the Drug Enforcement Administration, but many States have enacted more strict regulations based on them. Medications are placed into schedules based on their clinical use and their risk of abuse and dependence. It is important to note that some States change the Federal scheduling of certain medications. Under Federal law, a State cannot place a medication in a lower schedule than where it is placed by the Federal government (eg, States cannot change a drug placed in Federal Schedule II to Schedule III, IV, or V), but States can and do place certain medications in higher schedules (eg, changing a drug placed in Federal Schedule V into Schedule II, III, or IV, or changing a drug which is not a controlled substance under Federal law into a controlled substance within that State).

- *Schedule I:* No medical use, high abuse, and dependence potential.
- *Schedule II:* Legitimate medical use, high abuse, and dependence potential.
- *Schedule III:* Legitimate medical use, abuse, and dependence potential somewhat less than Schedule II.
- *Schedule IV:* Legitimate medical use, abuse, and dependence potential less than Schedule III.
- *Schedule V:* Legitimate medical use, limited abuse, and dependence potential.

Dosage Forms

The most common dosage forms and strengths are listed. Other dosage forms may exist, and may be referenced in the Clinical Pearls section.

Common FDA Label Indication, Dosing, and Titration

The US Food and Drug Administration (FDA) approves medications for market, and also approves specific indications for use and the doses for those uses. Some medications are approved for only one indication, while others are approved for many indications. In most cases, all FDA-approved ("labeled") indications are listed with their approved doses.

Off-Label Uses

While every medication must be approved by the FDA for at least one indication before it is marketed, FDA approval is not always sought for subsequent indications. Prescribers are legally entitled to prescribe medications for any indication they feel is appropriate and clinically justified. In most cases, prescribers limit their use of medications to indications for which evidence supports safety and efficacy, as demonstrated in published clinical trials. While these may not be FDA-approved indications, "off-label" use is common and often completely appropriate. Common off-label uses are included, along with dosing recommendations.

MOA (Mechanism of Action)

The MOA is a succinct summary of the pharmacological properties of each medication.

Drug Characteristics

Each card includes a table summarizing key drug parameters, as outlined below.

Dose Adjustments Hepatic

A Child-Pugh Score can be used to assess hepatic dysfunction. The score employs five clinical measures of liver disease. Each is scored 1-3, with 3 indicating the most severe derangement of that measure. Based on the number of points for each measure, liver disease can be classified into Child-Pugh class A, B, or C.

Measure	1 Point	2 Points	3 Points
Total bilirubin, mg/dL	<2	2-3	>3
Serum albumin, g/L	>35	28-35	<28
INR	<1.7	1.71-2.20	>2.20
Ascites	None	Mild	Severe
Hepatic encephalopathy	None	Grade I-II	Grade III-IV

Points	Class	One-Year Survival	Two-Year Survival	Liver Dysfunction
5-6	A	100%	85%	Mild
7-9	B	81%	57%	Moderate
10-15	C	45%	35%	Severe

Dose Adjustments Renal

Dose adjustments for some (but not all) of medications that are renally eliminated are necessary in patients with renal dysfunction and hepatically eliminated medications in patients with hepatic dysfunction. Dose adjustments are made by either lowering the dose or dosing less frequently (eg, reducing from tid to daily dosing). The degree of renal dysfunction usually determines the degree of the dose adjustment. Definitions of renal and hepatic dysfunction are often inconsistent, but the recommended dose adjustments included in these flash cards are drawn from product package inserts and other sources. Clinicians should always exercise caution when treating patients with liver and/or kidney disease, and monitor carefully for signs of toxicity, even if dose adjustments are made.

In general, CrCl is used to assess renal function and is calculated with the following equations:

Cockcroft and Gault Equation:
CrCl (males) = [(140 – age) × IBW]/(Scr × 72)
CrCl (females) = [(140 – age) × IBW]/(Scr × 72) × (0.85)

Estimate Ideal Body Weight in (kg):
Males: IBW = 50 kg + 2.3 kg for each inch over 5 ft
Females: IBW = 45.5 kg + 2.3 kg for each inch over 5 ft

Normal Renal Function: CrCl = 50 mL/min or greater
Moderate Renal Impairment: CrCl = 30-50 mL/min
Severe Renal Impairment: CrCl =10-29 mL/min
Renal Failure: CrCl = 9 mL/min or less

Dialyzable

Medications may be removed by peritoneal or hemodialysis, requiring dose adjustments and/or redosing after dialysis to replace drug lost. Many references provide details regarding the dialyzability of drugs, and these cards provide basic adjustment recommendations.

Pregnancy Category

The FDA rates and categorizes medications based on the level of risk of fetal harm that medications pose when taken by pregnant women. While these categories are discrete, it is important to recognize that they are sometimes set on the basis of theoretical risks. Clinical decisions must be made individually, weighing the potential risk to both the pregnant woman and the fetus. The pregnancy category of each medication is provided.

- *Category A:* Adequate and well-controlled studies have failed to demonstrate a risk to the fetus in the first trimester of pregnancy (and there is no evidence of risk in later trimesters).
- *Category B:* Animal reproduction studies have failed to demonstrate a risk to the fetus and there are no adequate and well-controlled studies in pregnant women.

- *Category C:* Animal reproduction studies have shown an adverse effect on the fetus and there are no adequate and well-controlled studies in humans, but potential benefits may warrant use of the drug in pregnant women despite potential risks.
- *Category D:* There is positive evidence of human fetal risk based on adverse reaction data from investigational or marketing experience or studies in humans, but potential benefits may warrant use of the drug in pregnant women despite potential risks.
- *Category X:* Studies in animals or humans have demonstrated fetal abnormalities and/or there is positive evidence of human fetal risk based on adverse reaction data from investigational or marketing experience, and the risks involved in use of the drug in pregnant women clearly outweigh potential benefits.

For several years, the FDA has considered changes to the pregnancy and lactation risk rating systems, and while the old systems remains in place at the time these cards are being edited, they may change before the next edition is published. Information about the change can be found at the FDA web site, and excellent information about this situation can be found in these two papers: Ramoz LL, Patel-Shori, NM. Recent changes in pregnancy and lactation labeling: Retirement of risk categories. *Pharmacotherapy* 2014;34(4):389-395, and Singh A, Hughes GJ, Mazzola, N. New changes in pregnancy and lactation labeling. *US Pharm.* 2014;39(10):40-43.

Lactation

As with pregnancy categories, relatively little evidence is available to guide clinical decision making regarding the use of medications in women who are breast-feeding. In most cases, the risks to the child must be weighed against the benefits to the breast-feeding mother. In general, this assessment is based on the risk that an individual medication will be expressed in breast milk, and the risk that such an expression would cause to the infant who subsequently ingests it. As noted above, the FDA is considering changes to the pregnancy and lactation systems used to describe risk. The articles cited can be reviewed for information about this pending change.

Contraindications

Some medications should never be used in certain circumstances or under certain conditions. These situations are known as contraindications and are usually related to common and very dangerous adverse effects that must be avoided by selecting alternative therapeutic options.

Absorption

Pharmacokinetic parameters related to oral bioavailability (F) and the impact of food on absorption are provided.

Distribution

Pharmacokinetic data on extent and nature of distribution, including volume of distribution (Vd) and the extent of protein binding, are provided.

Metabolism

Pharmacokinetic data on metabolic pathways, including cytochrome P450 pathway of elimination and whether a drug is an enzyme inducer or inhibitor, are provided.

Elimination

Pharmacokinetic data on extent of renal (or other) elimination, as well as elimination half-life, are provided.

Pharmacogenetics

Pharmacogenetic information is included if the drug has pharmacogenetic information in the drug label. Generally, information is provided when a patient's genetic composition can affect drug exposure and clinical response variability, risk for adverse events, genotype-specific dosing, or mechanism of drug action. A complete list of drugs with pharmacogenetic information can be found at the following web site: http://www.fda.gov/Drugs/ScienceResearch/ResearchAreas/Pharmacogenetics/ucm083378.htm.

Black Box Warnings

The FDA requires manufacturers to list certain significant safety-related concerns in boxed warnings in their approved product package inserts. These "black box warnings" contain critical information for the safe use of those medications. Key black box warning content is included on each card. Additional information on black box warnings can be found at the following web site: https://blackboxrx.com/app/index.

Medication Safety Issues

Each card includes a table summarizing key medication safety concerns, as outlined as follows.

Suffixes

Many products are available in multiple formulations, for example, in delayed-release dosage forms. These dosage forms are often distinguished through the use of suffixes appended to the name of a different formulation of that same product. It is essential to exercise caution to avoid errors caused by confusing one product with another by omitting or not recognizing the additional suffix. Products that are available in multiple formulations, distinguished by a suffix (or occasionally, a prefix), are noted in this field.

"Tall Man" Letters

Many medications are spelled similarly, leading to substitution errors during prescribing, dispensing, or administration. The use of "Tall Man" lettering—distinguishing one medication from a different, similarly named medication, by capitalizing specific portions of the medication name (either brand or generic name)—has been shown to help prevent substitution errors. Those products for which Tall Man lettering is recommended are noted in this field.

Do Not Crush

Many solid oral dosage formulations are developed to release their active ingredient slowly over time. Crushing those dosage forms (eg, to enable administration through a nasogastric tube, or to make easier to swallow by patients with swallowing disorders) may be particularly dangerous. The formulations of certain products that should not be crushed are noted in this field. Sublingual dosage forms are meant to be dissolved under the tongue and swallowing these dosage forms without allowing them to dissolve lowers the efficacy of the drug. Some taste really bad, and patients prefer to swallow them without allowing them to dissolve.

High Alert

The Institute for Safe Medication Practices (ISMP) maintains a list of medications that are often involved in medication errors, or that are associated with a heightened risk of causing significant patient harm when used in error. Specific care must be exercised when prescribing, dispensing, or administering these products. More information on this field can be found at the ISMP web site at www.ismp.org.

Confused Names

Many medications are confused with other medications based on similarities in the spelling or pronunciation of their names, resulting in substitution errors. Those products that may be confused with different "look-alike or sound-alike" products are noted in this field.