An Introduction to Food Insecurity for the Advanced Practice Pharmacist

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What is food insecurity?

Food insecurity has been traditionally defined as "limited or uncertain availability of nutritionally adequate and safe foods or limited or uncertain ability to acquire acceptable foods in socially acceptable ways."[i] The United States Department of Agriculture (USDA) more recently classified food insecurity as a spectrum:

- High food security (previously known as "food secure") denotes no indications of problems with food access or limitations on food.
- Marginal food security includes determinants such as anxiety over food sufficiency or shortage of food in the house, but there is usually little to no change in actual composition or quantity of food intake.
- Low food security may not indicate any reduced food intake but involves reduced quality, variety, or desirability of diet.
- Very low food security includes the same characteristics as low food security and also disrupted eating patterns and reduced food intake.

It is important to note that households may not necessarily be food insecure all of the time – food insecurity can come and go in response to changes in other social aspects and can reflect a need to make tradeoffs between paying for food and paying for other expenses, such as medical bills or housing costs.

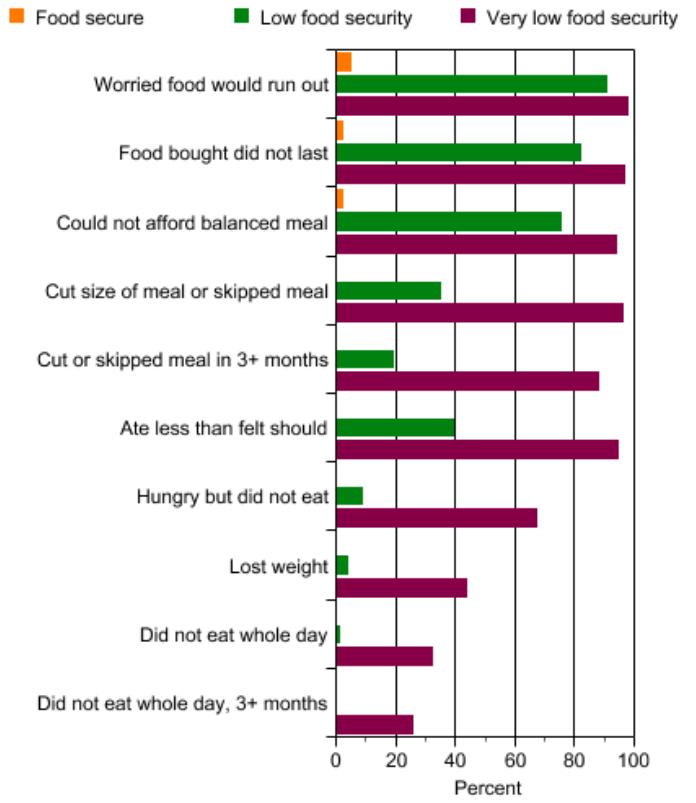
In a food-insecure household, normal eating patterns may be disrupted multiple times throughout the year in response to a lack of resources to obtain normal types and quantities of food. In a 2007 report, it was estimated that food insecurity and hunger cost the United States $90 billion annually, $67 billion of which was associated with mental health and medical care. In a state-by-state breakdown, California had the highest economic cost of hunger in the entire nation.[ii] According to the USDA, one in four Americans will access a food and nutrition assistance program at some point over the year[iii]. The Supplemental Nutrition Assistance Program (SNAP, formerly "food stamps", designated as "CalFresh" within the state of California) served 47.6 million people in FY 2013, and was the second largest of all federal means-tested assistance programs for low-income individuals, second only to Medicaid[iv]. In 2011, nearly 50,000 residents of San Francisco County participated in SNAP.[v]

In a 2016 USDA survey assessing food security, more than 95% of 'very low food security' households reported that:

- they worried about food running out before they could afford to buy more
- the food they bought did not last, and they did not have the means to buy more
- they could not afford to eat balanced meals
- an adult had reduced the size of their meal or skipped their meal entirely because there was not enough money for food; 88% stated this happened in 3 or more months throughout the year

Additionally, 44% of respondents with very low food security said they had lost weight due to inability to afford food, and 33% reported that an adult did not eat for a whole day because there was not enough money for food. [vi]

Percentage of households reporting indicators of adult food insecurity, by food security status, 2016



Source: USDA, Economic Research Service, using data from the December 2016 Current Population Survey Food Security Supplement.

Who is at risk of food insecurity?

According to USDA data, food insecurity is higher among households with children (especially children under age 6), those households headed by a single parent, individuals living alone, Black and Hispanic households, and households with incomes below 185% of the poverty line.[vii] This data comes from a *household* survey, and thus does not adequately address two key groups who are at risk for food insecurity: those who are housing insecure or homeless, and many undocumented patients, who may be more likely to be food insecure due to more limited access to sources of income and government support.

Special consideration is warranted also for those living within a "food desert": an area with limited access to supermarkets, grocery stores, or other sources of healthy and affordable foods. This designation takes into account both distance-to and number of stores in an area, as well as factors such as income and access to transportation, both on an individual and neighborhood level.[viii] More information for specific locales can be found in the USDA Food

Access Research Atlas (https://www.ers.usda.gov/data-products/food-access-research-atlas/go-to-the-atlas/).

Furthermore, people in certain living situations may have an "atypical food status." A limited means to cook may arise in a domicile that does not include a stove or oven. In these situations, one should investigate what means the person *does* have to cook and make appropriate recommendations based on resources available. For instance, frozen or canned vegetables can be prepared if there is a microwave available. A crockpot may be used to cook many nutritious foods. Also, domiciles without refrigeration may emphasize shelf-stable foodstuffs that are typically stored in a pantry, and such foods are likely to be higher in carbohydrates (bread, crackers, rice, pasta), sodium (soups and other canned foods), and lower in vegetables than foods that require refrigeration. Leftovers also cannot be stored, for the most part, without refrigeration, which can be a disincentive for some patients to cook healthy meals. Lastly, many patients may not have the capability to cook due to their own physical bodily constraints; in these instances, modes of assistance for cooking or meal delivery should be strongly considered.

How does food insecurity impact patient health?

Consumption of a healthy diet - composed of lean proteins, whole grains, fruits, and vegetables - is critical to the successful management of many chronic disease states. Unfortunately, the cost of healthy foods has risen disproportionately relative to calorie-dense, nutrient-poor options. For example, between 1985 and 2000, the cost of carbonated soft drinks rose by 20% and the cost of fats and oils rose by 35%, while the retail price of fresh fruits and vegetables increased by 118%[ix] . Given these statistics, it is easy to understand how patients with food insecurity may not be able to afford fruits and vegetables, compared with other less-nutritious options that are more financially accessible.

Research has illustrated that morbidity and control of chronic medical conditions is negatively impacted by food insecurity. In a retrospective review of a national database, food insecurity was associated with both HbA1c of > 9.0% and LDL > 100mg/dL in diabetic patients, even after adjustment for confounding variables[x]. Other studies have shown that food insecurity is a risk factor for both elevated HbA1c and clinically significant hypoglycemia in low-income patients[xi]. In a survey of homeless adults who presented to the emergency room, food insufficiency was associated with greater odds of any-cause hospitalization and high ED utilization, defined as >4 visits per year. The authors cited several factors that may predispose food-insecure individuals to utilize acute health care more frequently, including choosing to buy food over medications and using health care services in order to obtain food[xii]. In non-homeless patients who utilized emergency department services, food insecure patients were more likely to have chronic medical conditions, to put off paying for medications in order to have money for food, to take medication less often because they could not afford more, to report needing to make a choice between buying medication and food, and to report getting sick because they couldn't afford to take medication[xiii]. Some association with negative health

outcomes persists even among those who utilize food assistance modalities: in a study of women who received home delivery meal services, low nutrient intake was greater among women with and at risk for food insufficiency, and multi-morbidity was higher among women experiencing food insufficiency[xiv]. Fortunately, new research indicates that medically-tailored meals improved food security, medication adherence, self-management of disease, and nutritional intake among individuals with certain chronic diseases.[xv]

What are the general nutrition goals for patients with chronic medical conditions?

- Diabetes Mellitus: The primary dietary emphasis for patients with diabetes is carbohydrate intake. I have found that counseling on the plate method (half-plate of non-starchy vegetables, quarter plate of lean protein, quarter plate of carb/starch/grain) is an easily understandable visual that can help most patients with balancing their diet. But counseling on appropriate portion sizes can be difficult for someone with uncertain access to food, who may need to eat whatever is available to them at that time. In such cases, tailoring medications to food intake (one vs. two tablets of a sulfonylurea, insulin dosing based on carb intake) is ideal, as long as the patient has sufficient health literacy to make those adjustments.

- Dyslipidemia: Goals include reduction in fats (particularly saturated and trans fats), with a focus on healthier fats found in foods such as fish and nuts.

- Hypertension: Dietary interventions for hypertension focus largely on sodium intake. Sodium is found in large amounts in processed and prepackaged food, which is unfortunately many times the cheapest, most accessible option for patients. The American Heart Association[xvi] currently recommends a sodium limit of 2300 mg per day (which is equal to approximately one teaspoon of table salt); this is a full *gram* under the average daily sodium intake for Americans, though some individuals' intakes are much higher. One common method of eating is called the DASH diet, which stands for Dietary Approaches to Stop Hypertension. This approach recommends a balanced diet that includes fruits, vegetables, whole grains, lean dairy and meat, beans, nuts and vegetable oils; avoidance of foods high in saturated fats; and limiting sugar-sweetened foods and beverages.

- Congestive heart failure (CHF): Sodium is also a focus in the management of CHF; for patients with mild-moderate CHF, the same recommended limit of 2300mg sodium/day applies. Even so, the consequences of nonadherence to sodium restriction may be much more severe in patients with CHF (including admissions for an exacerbation), thus is it critical to identify any food insecurity and provide practical means to address this as early as possible to ensure that patients have access to foods with an appropriate amount of sodium.

- Chronic kidney disease (CKD): Though I advocate that a dietitian should be an important part of any team managing chronic disease, patients with CKD in particular should have access to a dietitian. While many of the disease states above have dietary recommendations that fall within what is thought of as a traditional "healthy, well-balanced" diet, patients with CKD may have additional restrictions that can be challenging, such limits on intake of potassium, phosphorous, and protein, depending on the severity of the disease. Patients also may have dietary considerations for the underlying comorbidities that are the etiology of their CKD.

Examples of how food insecurity may interact with management of chronic disease:

- Patients who eat more at the beginning of the month because their benefits have been renewed and thus they can afford more food. Toward the end of the month, assistance funds may run lean and they tend to eat less. Adjustment of insulin to cover blood glucose values at the beginning of the month may lead to hypoglycemia at the end of the month. Conversely, some patients may experience more hyperglycemia when fewer financial resources are available, because they opt for less expensive, more carbohydrate-rich foods. For example, I have a patient whose blood glucose runs higher at the end of the month because she eats significantly more tortillas at this time; tortillas are a less expensive component of her family's meals, and they rely on this staple until the month renews and a new benefits check arrives.

- Patients on warfarin who can have significant swings in INR due to food insecurity. When patients are accepting whatever meals they can – whether this is delivered, provided though community access programs such as shelter kitchens or food pantries, or an out-of-the-ordinary meal bought when the patient has extra cash – it's exceptionally challenging to keep their Vitamin K 'consistent.'

- A patient who is a teacher with DM, CHF, and AF on warfarin – thus, they need to be mindful of carbohydrate, sodium, and Vitamin K intake. They have no issues with food security during the school year but have a more difficult time during the summers when they do not have a source of income.

How can pharmacists help patients deal with food insecurity and meet their nutritional goals?

- Screening

    - Ask patients about their food security status! Someone *has* to ask. You may have clues as to who may be experiencing food insecurity based on the risk factors discussed above, but it's my practice to screen every single one of my patients the first time I meet them. If they screen negative for food insecurity

initially, I always encourage them to let me know if that changes, as there are resources I can connect them with.

- What is the best way to ask about this? Two simple questions have a 97% sensitivity to screen for food insecurity:[xvii]
  - Within the past year, did you worry whether food would run out before you got money to buy more?
  - Within the past year, did the food you bought not last and you didn't have money to get more?

- Although this initially can be a challenging conversation to initiate, approaching the topic with sensitivity and supportiveness can produce more honest and accurate answers regarding food status. I phrase this in several ways:
  - "It can be really challenging to take care of your health to the best of your ability if you can't afford certain types of foods."
  - "I know we live in a really expensive area, and making sure that everything gets covered can be challenging."
  - "I've had many patients who have had really good experiences with [insert and describe organization here] – is that something that you think would be helpful to you?"

• Food assistance programs and information

Included at the end of this article is a list of a few key sites for food access, as well as location-specific programs in for select counties in Northern California. This is not meant to be a comprehensive list, but rather a compilation of unique resources that may cater to your patient needs. If your county is not specifically highlighted, I recommend using the national sites listed first, most of which have a search feature that will connect you to local resources.

• Cultural sensitivity

It is important to always develop and display cultural sensitivity for food preferences, traditions, and special occasions. For example, many Hispanic diets consist heavily of rice, beans, and tortillas; noodles and rice are a staple of many Asian diets; I work with many Ethiopian patients who frequently eat injera (a spongy bread used to scoop up food) with grain-based stews. Additionally, many items traditionally thought of as "comfort" foods within a patient's particular culture may be high in fat or sodium. Simply asking patients not to eat these things is neither realistic nor supportive; rather, the focus should be on appropriate portions of these foods or versions of these foods with less impact on patient's health. Keep in mind, however, that whole-grain, low-sodium versions of foods may not always be as accessible to the patient.

- Medications

Any discussion geared toward pharmacists would be incomplete if there weren't a discussion of medications! To mitigate the financial impact of a patient's medication therapy, pharmacists should consider lower cost therapeutic options or help make connections with medication assistance programs for those who qualify. Income qualifications for various food and medication assistance programs vary widely; some patients may earn too much to qualify for some government assistance programs (one estimate reports that 26% of food insecure people are above the 185% of the federal poverty limit, a cutoff for many food assistance programs[xviii]), but remain underinsured enough that they could benefit significantly from private assistance.

Pharmacists managing chronic diseases should consider pharmacotherapeutic options whose effect is not dependent upon food. Certain medications should be taken with food to garner the full effect or avoid adverse effects, and this can lead to health complications fairly easily in patients with food insecurity. For example:

- Taking a sulfonylurea or prandial insulin without eating can lead to significant hypoglycemia.
- The absorption of several antiretrovirals is significantly impacted by food, and as such, should be administered with a meal. For patients who may not have regular access to meals, this can lead to suboptimal viral suppression.
- Among novel oral anticoagulants, rivaroxaban can be challenging for patients with food insecurity, as its bioavailability is significantly reduced if not taken with food.

Why does this matter to me, as a pharmacist?

With the recent advent of the Advanced Practice Pharmacist (APh) certification, pharmacists are increasingly interacting with a broader portion of the patient's healthcare than just their medications. In fact, one of the core tenets of the APh certification is that pharmacists are authorized to "participate in the evaluation and management of diseases and health conditions in collaboration with other health care providers", solidifying the pharmacist's role a central figure on the patient's health care team. Pharmacists are frontline, accessible healthcare providers and should have a clear understanding of the whole spectrum of care. For community and ambulatory pharmacists, long-term relationships are often built with patients, and truly responsive, competent care should take into consideration all aspects of a patient's life that may impact their health. For hospital pharmacists, a "chronic" relationship with a patient isn't usually the goal, but in today's healthcare environment where readmissions for

chronic conditions are going to count against hospitals, every pharmacist needs to consider a patient's ongoing needs. Regardless of your arena of practice, your patient's chronic conditions do not disappear when they leave your care. By becoming better educated and better equipped to help patients manage social determinants of health such as food insecurity, pharmacists will be able to more effectively promote wellness for patients with chronic disease.

Selected Food Access Resources:

Program	What it is	Website
Hunger + Health	Information, tools, and resources addressing the root causes of food insecurity and social determinants of health. Includes database of educational resources, food bank/pantry locator, and opportunities to get involved	Hungerandhealth.feedingamerica.org
211	Information on local school lunch programs, government-sponsored programs, soup kitchens, community gardens and more	211.org; search by zip code
MyPlate	Tips for shopping, cooking, and eating healthfully on a budget	Choosemyplate.gov/budget https://whatscooking.fns.usda.gov/sites/default/files/featuredlinks/MeetingYourMyPlateGoalsOnABudget.pdf
Santa Clara county		
Santa Clara County Healthy Food Incentive Grocery Project	AKA "Double Up Food Bucks California: - provides matching funds for fruits and vegetables to CalFresh	DoubleUpCA.org
Produce Mobile	Refrigerated truck that brings fresh fruits and vegetables to neighborhood locations for community members in need	https://www.shfb.org/producemobile Other Second Harvest Food Band Programs: ○ http://www.shfb.org/familyharvest ○ http://www.shfb.org/brownbag
Alameda County		
Phat Beets	Organization that participates in local farmers markets; matches SNAP funds up to $10; will deliver produce boxes for SNAP recipients	Phatbeetsproduce.org
Project Open Hand	Provides medically-appropriate meals and grocery bags for seniors and those with chronic illness;	Openhand.org

	available for pick-up or delivery; no-cook options available	
Sacramento county		
Produce for All	Produce distribution in under-served areas throughout Sacramento county	https://www.sacramentofoodbank.org/produce-for-all/
Contra Costa County		
Contra Costa Food Bank Community Produce Program	Provides households with 1-2 bags of fresh fruit and vegetables twice per month; other city-specific assistance available	https://www.foodbankccs.org/get-help/foodbycity.html
San Francisco County		
Project Open Hand	(see above)	Openhand.org
Eat SF	System that distributes vouchers through community-based organizations and health clinics; vouchers can be redeemed for fruits, vegetables, and herbs	Eatsfvoucher.org
Sonoma County		
Ceres Community Project	Free/low-cost home-delivered meals for those experiencing acute or chronic health challenges	Ceresproject.org
Food for Thought Food Bank	Free weekly groceries for this with HIV and other serious illnesses; delivery and frozen prepared meals available	Fftfoodbank.org
Bay Area (Non-County Specific)		
Fresh Approach	Classes and access to healthy foods for low-income individuals, youth, and families who have diet-related health conditions; offers a Freshest Cargo mobile farmers' market; Food Equity Outreach Program helps connect eligible people with food assistance programs; participates in Market Match (dollar-for-dollar match up to $10 when CalFresh used at participating partners)	http://www.freshapproach.org

[i] Core indicators of nutritional state for difficult-to-sample populations. J Nutr, 1990. 120 Suppl 11: p. 1559-600.

[ii] Brown, J.S., D; Martin, T; Orwat, J, The Economic Cost of Domestic Hunger. 2007, Sodexho Foundation: Gaithersburg, MD.

[iii] Mancino, L. and J. Guthrie, SNAP Households Must Balance Multiple Priorities to Achieve a Healthful Diet, in Amber Waves. USDA.

[iv] Oliveira, V., L. Tiehen, and M.V. Ploeg, USDA's Food Assististance Programs: Legacies of the War on Poverty, in Amber Waves. 2014, USDA.

[v] Kirlin, J. SNAP Data System/Go to the Map. 2014 March 11, 2014 [cited 2014; Available from: http://www.ers.usda.gov/data-products/supplemental-nutrition-assistance-program-(snap)-data-system/go-to-the-map.aspx.

[vi] https://www.ers.usda.gov/topics/food-nutrition-assistance/food-security-in-the-us/definitions-of-food-security/
[vii] https://www.ers.usda.gov/topics/food-nutrition-assistance/food-security-in-the-us/key-statistics-graphics.aspx#householdtype
[viii] https://www.ers.usda.gov/data-products/food-access-research-atlas/documentation/#definitions
[ix] Seligman, H.K. and Schillinger, D. Hunger and socioeconomic disparities in chronic disease. N Engl J Med, 2010. 363(1): p. 6-9.
[x] Berkowitz, S.A., et al., Food insecurity and metabolic control among U.S. adults with diabetes. Diabetes Care, 2013. 36(10): p. 3093-9.
[xi] Seligman, H.K., et al., Food insecurity is associated with hypoglycemia and poor diabetes self-management in a low-income sample with diabetes. J Health Care Poor Underserved, 2010.
21(4): p. 1227-33
[xii] Baggett, T.P., et al., Food insufficiency and health services utilization in a national sample of homeless adults. J Gen Intern Med, 2011. 26(6): p. 627-34.
[xiii] Sullivan, A.F., et al., Food security, health, and medication expenditures of emergency department patients. J Emerg Med, 2010. 38(4): p. 524-8
[xiv] Sharkey, J.R., Risk and presence of food insufficiency are associated with low nutrient intakes and multimorbidity among homebound older women who receive home-delivered meals. J Nutr,
2003. 133(11): p. 3485-91
[xv] Palar K, et al. Comprehensive and Medically Appropriate Food Support is Associated with Improved HIV and Diabetes Health. *J Urban Health*. 2017 Feb; 94(1): 87-99.
[xvi] Van Horn L, et al.; on behalf of the American Heart Association Nutrition Committee of the Council on Lifestyle and Cardiometabolic Health; Council on Cardiovascular Disease in the Young; Council on Cardiovascular and Stroke Nursing; Council on Clinical Cardiology; and Stroke Council. Recommended dietary pattern to achieve adherence to the American Heart Association/American College of Cardiology (AHA/ACC) guidelines: a scientific statement from the American Heart Association. *Circulation.* 2016;134:e1-e25. doi: 10.1161/CIR.0000000000000462.
[xvii] Gundersen C, et al. *Public Health Nutr* 2017 Jun; 20 (8): 1367-1371.
[xviii] http://map.feedingamerica.org/

Self-assessment questions:

1. The USDA definitions for levels of food security are discrete and do not include overlapping indicators.
    a. True
    b. False

2. Which of the following statements regarding food security is correct?
    a. People who are food secure do not have concerns about avoiding a shortage of food in the house.
    b. Food security is static, according to social class.
    c. Patients with low food security may reduce the size of their meal or skip their meal entirely because there is not enough money for food.
    d. People with very low food security have their needs addressed by charity programs.

3. Which of the following patients have an increased risk of food insecurity?
    a. Patients who are homeless and/or unemployed
    b. Patients from a household with children
    c. Patients who live alone
    d. All of the above

4. The term “food desert” refers to which of the following situations:
    a. An arid environment with limited ability to grow fresh food
    b. An area with limited access to stores selling healthy and affordable food
    c. An area with only fast-food restaurants
    d. All of the above

5. Food insecurity is associated with which of the following:
    a. Both an HbA1c of > 9.0% and LDL > 100mg/dL in diabetic patients
    b. Both elevated HbA1c and clinically significant hypoglycemia in low-income patients
    c. Greater odds of any-cause hospitalization
    d. All of the above

6. Which of the following is an example of food insecurity complicating the management of chronic diseases?
    a. Choosing to buy food rather than medications
    b. Use of food assistance modalities
    c. Using health care services to access food
    d. A and B

7. JL is a 73 yo man who lives in a rented room that allows use of a hotplate for cooking. JL cannot afford to purchase a refrigerator or pay for the increased utility bill that use of a refrigerator would entail. Twice each month, a local church group provides JL transportation to a local foodbank where he is able to obtain canned meats (tuna, salmon, chicken), canned chili, condensed canned soup, canned vegetables, and crackers. These items are shelf-stable and can be used to produce one meal at a time without waste or need to refrigerate leftovers.

    The therapy for which of the following disease states is likely to be compromised most by JL’s choices among shelf-stable foods?
    a. DM Type II
    b. Hyperlipidemia
    c. CHF
    d. HIV/AIDS

8. Which medication does not need to be taken with adequate amounts of food for safe and effective use?
    a. Glyburide
    b. Metformin
    c. Rivaroxaban
    d. tenofovir disoproxil fumarate

9. What is the best way to detect whether a patient is experiencing food insecurity?
    a. Identify whether the patient belongs to a high-risk group.
    b. Monitor the patient's weight.
    c. Ask patients who live in economically-disadvantaged areas.
    d. Ask screening questions of everyone.

10. DT is a 43-year old woman with rheumatoid arthritis, hypertension, and DM Type II. She works as a receptionist in a business office and receives her paycheck every two weeks. She is able to adhere to dietary recommendations for most days of the month, but for two days before each paycheck she no longer has fresh food and relies on beans, cheese, and rice for nutrition. What is the best strategy to help DT avoid adverse disease management sequelae due to food insecurity?
    a. Instruct DT to skip her glipizide on days that she eats less.
    b. Instruct DT to reduce her insulin glargine by 25% on days that she eats less.
    c. Advise DT not to use salt to cook her rice or beans and use extra rice to stretch her food to last for three meals each day.
    d. Help DT to access a local food pantry.

Go to: https://www.surveymonkey.com/r/H9VRRW8 to submit answers to the post-exam. Pharmacists who pass the online post-test with a score of 70% or higher **by March 31, 2018** will be provided a code to report 0.25 credit hours to NAPB. **After March 31, 2018,** pharmacists who pass the post-test with a score of 70% or higher must have a valid NABP e-Profile ID and date of birth on file with ACCP and ACCP will submit credit to NABP. ACCP membership is not required; a free ACCP account can be created at https://www.accp.com/signin/register.aspx

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