ACCP Pulmonary PRN

Annual Newsletter 2023

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ACCP Pulmonary PRN
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Developed by the Communication Committee

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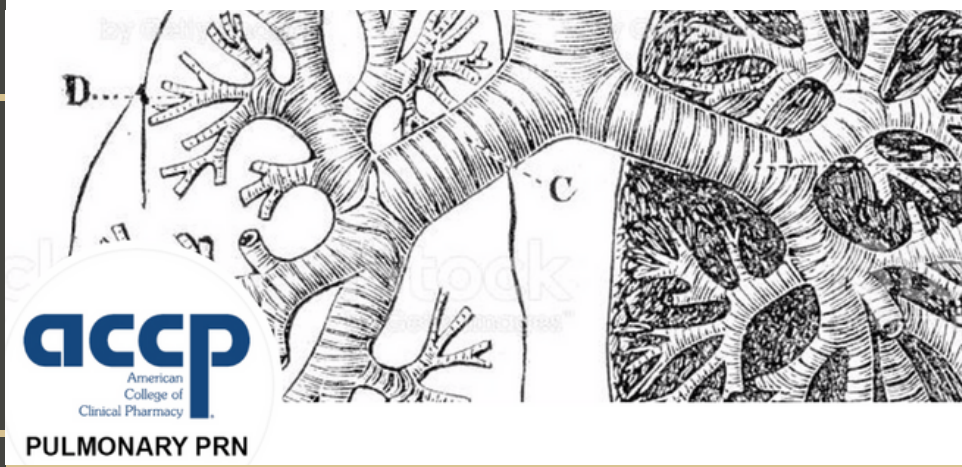

Message from the Chair

Melissa Santibañez, Pharm.D., BCCCP
(msantibanez56@gmail.com)

It has been the opportunity of a lifetime to serve as the Pulmonary PRN chair this past year! Ever since I was a pharmacy student, ACCP was my main professional home for clinical pharmacy practice and research. I have been involved with the Pulmonary PRN since my PGY2 training in 2017 when the call to charter a new PRN went out! I've been honored to have led many of our PRN's charges, especially with our annual focus session proposals and chapter newsletter within the Education & Programming Committee. Due to the tireless efforts of your PRN leaders, this has been a year of many firsts! We developed our first annual speaker's bureau,

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gathering members' expertise in order to feature a broader diversity of our members in future focus sessions and educational webinars. The speaker's bureau submission portal will be open on a rolling basis; please consider providing your interests and areas of expertise (https://forms.gle/68cci5p9qL8M7yf1A). We awarded our first student/resident travel award to Trenton Flanagan (University of Oklahoma), who provided a phenomenal presentation of his research project on inflammatory mediators of colchicine metabolism. We will be continuing this research award for this year to support another PRN in-training member (student/resident/fellow) and a PRN professional member to attend the Annual Meeting. We also held professor rounds during the Virtual Poster Symposium and will be featuring our Best Poster winner in this newsletter! Finally, this year saw our first PRN opinion paper publication in Pharmacotherapy, a scoping review on theophylline uses for pulmonary conditions from our Research Committee led by our incoming PRN Chair, so I am beyond confident that our PRN will only continue growing and expanding in the future!

Chair-Elect: Paul M. Boylan, Pharm.D., BCPS (boylan.pm@gmail.com)

I am currently an Assistant Professor at The University of Oklahoma College of Pharmacy. I graduated from the Nesbitt School of Pharmacy at Wilkes University in 2014 and completed my PGY1 residency at Reading Hospital in Pennsylvania and a PGY2 Transitions of Care residency at Nova Southeastern University in Florida. I have been a member of the Pulm PRN since its inauguration four years ago. It has been a privilege to network and collaborate with colleagues similarly interested in pulmonary disorders and who care for patients with lung conditions. My fondest ACCP memory is meeting - in person for the first time! - our members at the 2019 Annual Meeting in New York. The experiences therein reaffirmed that ACCP and the Pulm PRN would be my "professional homes" and that I would strive to continually engage with our community. Thank you for the opportunity to lead our network this year and I look forward to working with you!

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Secretary/Treasurer: Linda Fitzgerald, Pharm.D., BCPS, BCTXP, DPLA (ljs0328@gmail.com)

I currently work as a Medical Science Liaison in Transplantation. I received my Doctor of Pharmacy degree from the University of Missouri-Kansas City and completed a Pharmacy Practice Residency and PGY2 critical care specialty residency at the Hospital of the University of Pennsylvania. I previously practiced as an adult solid organ transplant/cystic fibrosis pharmacist and served as the residency program director for the PGY2 solid organ transplant residency and Clinical Team Lead of the Transplant Pharmacist team at Michigan Medicine. I have been a member of the Pulmonary PRN since its inception and have participated on several committees. I am grateful to have this opportunity to serve the PRN in my current role this year!

Committee Updates

Education and Programming Committee (EPC)
Chair: Melissa Lipari, Pharm.D., BCACP (mlipari@wayne.edu)
Chair-Elect: Jeffrey Gonzales, Pharm.D., PDE-C (jeff_gonzales84@comcast.net)
Members: Melissa Santibanez, Paul Solinsky, Theresa Prosser, Connor Hayes

The Education and Programming (formerly Education, Programming, and Communications) Committee's charges over 2022-2023 were to submit and finalize our PRN focus session programming for the 2023 annual meeting and to maintain the updated list of our past PRN focus sessions. Our Pulmonary PRN focus session was accepted and will be offered live on Saturday, November 11th from 3:30 PM to 5:00 pm CST, titled “As Good as GOLD: Updates in COPD Management." This session was developed to discuss the major changes in the 2023 Global Initiative for Chronic Obstructive Lung Disease guidelines based on recently published literature. We have three exciting speakers, Dennis M. Williams, Pharm.D., FCCP, BCPS, Suzanne G. Bollmeier, Pharm.D., FCCP, BCPS, AE-C, and Sheryl F. Vondracek, Pharm.D., FCCP, BCPS, who are experts in the area of COPD. They will focus on the updated assessment strategy for COPD severity, therapeutic recommendations in chronic and acute COPD, and recommendations for systemic corticosteroid use in the management of acute COPD.

Research Committee
Chair: Brooke Foster, PharmD, BCACP (brooke.foster@froedtert.com)
Chair-Elect: Lori Wilken, PharmD, BCACP (lwilken@iuc.edu)
Members: Megan Fleischman, Jeff Gonzales, Melissa Lipari, Hanna Phan, Mark Malesker, Amber Lanae Martirosov, Melissa Santibanez, Dennis Williams

The ACCP Pulmonary PRN published its first PRN-sponsored publication in *Pharmacotherapy*! The article is titled Theophylline for the management of respiratory disorders in adults in the 21st century: A scoping review from the American College of Clinical Pharmacy Pulmonary Practice and Research Network. Authors were Paul Boylan, Maha Abdalla, Brittany Bissell, Mark Malesker, Melissa Santibanez, and Zachary Smith. The research committee also kicked off a new research project regarding interstitial lung disease (ILD) as this was identified by PRN members as an area of opportunity for

Committee Updates, cont.

knowledge expansion and further pharmacist involvement. This project is being led by Amber Lanae Martirosov and will consist of two phases: an overview of ILD and best practices for pharmacist involvement in ILD care.

The research committee also put together a poster on the history of the pulmonary PRN to highlight the PRN's growth and impact since its inception. This poster will be presented at the ACCP Annual Meeting. Lastly, the committee is considering creating a PRN peer review process to help support PRN members in their own research endeavors. Look for a question about your interest in this in the upcoming annual member survey.

Nominations and Awards Committee

Chair: Julio A. Rebolledo, Pharm.D., BCPS, BC-ADM, AE-C (jrebol2@uic.edu)
Chair-Elect: TBD
Members: Linda Fitzgerald, Megan Fleischman

The Nominations and Awards Committee's primary charges for the 2022-2023 term were as follow: A report that highlights our Pulmonary PRN member's accomplishments was prepared. This report is included in the ACCP PRN News Briefs published during Spring and Fall. ACCP PRN Report Nominations for officers were solicited and all of our officers have been elected. Pulm PRN member Nominations for ACCP and PRN awards were submitted as well. This year we submitted multiple nominations and two of our members received the following awards; Dr. Paul Boylan received the 2023 ACCP New Educator Award and Dr. Lori Wilken was awarded the ACCP Fellowship. Both will be celebrating with all award recipients and ACCP members in Dallas. Our members also participated in the ACCP Virtual Poster Symposium, and the Best Poster Award was awarded to the top scoring poster. This year we had two winners, Dr. Theresa Prosser; Dr. Suzanne Bollmeier and Dr. Mark Malesker. They were formally recognized during our business meeting. A travel award for student and resident members continues to be offered. We invite all of our members to encourage their students and residents to join the Pulm PRN and participate in its committees.

Thank you, Committee members!

Committee Updates, cont.

Communications Committee

Chair: Jean Moon, Pharm.D., FCCP, BCACP (jmoon@umn.edu)

Chair-Elect: Jeff Gonzales, Pharm.D., MS, BCPS, CDCES, PDE-C

Based on feedback from both our Committee Chairs and PRN Officers, we started a separate Communications Committee. This Committee will be tasked with advertising and marketing our PRN's achievements and upcoming events with the officers. Our committee is expected to regularly update the PRN's social media accounts (X, Instagram), PRN website on ACCP, and will also develop and issue our annual PRN newsletter. We started off very small and hope to have more members in the future! Please reach out to any PRN Officer if interested in joining!

Research Updates

Theophylline Use in the 21st Century: A Scoping Review from the ACCP Pulmonary Practice and Research Network

Principal investigator: Paul M. Boylan, Pharm.D., BCPS
Co-investigators: Maha Abdalla, Brittany Bissell, Mark E. Malesker, Melissa Santibañez, Zachary Smith

Assessment of Theophylline Prescribing Practices for Pulmonary Conditions

Principal investigator: Melissa Santibañez, Pharm.D., BCCCP
Co-investigators: Suzanne Bollmeier, Paul Boylan, Melissa Lipari, Dennis Williams

The primary aim of this prospective survey-based study is to assess and describe prescriber preferences regarding theophylline for pulmonary conditions. This study directly builds upon the prior PRN-sponsored scoping review of theophylline for pulmonary conditions. It will assess prescriber preferences for theophylline along multiple demographic and clinical areas (e.g., indications, patient selection, prescriber training program/country/year/current region of practice, incorporation of therapeutic drug monitoring/goal therapeutic ranges, adjunct vs primary therapy, monotherapy vs combination therapy). Prescribers selected to survey will include: physicians, mid-level providers (e.g., nurse practitioners, physician assistants), and pharmacists. The study team is currently developing the survey instrument to submit for IRB approval and then pilot test and issue to the selected prescribers by late fall 2022/early spring 2023. Please direct any project inquiries to Dr. Melissa Santibañez.

MEMBER SPOTLIGHT

KIMMY NGUYEN, PHARM.D., BCACP

Kimmy Nguyen is an assistant professor of pharmacy practice at Wilkes University, Nesbitt School of Pharmacy in Northeast Pennsylvania. She has a clinical practice site at Volunteers in Medicine, a free clinic that serves an uninsured population. She earned her Doctor of Pharmacy degree from the Philadelphia College of Pharmacy and completed two years of post-graduate residency at the Corporal Michael J. Crescenz VA Medical Center in Philadelphia, PA and the VA Hudson Valley Health Care System in Wappingers Falls, New York. She is board certified in ambulatory care pharmacy and advanced diabetes management. Dr. Nguyen's clinical responsibilities focus on the management of chronic conditions, like diabetes, hypertension, and pulmonary disorders, and she precepts students, residents, and other healthcare trainees.

1. What's your favorite pulmonary disease and why?

If I had to pick a "favorite" pulmonary disease, I'd say it's asthma because it's a condition where providing education and medication management can make a significant and positive impact on a person's life. Helping people breathe easier and achieve a better quality of life is a rewarding part of being a pharmacist. Plus, it's incredibly satisfying to help people get back into their hobbies, like sports or being active with their friends and family. So asthma wins my "favorite" title for the positive changes we can make in people's lives through proper care and education.

However, it's definitely not my favorite topic to teach! That distinction goes to COPD because I enjoy going over bronchodilators, and it's a bit more straightforward than asthma!

2. How would you advise residents and new practitioners that want to incorporate research into their practice but don't know where to start?

Getting started with research can certainly be daunting and intimidating. Here are my top tips on how to start incorporating research into practice:

- Identify Areas of Interest: Start by reflecting on areas within pharmacy or healthcare that genuinely interest you. This could be a specific disease state, medication therapy, or a healthcare process you'd like to improve. Then take a look at the literature to review research and projects that have been conducted in your area of interest. This can potentially help identify gaps in knowledge and interesting questions that may warrant further exploration.
- Seek Mentorship and Collaboration: Connect with experienced preceptors, faculty, or colleagues who share your interests. Mentorship is invaluable in guiding your research journey! They can help refine research ideas, connect you with resources, and bring diverse perspectives to your projects. Additionally, many institutions have research support offices or departments dedicated to assisting researchers. These offices can provide guidance on grant applications and data analysis!
- Stay Persistent: Research can be challenging and may involve setbacks. Persistence is key! Keep refining your research skills and learning from each experience.

3. What advice do you have for students, residents, and new practitioners looking to be involved with professional organizations?

Involvement in professional organizations can be a fulfilling and enriching aspect of your pharmacy career. It not only provides opportunities for personal and professional growth but also allows you to contribute to the advancement of the pharmacy profession as a whole. I became more involved in ACCP as a resident, and I found their board preparation materials immensely helpful in preparing for the ambulatory care certification! Here's some advice on how to get more involved:

Explore Your Interests: Identify specific pharmacy interests and then determine which professional organizations best align with your career goals! Different organizations cater to a wide array of specialties and areas of pharmacy practice, so spend some time reading about what they have to offer or connect with colleagues in the organization to learn more about their experience.

Join and Engage: Once you've found organizations that mesh with your personal or professional interests, become an active member by attending meetings, conferences, and events. Educational resources, webinars, and courses are excellent ways to expand your knowledge and stay current in your field. Many groups also offer online discussion forums, email lists, and committees within the organization, and these are great ways to network, volunteer, and develop leadership!

Network: This is a crucial aspect of professional organization involvement. Building relationships with fellow members can lead to unique opportunities for mentorship, collaboration, and career advancement!

4. What career advice do you have for new practitioners?

Having been in practice now for the better part of a decade, I would have liked to remind my younger self that pharmacy is a journey. It's expected that you'll encounter challenges and opportunities along the way, and you'll

grow with both of these experiences. I would encourage new practitioners to invest in their professional development and never stop learning. It can be so easy to underestimate the impact you have on improving patient care and advancing the pharmacy profession when you're just starting out, but your work matters. Networking and seeking mentorship at this stage can provide important support and guidance to combat any feelings of doubt or insecurities.

It's also helpful to think ahead to where you want to be by setting short- and long-term career goals. Having a clear direction can help you make informed decisions about job opportunities, further education, and professional development.

Lastly, I would ask that new practitioners check their work-life balance and periodically self-assess their well-being to avoid burnout. A balanced life will help sustain a successful and fulfilling career to create positive change in the lives of those around you.

5. What is the most challenging and most rewarding part of being a faculty member or in your practice setting?

The most challenging aspect of being a faculty member is striking the balance between teaching, research, and patient care. With a practice site at a free clinic that serves the uninsured, finding ways to provide both evidence-based and patient-centered care in a low-resource environment requires a lot of critical and creative thinking. And it can lead to some tough decisions and conversations, made more difficult when we consider language and health literacy barriers in addition to social determinants of health. My initial training was within the VA healthcare system, so when I started at Volunteers in Medicine, I had to quickly learn new ways to help our patients access, afford, and understand necessary and potentially life-saving medications. The ability to create boundaries and maintain wellness is definitely put to the test with some of the more complex cases. Add to that learners from different levels, from IPPEs to APPEs to pharmacy residents, and you get some busy clinic days! And this means that sometimes my research and other academic responsibilities are left for the evenings or other days in the week.

But working in this clinic has also been the most rewarding part of being a faculty member. Being able to directly help people in our local community while showcasing the ways that pharmacists can play an integral part on the healthcare team in new and creative ways is truly something special. Learners that have worked with me in the clinic grow both personally and professionally, and they leave with an appreciation for ambulatory care and the value of perseverance and collaboration. By having such an active practice, I have no shortage of patient stories that help me illustrate the key points in my lectures, and it's this human element that fosters a deeper connection between learners and the material. At the end of long and busy days, I rest easy knowing that this position has allowed me to help both patients and learners, and I think it's just so cool to be able to help shape future generations of pharmacists to create their own positive change in the world.

6. What advice do you have for preventing burnout or encouraging work-life balance?

The number one piece of advice is that you have to be honest with yourself and know when to put yourself first. I entered academia directly from residency, and so it was too easy to maintain that residency pacing of long hours and accepting project after project. That pacing is not sustainable for most, and by the time I sat down to re-evaluate my work-balance (prompted in part by the pandemic), it was a bit too late. A part of me felt like a passive observer as I ticked off different signs of different stages of burnout. But recognizing the signs is the first step. The second, and much harder, step for me was to take action to address the problem. As a tenure-track faculty, there are certain things I have to do to make sure that I'm prepared for tenure and promotion. I had some concerns that scaling back may affect my trajectory, but the more pressing matter was this nagging feeling that I wasn't doing enough. I sought the mentorship and advice from colleagues, which really helped me work through my thoughts, and the conclusion that took me too long to arrive at was that I needed to take care of myself first if I wanted to provide patients and learners going forward. And I think everyone knows this. But it's one of those things that you have to arrive at on your own. So I encourage anyone reading this to do a quick check on how you're feeling about your work-life balance and build that into your routine so you can set boundaries and take time for self-care *activities that align with your joys and interests. And if you're battling feelings of doubt or guilt in wanting to take time for yourself, my best advice is talking this out with trusted peers, mentors, or friends.*

7. What is 1 thing you have accomplished in your pharmacy career that you are proud of?

One thing that I'm most proud of is simply making it to where I am today. I'm a first-generation college student who struggled to figure out what I wanted to do after pharmacy school. I wanted a career where I could use my creativity to help both patients and learners, and academia seemed to fit the bill. However, self-doubt and uncertainty accompanied me every step of the journey. They were there when I was competing for residency and when I didn't hear back from an interview for a faculty position. And even though I've made it to where I've always wanted to be and the tenure and promotion process is proceeding smoothly, I still have some self-doubt and uncertainty from time to time, but I think that might just be part of life. Ultimately, working to get to a position where I can help so many people every day is something I'm deeply proud of, and I'm eternally grateful for all the connections I've made along the way through state and national organizations, like ACCP!

Pharmacotherapy Article

Albuterol–Budesonide Fixed-Dose Combination Rescue Inhaler for Asthma: A Review

Nancy Guilliame, Pharm.D. Candidate
Advisor: Jeffrey Gonzales, Pharm.D., MS, BCPS, CDCES, PDE-C

A trial aimed to assess the efficacy and safety of albuterol-budesonide metered-dose inhaler in adults and children 4 years of age or older with asthma (MANDALA), compared to albuterol monotherapy. Asthma poses complex challenges, characterized by variable airflow obstruction and persistent airway inflammation. Short-acting β2-agonists like albuterol are commonly used for immediate symptom relief during acute exacerbations, but they fail to address underlying inflammation, leading to severe exacerbation risks. To mitigate this risk, a new formulation has emerged, as recommended by the Global Initiative for Asthma and the National Asthma Education and Prevention Program. A fixed-dose combination of albuterol and budesonide, aims to provide albuterol–inhaled glucocorticoid rescue therapy. The study delves into the use of this combination as a rescue inhaler for asthma and explores its potential implications for the future of pharmacy.

The multinational, phase 3, double-blind, randomized, parallel-group, event-driven trial involved 295 sites across North America, South America, Europe, and South Africa. Participants included adults and adolescents with moderate-to-severe asthma who had experienced at least one severe exacerbation in the prior 12 months. The participants were randomly assigned into three treatment groups, each group had a differing dose, of albuterol-budesonide or albuterol alone. The higher-dose combination group was treated with 180 micrograms (µg) of albuterol and 160 µg of budesonide, the lower-dose group with 180 µg of albuterol and 80 µg of budesonide, and the control group with 180 µg of albuterol. Children aged 4 to 11 years were assigned to the lower-dose combination or albuterol-alone group due to safety concerns. Participants used trial medications as needed, and other fast-acting bronchodilators were prohibited for rescue purposes. Changes in maintenance therapy were discouraged during the trial, except when clinically necessary. The trial was event-driven, with the primary efficacy endpoint being the first severe asthma exacerbation analyzed using time-to-event analysis. Secondary endpoints included the annualized rate of severe exacerbations, total systemic glucocorticoid exposure, and improvement in asthma control and quality of life scores. Safety endpoints were also assessed. The trial used preplanned efficacy analyses to compare the treatment groups and was designed to detect a 25% lower risk of severe asthma exacerbation with the fixed-dose combination of albuterol–budesonide compared to albuterol alone.

The intention-to-treat analysis showed that the higher-dose combination group had a 26% lower risk of experiencing severe asthma exacerbation compared to the albuterol-alone group (hazard ratio, 0.74; 95% CI, 0.62 to 0.89; P=0.001). The lower-dose combination group also showed a numerical reduction in the risk of severe asthma exacerbation, but it did not reach statistical significance. Secondary efficacy endpoints, including the annualized rate of severe asthma exacerbations and total systemic glucocorticoid exposure, favored the combination groups over the albuterol-alone group. The safety profile of the fixed-dose combination was similar to that of the active components.

The findings of this study support the use of albuterol–budesonide fixed-dose combination inhaler as a rescue medication in patients with moderate-to-severe asthma.

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The results showed that the higher-dose combination group had a significantly lower risk of severe asthma exacerbation compared to the albuterol-alone group. Secondary efficacy endpoints favored the combination groups over albuterol alone, and the safety profile of the fixed-dose combination was similar to the individual components. These results have important implications for the future of pharmacy, as they suggest that a fixed-dose combination inhaler could replace SABA alone as the preferred rescue therapy in patients with moderate-to-severe asthma. This may lead to changes in treatment guidelines and pharmacy practices, emphasizing the importance of incorporating anti-inflammatory agents in rescue medication regimens.

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The Revefenacin Debate: Adherence and Cost Benefits versus Inpatient Formulary Limitations

Katelyn Helwig, Pharm.D. candidate
Macie Gibbs, Pharm.D. candidate
Advisor: Paul Boylan, Pharm.D., BCPS
The University of Oklahoma Health Sciences Center, College of Pharmacy, Oklahoma City, OK

Introduction

Revefenacin (Yupelri ®) is the first long-acting muscarinic antagonist (LAMA) formulated as a nebulizer solution. It was Food and Drug Administration (FDA)-approved in 2018 for the treatment of chronic obstructive pulmonary disease (COPD). 1 LAMAs such as revefenacin provide bronchodilatory effects by blocking acetylcholine at muscarinic receptors in the smooth muscles of airways, thereby improving airflow and reducing exacerbations. There are six LAMAs discussed in the GOLD 2023 Report, but revefenacin is only mentioned once in a table listing the different drug classes used as maintenance therapy. 2 Non-pulmonary prescribers may thus be unfamiliar with this medication compared to more frequently-used LAMAs, such as tiotropium. With revefenacin's convenient once daily dosing, both adherence concerns in outpatients and inpatient medication prescribing errors may be expected.

Adherence

Non-adherence to inhaled maintenance therapy is a common concern for patients living with COPD, which leads to more frequent symptoms, exacerbations, and increased healthcare visits and costs. 2 One benefit of revefenacin is that the duration of bronchodilatory effect is twenty-four hours, thus offering once daily dosing compared to twice-daily dosing of some other LAMAs, such as aclidinium or glycopyrrolate; revefenacin's once-daily frequency may improve adherence.

Pharmacotherapy Article

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Revefenacin is also a suitable option for those who are unable to use inhalers, such as the elderly or those with physical limitations. 1 Metered-dose inhalers (MDI) and dry-powder inhalers (DPI) require coordination of inhalation and actuation in order to receive the full dose of the inhaled medication. Also, DPIs should not be used in patients who cannot achieve high inspiratory flow, such as those experiencing bronchospasms. 3 Nebulized medications do not require such coordination and are easier to administer for those with inadequate inhaler technique. 4

Inpatient Formulary Cost Savings

Revefenacin may be beneficial to add to inpatient formularies to decrease healthcare costs for patients and improve cost-savings for health systems. Nebulizer solutions are formulated in unit-dose packages that may be dispensed as patient-specific doses for inpatient use while MDIs are commercially-supplied and provide more doses that typically extend further than the duration of an inpatient stay. Per the Agency for Healthcare Research and Quality, patients hospitalized for acute exacerbations of COPD are hospitalized, on average, between 4 and 5 days.5 In one retrospective study, an estimated hospital cost of $182 per patient on wasted doses of MDI and DPI was found. 6 With approximately 1.3 million admissions per year for COPD or asthma in the United States, this results in an estimated $236 million lost on wasted MDI and DPI doses annually. 6 Kaiser Permanente Baldwin Park Medical Center found that switching the formulation of ipratropium from a MDI to a nebulizer solution saved the hospital an estimated $68,700 in drug costs over an eleven-month period. 7 The potential cost savings with using a nebulizer solution like revefenacin may be similarly beneficial for hospitals to make the switch from traditional MDIs or DPIs to nebulizers. Revefenacin had greater improvements in trough forced expiratory volume in one second (FEV 1) and lower adverse events than tiotropium in a short term study; however, long term studies would need to be conducted to determine if the results would remain consistent across a greater amount of time. 8 Anecdotally, at The University of Oklahoma Health OU Medical Center, the cost of one vial (one daily dose) of revefenacin is $6.30 versus $69 for a 5-days supply of tiotropium soft mist inhaler.

Inpatient Drawbacks

According to the manufacturer, revefenacin is only labeled for the maintenance treatment of COPD, and it should not be used as rescue therapy to relieve bronchospasms or acutely deteriorating COPD. 9 The time to peak effect of bronchodilation is 14 to 41 minutes after the start of nebulization and the peak FEV 1 is 2 to 3 hours. 9,10 This contrasts albuterol and tiotropium having peak times of 5 to 7 minutes for bronchodilation and peak FEV 1 times of less than 30 minutes to 2 hours for albuterol and 3 hours for tiotropium. 11-13

The slower onset for revefenacin to take effect might explain why it may not be the best option for some hospitalized patients if their COPD is uncontrolled, worsening, or if they are experiencing exacerbations.

Conclusion

Revefenacin is the first nebulized 24-hour LAMA. Once daily administration is a boon for adherence and an alternative for patients experiencing difficulty using inhalers. Revefenacin may be cheaper dose-per-dose for inpatient formularies but it should not be used to treat patients experiencing bronchospasm or acute exacerbations of COPD.

Pharmacotherapy Article

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Pharmacotherapy Article

Climate Change & Respiratory Care: What Can Pharmacists Do?

Hayley Blackburn, BCACP, BC-ADM, Associate Professor, University of Montana Skaggs School of Pharmacy
Alice Gahbauer, BCACP, Associate Professor, University of Charleston School of Pharmacy

As summer of 2023 comes to an end and we review the record-breaking weather events across the globe to date, many are reflecting more deeply about the wide-ranging impacts of climate change on our health. It is increasingly urgent for health professionals to take an active role in responding to climate change through adaptation efforts as well as through working toward decarbonization of our health systems and communities. These goals present an opportunity for pharmacists involved in respiratory care to take action on both fronts.

First, it is important to have a clear understanding of the wide range of impacts on respiratory health driven by climate change. While the direct risks to respiratory health posed by air pollutants produced by wildfire smoke and burning fossil fuels are well-known, direct and indirect risks associated with changes in temperature, precipitation, and weather-related disasters can often be overlooked [Eguiluz-Gracia, 2019]. Extreme heat is associated with increased exacerbation rates, morbidity, and mortality of respiratory disease, and may have synergistic harmful effects with concurrent exposures to air pollution. Changing weather patterns affect the quantity, timing, and duration of seasonal allergens, including pollen and fungal spores, increasing risk of exacerbations and new sensitizations. In addition, increasing intensity and frequency of thunderstorms in some regions may increase cases of "thunderstorm asthma," or asthma exacerbations triggered by the sudden release of large quantities of aeroallergens during thunderstorms. Conversely, drought conditions may increase the likelihood of dust storms in drier regions of the world, resulting in airborne particulate matter that can impact air quality in distant geographic locations [Cecchi, 2010]. While hazards and health impacts will vary from region to region and across different populations, it is important to recognize climate change as a vulnerability amplifier for patients already experiencing health disparities [Covert, 2023].

Given pharmacists' position as accessible health professionals who have frequent contact with high-risk populations, we can serve an important role in these efforts through early identification of patients who may have risk factors and proactive counseling and clinical management to improve health outcomes. Providing patient education related to wildfire smoke is one such example. There is no "safe" level of wildfire exposure for anyone, but older adults, children, pregnant people, and people with underlying chronic conditions, including respiratory conditions and cardiovascular conditions, are at particular risk and should receive education to help them understand the steps they can take to reduce their exposure. As a pharmacist, you can also help patients manage their respiratory symptoms during hazardous air quality days. Consider equipping patients with an Asthma or COPD Action Plan and talking with them ahead of wildfire season about their risks. There is no current evidence to support preemptive use of short-acting bronchodilators before going outdoors when wildfire smoke is present, but patients should ensure that they have rescue medication on hand for wildfire smoke events and that they continue with good adherence to an optimized medication regimen. With fluctuations in air quality and increasing frequency and intensity of "smoke waves," remote patient monitoring tools may also be a helpful option to provide extra support to patients during particularly high-risk periods. Many available digital inhaler systems are accompanied by apps that track symptoms, adherence, and include air quality information for patients [Mosnaim, 2022].

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In addition to helping patients adapt to climate change, pharmacists involved in respiratory care have an opportunity to be particularly impactful in reducing healthcare's carbon footprint because the propellants used in certain inhaled medications are significant contributors as potent greenhouse gasses. The United Kingdom's National Health Service (NHS) estimates that inhaler emissions account for 3% of its carbon footprint [NHS]. Pressurized metered dose inhalers (pMDIs) using the standard propellant hydrofluoroalkane (HFA) are the main offenders; one pMDI has a similar carbon dioxide equivalent to driving 94 miles, compared to around 2 miles for one dry powdered inhaler (DPI) [Fulford, 2022].

One response to this problem could be a reconsideration of pMDI ubiquity in US respiratory care. Nearly 90% of inhaler doses are delivered by pMDIs in the US, but this is not a universal norm; the figure is in the 60-70% range in multiple European countries and less than 35% in Japan [Pritchard, 2020]. Patient and clinician education has been used toward the goal of more discretion in pMDI use. For example, the NHS published a patient decision aid for choosing inhalers in 2019 that incorporates inhalers' relative climate impacts [Robinson, 2019; NICE, 2022]. Similarly, the Canadian CASCADES initiative has published Climate Conscious Inhaler guides for inpatient and outpatient healthcare practitioners, as well as infographics and other educational materials [CASCADES, 2023].

Switching pMDIs to inhalers with lower global warming potential (soft mist inhalers or dry powder inhalers) when clinically appropriate is a needed response to our current climate emergency, however that alone is not an environmentally sustainable long-term solution. A 2019 inhaler life cycle analysis cautioned that while switching all pMDIs to DPIs would drastically reduce inhalers' carbon footprint, it would worsen other ecological impacts such as photochemical oxidant formation (205% increase) and water eutrophication (450% increase) [Jeswani, 2019]. It is also critical to note that inhaler switching should not be done without careful assessment and additional patient education to ensure correct technique, as even one moderate asthma exacerbation requiring a primary care visit could completely negate several months' worth of GHG reductions achieved from a pMDI to DPI switch [Kponee-Shovein, 2022]. Furthermore, the level of asthma severity and control is directly linked to the overall carbon footprint of asthma care, as one UK study estimated that over 75% of emissions linked to asthma care were associated with caring for those with uncontrolled asthma [Wilkinson, 2021]. This underscores the valuable role of pharmacists' expertise in selecting appropriate therapy, providing quality education on inhaler technique, and ensuring adherence as a foundation of decarbonization efforts in respiratory care. Further research is also needed to guide program development and policy change, which is yet another opportunity for pharmacists to get involved.

Other emerging responses include inhaler recycling and development of lower-carbon inhalers. From 2011-2020, GlaxoSmithKline ran the "Complete the Cycle," program in the US and UK, which sent inhalers collected from participating pharmacies to specialty recyclers, where unused propellant was recaptured from the canisters and the metal and plastic was reused [FiercePharma, 2012; GSK, 2019]. Teva launched a similar program in Ireland in 2020 [Hamilton, 2020; MyWaste], and Chiesi successfully piloted a mail-back inhaler recycling scheme in the UK in 2021-2022 [Murphy, 2023]. Two propellants in the pipeline, HFA 152a and HFO 1234ze, have carbon footprints 90% and 99% lower than current propellants, respectively [Baron, 2023]. AstraZeneca announced in 2022 that it would be using HFO 1234ze in a "next generation" pMDI it is developing. In the meantime, reducing wasteful inhaler prescribing and use is critical. As always, pharmacists should ensure that patients use correct inhaler technique to maximize the benefit per inhalation.

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Patients should also be educated to refill their pMDIs only when they are expired or empty. Rescue inhalers containing 200 inhalations are often prescribed for up to 12 puffs a day with monthly refills, leading many patients to throw away nearly-full pMDIs every month, unaware of this action's environmental impact.

As the U.S. healthcare system continues to direct increasing attention to the issues of climate adaptation and mitigation, pharmacists have an increasing responsibility to join these efforts through their own unique roles. The U.S. Department of Health and Human Services has created resources for health systems as they improve their climate resilience and sustainability efforts, and has invested more money for research and programs to change policy and regulations. As of spring 2023, over 1100 hospitals and 116 organizations have signed the White House/HHS Health Sector Climate Pledge, a voluntary commitment to decarbonization and climate resilience planning over the coming decades, and organizations like Health Care Without Harm have contributed broad guidance in a Global Roadmap for Health Care Decarbonization. If you are interested in learning more or getting involved, please visit Rx for Climate to connect with other pharmacists working in this area and find resources for education, practice, and advocacy for climate action.

Member Accomplishments

Promotions and Job Updates

- **Megan Fleischman:** Started a new position as an Assistant Professor of Pharmacy Practice, Concordia University of Wisconsin.
- **Brooke Foster:** Started a new position as an Ambulatory Care Clinical Pharmacist, Pulmonary Clinic – Froedtert Health.
- **Julio A. Rebolledo:** Started a new position as Clinical Assistant Professor, University of Illinois Chicago College of Pharmacy, and will be starting a new diabetes telemedicine clinic.

Awards, Honors, Recognitions

- **Paul Boylan:**
  - Teaching and Mentoring Award, ACCP Education and Training PRN.
  - 2022 Outstanding Educator, The University of Oklahoma Health Sciences Center College of Pharmacy Department of Pharmacy.
  - Top Poster Award, ACCP Education and Training PRN. Top Poster Award. ACCP Adult Medicine PRN.
- **Megan Fleischman:** Achieved Level IV pharmacist status at Froedtert Health.
- **Desiree Kosmisky:** Fellow, American College of Critical Care Medicine.
- **Paul Solinsky:** 2023 Minogue Award for Patient Safety Innovation, Maryland Patient Safety Center, for implementation of the AIR-COPD model (Acute Interdisciplinary Response to COPD) at Baltimore Washington Medical Center.

Publications

- **Foster B**, Obidare-Kolade D, Nagy M. Assessment of primary care provider and pharmacist knowledge, comfort, and barriers to appropriate inhaled corticosteroid use in chronic obstructive pulmonary disease. J Am Coll Clin Pharm 2023 Jan 2. [Epub ahead of print]
- Bakken BK, Bozymski KM, **Foster B**, et al. Ambulatory care pharmacy practice: findings from the 2019 National Pharmacist Workforce Survey. Am J Health Syst Pharm 2023;80:284-95.
- Lim L, **Lipari M**, Kale-Pradhan P. Intranasal olopa- tadine: mometasone in the treatment of seasonal allergic rhinitis. Ann Pharmacother 2022 Sep 19. [Epub ahead of print]
- Hudson JQ, Maxson R, Barreto EF, Cho K, Condon AJ, Goswami E, **Moon J**, et al. Education standards for pharmacists providing comprehensive medica- tion management in outpatient nephrology settings. Kidney Med 2022;4:100508.
- Montag Schafer K, Harris I, Lounsbery JL, Philbrick A, **Moon J**. Shifts in pharmacists' responsibilities in family medicine residency programs during COVID-19. Innov Pharm 2022;13:10.24926/iip. v13i1.4559.
- Nissly T, **Moon JY**, Ricco J. Asthma management: how the guidelines compare. J Fam Pract 2022;71:392-7.
- **Santibañez M**, Maldonado A, Hawkins Smith C, et al. 57: Building blocks for implementing a multi-site resident research certificate program: a pilot study. J Am Coll Clin Pharm 2022;5:1369.
- Acquisto NM, Buckley M, Adams C, Ammar M, Brandt K, Bullard H, Choron R, Chudow M, Deshpande R, Fontaine G, Johansson M, Jontz A, Musselman M, O'Connor M, Rodricks M, **Santibañez M**, et al. 12: Critical care pharmacy practice advancement recommendations on direct patient care activities: a Delphi study [abstract]. J Am Coll Clin Pharm 2022;5:1367.
- Robainas M, Maldonado A, **Santibañez M**, et al. 776: Fixed versus variable prothrombin complex concentrate dosing protocol for warfarin-related bleeding [abstract]. Crit Care Med 2023;51:379.

Member Accomplishments

Publications cont.

- Rzasa K, **Santibañez M**, Smedley L. Benzodiazepine alternatives for agitation in palliative care. SCCM Clinical Pharmacy and Pharmacology Section Newsletter 2022;22:14-8.

Presentations

- **Paul Boylan**:
  - Updates on allergic rhinitis and conjunctivitis: when to recommend the new Rx-to-OTC switches. Presented at: Walter P. Scheffe Continuing Pharmaceutical Education Series; October 2022; Oklahoma City, OK.
  - Building a better tomorrow with your colleges of pharmacy. Presented at: National Association of Boards of Pharmacy Districts 6, 7, 8 Meeting; August 2022, Oklahoma City, OK.
- **Brooke Foster:**
  - Aging – hypertension, hyperlipidemia and osteo- porosis. Presented at: 2022 North American Cystic Fibrosis Conference; November 2022; Philadelphia, PA.
  - Cystic fibrosis new therapies: do they help digestive function? Presented at: John F. Gilmore, Jr. Symposium for Excellence in Nutrition Enteral Feedings; September 2022; Chicago, IL.
- **Julio A. Rebolledo**:
  - Health disparities in asthma among Hispanics, Latinos and Blacks. Presented at: Association of Asthma Educators Annual Conference; August 2022; Chattanooga, TN.
- **Melissa Santibañez:**
  - Curbing constipation-centered concerns. Platform presentation for the Treatments on Autopilot session during SCCM Critical Care Congress; January 2023; San Francisco, CA.
  - Fixed versus variable prothrombin complex concentrate dosing protocol for warfarin-related bleeding. Research snapshot presented at: SCCM Critical Care Congress; January 2023; San Francisco, CA.
  - Evaluation of outcomes after implementation of a hyponatremia management order set in an acute care facility. Research-in-progress poster presented at: ASHP Midyear Clinical Meeting; December 2022; Las Vegas, NV.
  - Building blocks for implementing a multi-site resident research certificate program: a pilot study. Poster presented at: 2022 American College of Clinical Pharmacy Global Conference on Clinical Pharmacy; October 2022; San Francisco, CA.
  - Critical care pharmacy practice advancement recommendations on direct patient care activities: a Delphi study. Poster presented at: 2022 American College of Clinical Pharmacy Global Conference on Clinical Pharmacy; October 2022; San Francisco, CA.
  - Surviving the new sepsis guidelines. Presented at: FSHP Annual Meeting's critical care track; August 2022; Orlando, FL.
  - Roles of a preceptor workshop. Virtual presentation for Memorial Healthcare System inaugural preceptor development series; August 2022; virtual.

See you at the 2023 National Conference in Dallas, TX!

- **Pulmonary PRN Focus Session:** Saturday, November 11 @3:30pm-5pm CDT
  - **As Good as GOLD: Updates in COPD Management**
    - Objectives
      1. Recognize risk factors for patients with COPD.
      2. Classify de novo patients with COPD.
      3. Select an appropriate pharmacologic regimen for chronic stable COPD.
      4. Select an appropriate pharmacologic regimen for acute exacerbations of COPD.
      5. Recognize strategies to improve patient access to COPD medications.
    - *Faculty*
      - Dennis M. Williams, Pharm.D., FCCP, BCPS
      - Suzanne G. Bollmeier, Pharm.D., FCCP, BCPS, AE-C
      - Sheryl F. Vondracek, Pharm.D., FCCP, BCPS

- **Pulmonary PRN Business Meeting:** minutes/recording available at accp.com
- **Pulmonary PRN Networking Forum:** TBD (during annual meeting)