Alaska Pharmacists Association

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This lesson is a knowledge-based CPE activity and is targeted to pharmacists and technicians in all practice settings.

Learning Objectives

At the completion of this activity, the participant will be able to:

1. State two positive changes you can make to your practice following participation in this series.
2. Summarize three practice updates or changes you acquired while participating in this series.

Disclosure

The author(s) and other individuals responsible for planning AKPhA continuing pharmacy education activities have no relevant financial relationships to disclose.

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The Influenza Vaccine and Cancer

Authors:
Joe Mauer, North Dakota State University, PharmD Candidate 2020
CDR Anne Marie Bott, PharmD, BCOP, BCPS, IHS Alaska Area Oncology Pharmacist

The Centers for Disease Control and Prevention (CDC) estimates 48.8 million people in the United States contracted influenza in the 2017-18 season.[1] Influenza can be debilitating in any patient, but immunocompromised patients are at a higher risk of complications from influenza.

Categorized as immunocompromised, cancer patients are at increased risk for developing infections due to the nature of their treatments and subsequent side effects. Although there are many potential pathogens, influenza is one that can possibly be prevented due to readily available vaccines. Here is a brief overview of current guidelines and recommendations regarding cancer and the influenza vaccination.

Who should receive the vaccine?
According to the National Comprehensive Cancer Network (NCCN) guidelines both patients with hematologic and solid tumor malignancies should receive the inactivated influenza vaccine annually.[2] In addition, cancer survivors are also recommended to receive the influenza vaccine annually.[3]
Not only should the patient receive the influenza vaccine, but it is important that healthcare personnel and people who care for or live with the patient also receive the vaccine.[4] The importance of this is to reduce the chance of transmission to the patient.

Which influenza vaccine and when?
Currently both the NCCN and the CDC recommend immunocompromised patients receive an age appropriate Inactivated Influenza Vaccine (IIV) or a Recombinant Influenza Vaccine Quadrivalent (RIV4).[2,4] There is not sufficient evidence to recommend high dose influenza

vaccine over standard dose vaccine but both are safe in this population.[2] It is important that live virus vaccines, such as the nasal Live Attenuated Influenza Vaccine (LAIV4), are avoided in this patient population. LAIV4 should also be avoided in the patient's caretakers and providers, as there is theoretically a higher risk for a cancer patient to develop an infection from exposure to this vaccine.[4]

For patients about to start and those already receiving chemotherapy, the best time to give the vaccine is at least 2 weeks prior to receiving immunocompromising therapy or 3 months after therapy.[3] Although it is preferred to give the vaccine prior to or after chemotherapy, it is safe to give the vaccine while the patient is actively receiving treatment.[3]

Pharmacist's Role

Pharmacists can play a vital role in screening this patient population. In the American Society of Health-Systems "Guidelines on the Pharmacist's Role in Immunization," they recognize pharmacists are accessed by patients on a daily basis and can help promote vaccination.[5] Pharmacists can identify potential patients by taking adequate histories, educating about the benefits of vaccination and administering the influenza vaccine.[5]

Conclusion

Cancer patients are at increased risk of infection. With ample evidence and guiding bodies providing vaccination recommendations in this population, it is reasonable to bring this issue to the forefront of patient care. Proper vaccination of both patients and those in close contact with them has the potential to prevent serious complications and hospitalizations.

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2019 Community Acquired Pneumonia Guideline Update

Authors:
Lauren McCulley, PharmD Candidate 2020; St. Louis College of Pharmacy,
Preceptor: Mary Mackey, PharmD, BCPS

With pneumonia being one of the leading causes of morbidity and mortality worldwide, it is important to continue to update the guidelines with best practices. It has been over 10 years since the community acquired pneumonia guidelines have been updated; however, just last month, the Infectious Diseases Society of America (IDSA) and American Thoracic Society (ATS) published new community acquired pneumonia guidelines. The new guidelines give new recommendations on not only therapeutic options, but also on diagnosis and follow up of care. This guideline relates to patients in the United States who have not recently completed foreign travel, along with patients who do not have an immunocompromising condition such as, inherited or acquired immune deficiency, drug-induced neutropenia, those actively receiving chemotherapy, patients diagnosed with HIV with suppressed CD4 counts, and solid organ or bone marrow transplant recipients.

Community acquired pneumonia has a wide clinical presentation which leads to different severities in these patients. A mild case would present with a fever and productive cough, while a more severe case can present with respiratory distress and, at times, sepsis. The updated guidelines continue to use the 2007 guidelines to define severe community acquired pneumonia (Table 1). It is important to classify patients by severity because severity determines appropriate empiric antibiotic use for patients. Antibiotic recommendations for empiric treatment are based on the major treatable bacterial causes of community acquired pneumonia that include pathogens such as *Streptococcus pneumoniae*, *Haemophilus influenzae*, *Mycoplasma pneumoniae*, *Staphylococcus aureus*, *Legionella* species, *Chlamydia pneumoniae*, and *Moraxella catarrhalis*. Since there is no hard and fast tests to determine the accuracy of pneumonia diagnosis right away, it is recommended to treat empirically for a possible bacterial infection. There also comes the question of multidrug resistant pathogens, including methicillin-resistant *Staphylococcus aureus* (MRSA) and *Pseudomonas*

aeruginosa, which requires different antibiotic use that pharmacists must be aware of when treating patients.

Table 1: Severe Community Acquired Pneumonia	
Minor Criteria	**Major Criteria**
Respiratory Rate (≥ 30 breaths/min)	Septic shock with need for vasopressors
Pa_{o2}/FI_{02} ratio (≤ 250)	Respiratory failure requiring mechanical ventilation
Multilobar infiltrates	
Confusion/disorientation	To be classified as severe patient must have either one major criterion or three of more minor criteria
Uremia (blood urea nitrogen level ≥ 20mg/dl)	
Leukopenia due to infection alone (WBC < 4,000 cells/µl)	
Thrombocytopenia (platelet count < 100,000/µl)	
Hypothermia (core temperature < 36˚C)	
Hypotension requiring aggressive fluid resuscitation	

The guidelines break down antibiotic treatment based on setting and risk factors: outpatient with or without comorbidities, inpatient severe vs non-severe, and inpatient with or without risk factors of MRSA or *P. aeruginosa* (Table 2). For outpatients without comorbidities, it is recommended to use amoxicillin or doxycycline. Use of a macrolide can be considered only in areas with pneumococcal resistance to macrolides <25% for empiric treatment. For patients who can be treated outpatient but have comorbidities (chronic heart, lung, liver, or renal disease; diabetes mellitus; alcoholism; malignancy; asplenia) it is recommended to give combination therapy of either amoxicillin/clavulanate or a cephalosporin (cefpodoxime or cefuroxime) plus either a macrolide or doxycycline. If combination therapy is not wanted, monotherapy with a respiratory fluoroquinolone (levofloxacin or moxifloxacin) can be considered. Empiric treatment for those non-severe inpatients without risk factors of MRSA or *P. aeruginosa* includes monotherapy with respiratory fluoroquinolones or combination therapy of intravenous β-lactams plus a macrolide. Severe patients, those who meet criteria in table 1, are indicated for combination therapy of intravenous β-lactams plus macrolide or respiratory fluoroquinolones. Patients that have a MRSA indication should be treated with vancomycin or linezolid. Lastly, those with *P. aeruginosa* indications should be treated with an anti-pseudomonal agent (piperacillin-tazobactam, aztreonam, meropenem, cefepime, ceftazidime, or imipenem). The minimum duration of antibiotic use is consistent with the previous guidelines at 5 days and should be extended if the patient cannot tolerate foods or liquids or if there are no signs of symptom improvement. Major changes to antibiotic recommendations from the previous guideline update include the addition of amoxicillin as a first line agent for outpatient health patients and utilizing macrolides for that same subset of patients if the local pneumococcal resistance rate is < 25%. Other non-antibiotic focused recommendations are listed in table 3.

Table 2: Antibiotic Selection based on Presentation and Risk Factors

Healthy without comorbidities				
Amoxicillin high dose 1g PO TID	OR	Doxycycline	OR	Macrolide *only if local pneumococcal resistance rate <25%
With Comorbidities				
Chronic heart, lung, liver, or renal diseases; DM; alcoholism; malignancies; asplenia				
Respiratory Fluoroquinolone (levofloxacin, moxifloxacin, gemifloxacin)	OR	β-lactam (amoxicillin-clavulanate, cefpodoxime, cefuroxime) + Macrolide (azithromycin, clarithromycin)	OR	Doxycycline
Inpatient nonsevere empiric treatment without risk for MRSA or P. aeruginosa				
Respiratory Fluoroquinolone (levofloxacin, moxifloxacin, gemifloxacin)	OR	IV β-lactam (cefotaxime, ceftriaxone, ampicillin/sulbactam, ceftriaxone) + Macrolide (azithromycin, clarithromycin)		
Inpatient Severe Pneumonia				
β-lactam (cefotaxime, ceftriaxone, ampicillin/sulbactam)	PLUS	Macrolide (azithromycin, clarithromycin) OR Respiratory Fluoroquinolone (levofloxacin, moxifloxacin)		
MRSA Empiric Treatment				
Vancomycin 15 mg/kg every 12 hours, adjust based on levels	OR	**Linezolid 600 mg every 12 hours**		
P. aeruginosa Empiric Treatment				
Piperacillin-tazobactam 4.5 g every 6 hours	OR	**Aztreonam 2 g every 8 hours**	OR	**Meropenem 1 g every 8 hours**
Cefepime 2 g every 8 hours	OR	**Ceftazidime 2 g every 8 hours**	OR	**Imipenem 500 mg every 6 hours**

As pharmacists, it is important to stay up to date on new guidelines and assist clinicians in recommending appropriate empiric treatment on a patient-to-patient basis. Knowing the patient's past medical history of pathogens and their risk factors for drug resistance is vital for appropriate empiric treatment. Just as important as appropriate initiation of antibiotics, pharmacists can also play a role in de-escalation of antibiotics and appropriate duration of therapy. Many of the new suggestions relate to providers, however, as we grow into decentralized positions and a multidisciplinary field, we must be familiar with these changes and provide recommendations to the healthcare team.

Table 3: Recommendations on Testing and Treatments	
Sputum Culture	Outpatient: Recommend to not routinely obtain Inpatient: obtain a pretreatment culture if: - Classified as severe CAP - Empirically being treated for MRSA or P. aeruginosa - Previously infected with MRSA or P. aeruginosa - Were hospitalized and received parenteral antibiotics in the last 90 days
Blood Culture	Outpatient: Recommend to not routinely obtain Inpatient: Obtain pretreatment cultures in: - Those classified as severe CAP - Previously infected with MRSA or P. aeruginosa - Were hospitalized and received parenteral antibiotics in the last 90 days
Urine testing for Legionella	Outpatient: do not obtain routine testing Inpatient: only obtain if: - Indicated by epidemiological factors - Severe CAP
Treating for Influenza	When influenza virus is circulating in the community, it is recommended to test using the rapid influenza molecular assay Recommend treating with antiinfluenza treatment regardless of duration of illness for positive results in outpatient and inpatient
Use of Procalcitonin	Not recommended to determine need for initial antibacterial therapy
Treatment of suspected aspiration pneumonia	Suggested to not routinely add anaerobic coverage for suspected aspiration pneumonia unless lung abscess of empyema is suspected
Use of healthcare-associated pneumonia category	Recommend abandoning this categorization and put more emphasis on local epidemiology
Use of corticosteroids	Recommend not to use unless in the setting of refractory septic shock
Routine use of follow-up chest imaging	Recommended not to obtain in those whose symptoms resolved in 5 to 7 days

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Addressing Patient Questions Regarding the Uses of CBD Oil

Authors:
Carolann Lang, PharmD Candidate 2020; St. Louis College of Pharmacy
Preceptor: Michelle Locke, PharmD

Cannabinoids are components that make up the Cannabis sativa plant. Cannabidiol (CBD) is a non-psychoactive component and delta-9-tetrahydrocannabinol (THC) is the major psychoactive component. CBD has been investigated for a wide variety of therapeutic effects. It is usually derived from two forms of Cannabis sativa, marijuana and hemp. Marijuana contains more than 15% THC, while hemp is defined by the United States government as containing THC levels less than 0.3%.[1] The passage of the Farm Bill in 2018 exempted hemp and it components from the Controlled Substances Act, making it legal for sale in the United States.[2]

Epidiolex®, a schedule V prescription medication, is currently the only CBD product that is FDA approved. Because the active ingredient in Epidiolex® is CBD, it cannot be legally included in foods or dietary supplements. Epidiolex® is indicated for the treatment of seizures associated with Lennox-Gastaut syndrome and Dravet syndrome in children 2 years of age and older.[3,4] In clinical trials, Epidiolex® was shown to reduce frequency of drop seizures by 37-43% and also reduced total seizure frequency.[3] For children $\geq$ 2 years of age and adults, Epidiolex® should be administered orally at a dose of 2.5 mg/kg/dose twice daily. The dose may be titrated after a week to a maintenance dose of 5 mg/kg/dose twice daily with a maximum daily dose of 20 mg/kg/day. Epidiolex® use may show common side effects of include sedation, insomnia, and decreased appetite. Patients taking Epidiolex® should have ALT, AST, and total bilirubin assessed prior to initiating treatment. Dose adjustments may be required for hepatic impairment or certain drug-drug interactions.[3,4]

Although CBD has only been FDA approved for the treatment of epilepsy, it has been used to treat a variety of other conditions. Orally, it can be used to treat anxiety, bipolar disorder, diabetes, multiple sclerosis and Parkinson disease. Topically, it can be used to treat pain, anxiety, stress and rash. Although many people use CBD in an effort to provide relief for these conditions, there is insufficient evidence to determine if CBD is efficacious in treating these disease states. Early clinical studies do not show any benefit with the use of CBD, but further studies will be needed in order to define exact responses.[1,5] Now that CBD is exempt from the Controlled Substances Act, stronger trials are able to be carried to determine efficacy in other disease states. There are currently over 300 trials being conducted with CBD oil listed on ClinicalTrials.gov.

One of the biggest concerns with patients using CBD as a dietary supplement is lack of regulation on dosing and purity. Products that are sold as dietary supplements do not undergo required testing to ensure quality, purity and dosing.[2] Over-the-counter evaluations of commercially available oral CBD products have demonstrated consistent issues with product standardization and labeling. One laboratory assessment of the cannabidiol content of 84 products commercially available in the United States identified only 26 products were labeled accurately. The cannabidiol content of the remaining products either was over or under labeled. Additionally, about 20% of the cannabidiol products contained unlabeled THC, the major psychoactive component of marijuana. Although CBD cannot be detected in a urine drug screen, THC will be detected, even if it is in trace amounts from CBD products.[6]

As pharmacists, it is important to warn patients about potential interactions that may occur with their medications, and with the supplements and foods they take. Surprisingly, there are many drug interactions that can occur while taking CBD products. CBD oil is a substrate of CYP2C19 and CYP3A4 and it is an inhibitor of CYP2C19. Major drug interactions include clobazam (Onfi®), CYP2C19 substrates (omeprazole, lansoprazole, pantoprazole, diazepam, and carisoprodol), and valproic acid. Moderate drug interactions include CYP2C9 substrates (diclofenac, ibuprofen, meloxicam, celecoxib, amitriptyline, warfarin, glipizide, losartan), CYP3A4 substrates (alprazolam, amlodipine, clarithromycin, cyclosporine, erythromycin, lovastatin, ketoconazole, fexofenadine, and verapamil), topiramate, and zonisamide. Patients who are taking any medications that interact with CBD products should be advised to avoid CBD until discussed further with their provider.[1]

CBD can play a role in the treatment of certain disease states, but high-quality human evidence is lacking. Now that CBD is exempt from the Controlled Substances Act, we can expect to be seeing more clinical trials being published. As pharmacists, it is important that we are informed about how to talk to our patients about CBD containing products. The use of CBD does not come without side effects. Common side effects associated

with CBD use include, but are not limited to, sedation, insomnia and decreased appetite. The lack of regulation on dietary supplements can make it difficult to know exactly what ingredients are in these products, which makes their safety questionable as well. It is also very important to warn patients of the many drug that can occur while taking CBD products with other medications. Pharmacists are some of the most easily accessible health care providers and patients rely on us to be able to educate them on products such as CBD.

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The Dangers of Fentanyl Patches

Author
Lindsey Chippendale, Virginia Commonwealth University School of Pharmacy, PharmD Candidate 2020

Fentanyl is a synthetic opioid pain reliever that is approved for the management of severe pain in opioid-tolerant patients. Its potency is 50-100 times greater than morphine. Fentanyl can come in a variety of different dosage forms including tablets, injections, lozenges, and patches. In the years past, fentanyl transdermal patches have been misused and abused. This diversion has lead to multiple devastating events involving use of fentanyl patches. In 2012, the Institute for Safe Medication Practices (ISMP) published, "Top 10 steps parents should take to prevent medicine mishaps". In this article, it talks about fentanyl patches and how three different children died (ages 15 months, 2 years, and 4 years) by finding fentanyl patches and placing them either in their mouths or on their bodies[2]. The FDA evaluated a series of 26 cases of pediatric accidental exposures to fentanyl patches reported over the past 15 years. Of these 26 cases, 10 resulted in death and 12 in hospitalization; 16 occurred in children 2 years old or younger[3]. The fentanyl patch is designed to slowly release the drug over 72 hours through the transdermal route. When someone chews or swallows the patch, large quantities of the drug can be absorbed rapidly in the body, leading to a dangerous toxicity potential. Multiple deaths have occurred from misuse and abuse of fentanyl patches.

Fentanyl Patch Check Audit

I am a fourth year pharmacy student on a medication safety APPE rotation at Alaska Native Medical Center (ANMC) in Anchorage, Alaska. My preceptor is Dr. Sara Doran-Atchison, who is the Quality Improvement Pharmacy Manager. One of the projects that I have completed on this rotation is a fentanyl patch audit. ANMC has incorporated fentanyl patch checks into their standards of practice to help protect patients and others from misuse of the drug. The fentanyl patch audit looks at a patient who is currently on a fentanyl patch, the total number of patches used, the time elapsed (number of days), the number of possible checks (each patch should be checked twice daily), the percent of possible checks completed, and if there was correct removal of the patch. The audit then compares the percent of required checks completed separated by floor, and the hospital as a whole. Ensuring that fentanyl patch checks are completed is crucial to help prevent patches from causing harm to the patient or another person.

The Process of Fentanyl Patch Checks

A possible process could be implementing fentanyl patch checks every shift change by the nursing staff. These checks should include assessing and recording the type of patch on the patient, where the patch is located on the patient, and the strength of the patch. The removal of every patch should also be recorded on the patient's profile. Even after the 72 hour period that a patch has been used, there is still enough fentanyl left in the patch to cause harm to another person. If not documented and accounted for, patches can sometimes fall off of the patient creating an opportunity for someone to pick it up off of the floor. Patches that are not disposed of properly and thrown away in the trash can also be easily accessed and cause harm.

Important Fentanyl Handling Tips

Here is a list of safety tips for fentanyl patches to help educate others on the safe use of fentanyl patches[4].

1. Use for chronic pain only.
    - Fentanyl patches should be used to manage long-term chronic pain in patients who are opioid tolerant.

2. Use intact patches
   - Do not cut the patch or utilize a damaged patch.
3. Avoid broken skin
   - Place the patch on the skin without cuts or sores.
4. Talk to your pharmacist
   - Make sure to tell the pharmacist or ask the patient about any other pain medicines they've been taking and for how long.
5. Follow directions
   - Do not put on more patches than prescribed, or for a longer time period than prescribed. Remove the previous patch before placing on a new patch.
6. Don't warm your patches
   - Exposing your patch to heat can increase the absorption of the fentanyl in your body. Do not expose the patch to heat from hot water, sauna, a heating pad, etc.
7. Take care around children
   - Hide patches from children. Consider taping the patch to your skin so it is less likely to fall off. Seek immediate medical attention if a child has contact with a patch.
8. Report signs of an overdose
   - Signs of fentanyl overdose includes trouble breathing, tiredness, feeling dizzy/confused, etc.
9. Store patches safely
   - Store patches in areas that children cannot get to. Do not call the patches stickers, tattoos, or Band-Aids.
10. Dispose of patches safely
    - Fold the sticky sides of the patch together, and then flush the patch down the toilet.

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Continuing Education Quiz and Evaluation

Complete the quiz and evaluation online at:

https://alaskapharmacy.org/ce-events/home-study-ce/ce-quiz-quarterly-akpha-newsletter-first-quarter-2020/

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