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Special Points of Interest:

Synopsis of LIU: ACCP Newsletter

The 2021-2022 academic year was filled with many exciting and informative events for the members of the Long Island University (LIU) Pharmacy's American College of Clinical Pharmacy (ACCP) student chapter. Despite many meetings being held virtually, the LIU-ACCP executive board worked hard to provide students with a fulfilling year of educational PDP events, fundraisers, guideline and journal clubs, as well as outreach opportunities. Thanks to our chapter's advisors, Dr. Fischetti and Dr. Khaimova who helped us develop educational experiences for the students.

In the fall, as many members of the organization are interested in clinical pharmacy or residency, we had a great opportunity to host a PDP with Dr. Michael Ernst, Director of ACCP Research and Scholarship Academy. He discussed several research opportunities within clinical pharmacy and how pharmacy students can get involved. In the spring, LIU-ACCP hosted a PDP about residency training with Dr. Timothy Amin, a PGY2 Ambulatory Care Pharmacy Resident who presented an introduction to residency training and his experience. Moreover, we also had an exciting event in the spring with a Pediatric Pharmacy Resident, Dr. Selina Liang. She spoke about a day in the life of a Pediatric Resident, as well as the process of becoming a pediatric resident. We also had our annual residency panel where students had the opportunity to ask questions related to residency and pharmacy in general. We then ended the year with a PDP on what is research with Dr. Oriel Averion, a Research Pharmacist.

Aside from the informative organization meetings held with Pharmacy Residents and Clinical Pharmacists, we also hosted a few guideline and journal clubs. In the fall, we presented on the Acute Kidney Injury guidelines with a focus on risk assessment, evaluation, prevention,

and treatment. In addition, we had a journal club on Long-Acting Cabotegravir and Rilpivirine for Maintenance of HIV-1 Suppression. Our last guideline club of the semester was on Diabetes. In the spring, we presented on Abelacimab for Prevention of Venous Thromboembolism, GINA Guidelines on Asthma Management and Prevention, and the APA Guidelines for the Treatment of Depression. These events allowed us to stay up to date on different disease states and treatments, helping us become life-long learners.

LIU-ACCP also held a few fundraisers. In the fall, the organization formed a team for the Juvenile Diabetes Research Foundation (JDRF) One Walk to raise money and awareness for Type 1 Diabetes. JDRF is a nonprofit organization that promotes type 1 diabetes research and advocacy. The chapter collaborated with Phi Delta Chi, ACE-The Health Practitioner's Society, Middle Eastern Pharmacy Association, Students for Growing Interest for Transplantation (S4GIFT), Initiation of Giving Internationally through Volunteer Experiences (iGIVE), and the Student Pharmacists Society of the State of New York (PSSNY). This was a hybrid event so students were able to walk together as teams and individually out in their own communities. tracking their miles. Additionally, we put together a Halloween JDRF Type 1 DM bake sale.

In the 2022-2023 academic year, the LIU-ACCP student chapter has decided to hold most events online, with a few in person to accommodate our guest speakers. As events were held online for the most part last year, we are always prepared to continuously provide ACCP members with an enriching clinical pharmacy experience. We are looking forward to a fulfilling year along with our chapter advisors, Dr. Fischetti and Dr. Khaimova!

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New Drug Review: Prevnar 20, Vaxneuvance and Updated CDC Pneumococcal Adult Immunization Schedule and Recommendations

Prevnar 20 (PCV 20) [1] and Vaxneuvance (PCV 15) [2] are novel 20-valent and 15-valent pneumococcal conjugate vaccines that recently became mainstay prophylactic therapies against pneumococcal pneumonia infections and invasive pneumococcal disease (IPD) caused by *Streptococcus pneumoniae*. [3] Although Prevnar 20 was approved by the FDA on June 8, 2021 and Vaxneuvance was approved shortly thereafter on July 18, 2021,[4,5] the CDC's Advisory Committee on Immunization Practices (ACIP) did not publish updated immunization guidelines governing the usage of these newly developed pneumococcal conjugate vaccines until January 27, 2022. [6] This release influenced the 2022 Adult Immunization Schedule published on February 18, 2022, which reflects these novel vaccine products and encourages their widespread use for the prevention of pneumococcal infections. [7]

Prevnar 20 and Vaxneuvance are approved for the prevention of pneumonia and IPD caused by 20 and 15 different *Streptococcus pneumoniae* serotypes, respectively, as outlined in **Table 1**. These novel pneumococcal conjugate vaccines confer immunological protection against additional *S. pneumoniae* serotypes than their predecessor and previous standard of care for

pneumococcal infection prophylaxis, Prevnar 13 (PCV13), which are bolded in the following table. While pneumococcal conjugate vaccines are historically well-tolerated, some adverse effects have been reported with their administration in adult patients and are listed in **Table 1**. Similar adverse effects were reported in older adults, however at lower frequencies than in younger adults. Severe anaphylactoid reactions have been reported at an unknown frequency during the post marketing use of Prevnar 13 and may conceivably be extrapolated to Prevnar 20 and Vaxneuvance, as a result of their overlapping coverage of 13 *S. pneumoniae* serotypes. [1,2]

Table 1: Overview of Novel Pneumococcal Conjugate Vaccine Products [1,2]

	***S. pneumoniae* Serotypes**	**Population**	**Formulation**	**Adverse Effects**	**Contraindications**
Prevnar 20	1, 3, 4, 5, 6A, 6B, 7F, **8**, 9V, **10A**, **11A**, **12F**, 14, **15B**, 18C, 19A, 19F, **22F**, 23F, and **33F**	Adults 18 years of age and older	0.5 mL suspension for intramuscular injection in single-dose pre-filled syringe	● injection site soreness and/or swelling ● myalgia ● fatigue ● headache ● arthralgia	Anaphylaxis or allergic reaction of comparable severity to any component of vaccine or its diphtheria toxoid conjugate
Vaxneuvance	1, 3, 4, 5, 6A, 6B, 7F, 9V, 14, 18C, 19A, 19F, **22F**, 23F and **33F**	Adults and children 6 weeks of age and older			

The incorporation of Prevnar 20 and Vaxneuvance into the 2022 Adult Immunization Schedule significantly streamlined and simplified the 2021 pneumococcal vaccination recommendations. [3,8] The standalone single-dose Prevnar 20 vaccine confers immunity against pneumococcal pneumonia and IPD with fewer injections, which may improve pneumococcal immunization adherence and vaccination rates in indicated populations. [9] **Table 2** provides a review and comparison of the different pneumococcal immunization recommendations endorsed in the 2022 Adult Immunization Schedule. The most notable changes introduced in the 2022 Adult Immunization Schedule were the approval of Prevnar 20 as a one-time inoculation, and the replacement of Prevnar 13 in the guidelines with Vaxneuvance to provide broader coverage against two additional *S. pneumoniae* serotypes. PCV 13 is no longer included in the Adult Immunization Schedule as of the 2022 update. [3,8]

Table 2: 2022 Adult Immunization Schedule Recommendations [3]

Criteria	**Recommendations**
Adults 65 years of age and older	<u>Pneumococcal conjugate vaccine-naïve or unknown pneumococcal immunization history:</u> ● 1 dose of Prevnar 20 (PCV20) or 1 dose of Vaxneuvance (PCV15) ● If PCV15 is given, Pneumovax 23 (PPSV23) is recommended at least 1 year later <u>Prior history of PPSV23 vaccination:</u> ● 1 dose of PCV20 or 1 dose of PCV15 at least 1 year after previous PPSV23 dose

	• PCV15 does not need to be followed by PPSV23 vaccination in this subpopulation Prior history of PCV 13 vaccination: • The PCV13 dose should be followed by PPSV23 vaccination 1 year later or sooner as indicated by the patient's immune status • There is insufficient data to recommend additional vaccination with either PCV 15 or PCV 20 to augment PCV 13-conferred pneumococcal immunity at this time
Adults aged 19-64 with certain underlying medical conditions or risk factors for severe disease who are naïve to pneumococcal vaccines or have an unknown pneumococcal immunization history*	• 1 dose of PCV 20 or 1 dose of PCV 15, the latter of which should be followed with PPSV23 at least 1 year later • However, PPSV23 can be administered as early as 8 weeks after PCV 15 vaccination in adults with an immunocompromising condition, cochlear implant or CSF leak in order to minimize the risk of IPD caused by serotypes unique to PPSV23

*See full guideline for list of qualifying medical conditions

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Highlights to Guideline Review: AHA/ACC/HFSA Guideline for the Management of Heart Failure

Chronic Heart Failure (CHF) is a complex disease in which there is a change in the structure or function of the ventricles of the heart. These structural changes impair the heart's ability to fill or eject blood. It is characterized by fatigue, shortness of breath, and edema and is a chronic condition with no current cure. Currently, CHF is one of the leading causes of death in the United States and poses a financial burden on many families as well.[1] The goal of treatment is to control the symptoms for the patient and improve the patient's quality of life.[2]

The complexity of heart failure (HF) as a chronic condition has treatment regimens constantly evolving as more clinical trials are completed and more data is recorded. Thus, it is important to stay current on updates to the AHA/ACC/HFSA Guideline for the Management of Heart Failure. In the 2022 guideline, there have been adaptations to the categorizations of heart failure patients as well as the medication therapy utilized.

Firstly, the terminology utilized to distinguish specific classifications of heart failure was altered based on the left ventricular ejection function (LVEF). The updated classifications are: 1. HF with reduced ejection fraction (HFrEF): LVEF ≤40% 2. HF with improved EF (HFimpEF): Previous LVEF ≤40% and follow-up measurement of LVEF >40% 3. HF with mildly reduced EF (HFmrEF): LVEF 41-49% 4. HF with preserved EF (HFpEF): LVEF ≥50%. This slight change in terminology may seem trivial, but they were done in the hopes of communicating the severity of the disease and importance of early intervention and medication adherence to patients.[3]

The guideline also had a significant change with the introduction of Sodium-glucose Cotransporter-2 inhibitors (SGLT2i) to pharmacologic therapy. As more clinical trials were released, the functionality of these medications in heart failure were shown. In fact, SGLT2i's are now one of the four main classes of medications used for guideline directed medication therapy for HFrEF. Initially, this class of medications were only utilized for patients with type 2

diabetes who were at risk for developing heart failure. As more trials were completed, clinicians also saw benefit in utilizing SGLT2i in at-risk patients and those with symptomatic heart failure regardless of a diagnosis of type 2 diabetes. Finally, SGLT2i have also been added to the treatment of HFpEF and HFmrEF. This is vital because these conditions have responded less to guideline directed medication therapy in the past. The guideline has a class 2a recommendation for SGLT2i in patients with HFmrEF. [4,5]

In conclusion, heart failure is a complex and multifaceted disease that is managed through help of both pharmacological and non-pharmacological interventions. While there are still areas of treatment that are not yet understood and are in need are more research, the AHA/ACC/HFSA guidelines have vastly improved outcomes for this disease by decreasing hospitalizations and mortality.

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Clinical Spotlight: Dr. Troy Kish PharmD., BCPS

Dr. Troy Kish is a full time Associate Professor of Pharmacy Practice at Long Island University in Brooklyn, NY. He is involved as an APPE preceptor as well as a lecturer on topics relating to principles of infectious diseases, principles of oncology, and clinical management of specific malignancies. In 2008, he earned his Pharm.D. degree at University of Toledo. Upon graduation, he pursued a PGY-1 Pharmacy Practice residency at Kingsbrook Jewish Medical Center. Dr.

Kish further specialized by completing a PGY-2 Infectious Disease residency at the James J. Peters VA Medical Center in the Bronx, NY, where he still practices in Internal Medicine in conjunction with the LIU College of Pharmacy. In 2010, Dr. Kish also received his Board Certification of Pharmacotherapy (BCPS) certificate. His most recent publications include, "Systemic intravenous lidocaine for the treatment of complex regional pain syndrome: A case report and literature review" published online in September 2015 and "Metformin-induced hemolytic anemia in patients with glucose-6-phosphate dehydrogenase deficiency" in January 2015. His areas of research interests include treatment of C. difficile infections, skin and soft tissue infections, and management of cirrhosis.

1. What made you want to become a clinical pharmacist? How did you end up choosing your current specialty?

   I was inspired by my APPE rotations at the Cleveland Veterans Affairs hospital to pursue post-graduate training. At that time, IPPEs were not a part of the curriculum so this was my first real exposure to what "clinical pharmacy" was. Additionally, as a student, I always found Infectious Diseases to be the most interesting course because of how such a tiny organism would be able to completely incapacitate a person and how our antibiotics / antivirals would enter our body and selectively kill the organism so I knew if I were to specialize it would be in this area.

2. What does your typical work shift consist of?

   Typically rounds will start with the medical team around 8:30 am until 10am. Afterwards, there will be discussions with students and PGY-1 residents about the cases for a few hours. Afternoons are usually involved with reviewing patients or addressing other responsibilities for the hospital or university.

3. What would you say was the most difficult part of your journey in becoming a clinical pharmacist?

   The completion of my PGY-1 residency was likely the most challenging part of my training. Our program was very intense in terms of the responsibilities and the complexity of our patients.

4. How do you see your current role evolving in the next couple of years?

   At the moment, I don't really foresee any changes happening to my role in the near future. (knock on wood) But at our hospital we hope to continue creating new positions for pharmacists to be integrated into other aspects of patient care like clinics or other processes.

5. Did you do any research as a pharmacy student that helped you get to where you are right now?

   I did not participate in research as a student and to be honest this was not really something that was mentioned/offered during my time in school.

6. What advice would you give to a pharmacy student who is looking to become a clinical pharmacist and/or complete a residency after graduation?

   The best advice I would have is to actually open the textbooks. Read Goodman and Gilman's Pharmacology, watch YouTube videos to understand pathophysiology of diseases. If a student wants to succeed, stop viewing class notes as the only resource you need to learn. lectures are a supplement to these materials. Additionally, I would suggest learning some sort of basic programming or data analysis skills. So much is now being tracked and evaluated and pharmacists have the potential to step into these roles to help facilities meet metrics and achieve patient outcomes, but one has to know how to pull this information and analyze it appropriately so the right solutions can be discerned.

7. Are there any adaptations that were made to your workflow during the COVID-19 pandemic that still remain in practice today? If so, were the changes for the better or worse?

   We don't do bedside patient rounds anymore as a result of the pandemic so that has taken away from the experience a little. Most of our other services have since returned to pre-pandemic operations but perhaps in a reduced capacity due to staffing shortages.

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Bebtelovimab: COVID-19 Monoclonal Antibody Treatment

The COVID-19 pandemic has brought about several waves of healthcare innovation over the course of the last few years. Eli Lilly's bebtelovimab is one of the latest monoclonal antibody medications that has received emergency use authorization by the FDA as of February 2022 for use in adult and select pediatric patients with mild to moderate COVID-19 disease. Bebtelovimab is described as a recombinant neutralizing monoclonal antibody drug which binds to the COVID-19 spike protein and blocks it from attaching to the human ACE2 receptor, preventing the progression of disease.[1] According to the FDA's emergency use authorization, it is indicated for pediatric patients >12 years old and weighing >40 kilograms or adults >18 years old diagnosed with mild-to-moderate COVID-19 with high risk of complications or if other treatment options are unsuitable for them. The emergency use authorization defines high-risk individuals as patients who are >65 years old, have an advanced body mass index (BMI) in accordance with age and gender, or those with immunosuppressive conditions and/or treatment regimens. The treatment needs to be initiated within seven days of symptom onset as a single dose.[2] Compared to its predecessors, bebtelovimab administration is easier as it is given intravenously over at least 30 seconds.[1] Patients who are hospitalized or require supplemental oxygenation due to COVID-19 are ineligible for treatment with bebtelovimab at this time.[3] Side effects of bebtelovimab may include itching, rash, nausea, and infusion-related reactions.

Unlike preceding monoclonal antibodies, bebtelovimab is the only monoclonal antibody that shows activity against all known variants of COVID-19, including the omicron variant as well

as sub-variants recognized by early data.[4] Previously authorized monoclonal antibody cocktails such as Eli Lilly's bamlanivimab/etesevimab and Regeneron's casirivimab/imdevimab were deemed ineffective in the face of the emerging omicron variant. Therefore, emergency use authorization of both cocktails was limited by the FDA in January 2022 to only treat patients with susceptible COVID-19 strains, despite the lack of an available laboratory test to identify viral strain at this time.[5] Clinical trials have demonstrated that bebtelovimab has shown success over other monoclonal antibodies in reducing COVID-19 symptoms and overall progression of disease and hospitalization in both low and high–risk patients, with the primary outcome measured being reduced viral load. Eli Lilly's BLAZE-4 trial conducted among unvaccinated patients diagnosed with COVID-19 showed reduced viral load in patients receiving bebtelovimab (14%) when compared to combination monoclonal antibody treatment (13%) and placebo (21%.) The secondary endpoint, reduced hospitalization/death related to COVID-19, was also observed to be lower in patients treated with bebtelovimab (1.6%) when compared to combination monoclonal antibody treatment (2.4%) and placebo (1.6%).[6]

In February 2022, 600,000 doses of bebtelovimab were purchased by the US government followed by an additional 150,000 doses in June 2022.[4] Bebtelovimab has shown marked reductions in hospitalizations due to COVID-19 since its initial implementation in hospitals nationwide, which is said to be the government's motivation in continuing to purchase the drug. The government is also actively working with Eli Lilly to ensure the drug supply will stay available to meet demand, especially in the near future in the absence of funding.[7] Bebtelovimab has additionally been updated to be commercially distributed and marketed starting in August 2022 anticipating depletion of the federally allocated supply and lack of further funding from Congress. As a result, the Health and Human Services Secretary has worked with healthcare providers to ensure access to the drug, as well as development of initiatives for uninsured patients to receive a single bebtelovimab treatment free of charge.[8] Bebtelovimab has significantly contributed to reducing the spread of disease as well as hospitalization and mortality as a suitable treatment option for eligible patients, and the US government is actively ensuring its ease of access so that it may continue to do so.

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