

Inspire

Engaging the Next Generation of Oncology Professionals

SPRING
2023

EMBRACING CHANGE

**MASTERING
THE LETTER
OF INTENT**

PAGE 9

**USING DATA
TO IMPROVE
PATIENT CARE**

PAGE 25



PROFESSIONAL
STUDENT
ORGANIZATION

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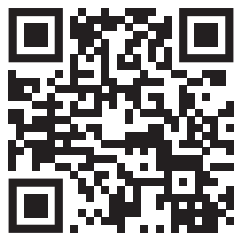
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FOR MORE INFORMATION, SCAN QR CODE OR VISIT:

www.ncoda.org/fall-summit

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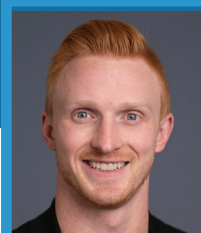


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Inspire

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A MESSAGE FROM THE INSPIRE TEAM

Hello! Bonjour! Hola! Ahlan! Ni Hao!

Guess who's back? Back again. *Inspire's* back! Tell a friend!

Welcome back to the second edition of *Inspire* — the official publication of NCODA's Professional Student Organization (PSO). Like the first edition, we hope to provide a space for students who are passionate about the world of oncology to learn, engage, manage, and be inspired in a fun and interactive way! So don't be afraid to scan QR codes, interact with puzzles, and challenge yourself throughout the publication.

Noticing things look different? We hope so! We vibe-checked ourselves with this new edition to find the official look of *Inspire*. One that is 100% us and the PSOs can take pride in being a part of. Don't get confused though. This is not a "new look, new me" moment! We are still bringing you the best personal editorial stories, interviews, and educational papers in a fun way.

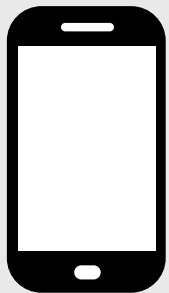
We added a theme for this edition — embracing change. Change is often scary. But change is necessary. Why, you may ask? Because that is how we can grow and become the best versions of ourselves. That is what *Inspire* is all about. Let's share our journey of growth and success!

The editorial team is so thankful for your continued support of *Inspire* and hopes that this brings you as much knowledge and joy as it has us! If you want to get involved with the *Inspire* publication, please email the publication manager, **Sarder Sadid**, PharmD, at sarder.sadid@ncoda.org. If you have a great topic that you would like highlighted in the next edition or want to give feedback, please submit a response using the QR codes below.

Now, sit back and enjoy the ride because, like the Backstreet Boys... *Inspire* is back, alright!

Love,

The Inspire team



TO INTERACT WITH
US, SCAN THE QR
CODES AT RIGHT



ARTICLE TOPIC REQUEST



PUBLICATION FEEDBACK

NCODA'S PROFESSIONAL STUDENT ORGANIZATION: WHERE DID WE START? WHERE ARE WE NOW? WHERE ARE WE GOING?

By Cooper Bailey, PharmD

The NCODA Professional Student Organization (PSO) has come a long way in less than four years. Here's a quick summary of our progress so far.

WHERE DID WE START?

The inception of the NCODA PSO in 2019 was inspired by one mindset: "To empower the future generation of oncology leaders." NCODA's vision was to create PSO chapters as a sustainable space where healthcare students could learn, engage and connect with the expanding field of oncology.

In October 2019, the first PSO chapter was established by students and faculty at South University School of Pharmacy in Columbia, South Carolina. After the formation of the first few chapters, many key oncology leaders applauded NCODA for its leadership in focusing on the future of oncology healthcare providers. NCODA is the first and only international oncology association dedicated to providing oncology education and leadership opportunities for healthcare learners.

WHERE ARE WE NOW?

We have seen tremendous growth within the NCODA PSO initiative. NCODA PSO now has more than 50 student-led chapters and more than 2,000 active student members worldwide. The NCODA PSO international office also has continued to evolve, allowing for increased opportunities. We have developed relationships with our industry partners, practices and collaborating organizations to expand the opportunities available to active students.

One example of this is the newly launched Medically Integrated Oncology Pharmacy Residency Program (See Page 21).

We have two international competitions: the PQI competition, and the NCODA PSO Chapter of the year competition. Both have successfully increased chapter and professional engagement.

NCODA also has expanded its annual meeting to incorporate students, residents, and fellows with the addition of the Oncology Careers Symposium. NCODA PSO students now encompass multiple healthcare professions including but not limited to pharmacy, nursing, medical and physician assistant roles. PSO Committees have been created to focus efforts and provide expanded chapter resources.

To enhance professional relationship-building, the NCODA

Oncology Mentorship Program was launched last fall and included more than 35 mentors and mentees. Finally, NCODA PSO has also established its own publication, *Inspire*.

WHERE ARE WE GOING?

The NCODA Professional Student Organization will continue to bolster its resources to fit the needs of healthcare students. Resources to expect in the future include enhanced interprofessional events, online oncology clinical basics course, expanded fellowship and residency positions (including international expansion), and additional education and leadership opportunities.

NCODA PSO is excited to announce the expansion of its chapter by-laws in the establishment of our first European chapter in Greece. NCODA PSO will continue to focus on global expansion to ensure all healthcare students have access to oncology education and leadership. European growth is spearheaded by a successful collaboration with the European Pharmaceutical Students Association (EPSA) www.epsa-online.org. With continued expansion overseas, NCODA also plans to host its first International meeting.

NCODA PSO also looks to expand the number of nursing students and medical students to ensure medically integrated collaboration between different healthcare fields is fostered during didactic education.

NCODA PSO is also integrating into pre-healthcare students. The first NCODA PSO pre-healthcare internship will kick off during Q3 to give undergraduate students valuable experience to advance into a postgraduate healthcare education.

Innovation will always be at the forefront of NCODA PSO as we continue to foster the next generation of oncology leaders.

NCODA's Vision is "to be the world leader in oncology by providing a patient-centered medically integrated community whose focus is to innovate the continuity of cancer care so every patient receives the maximum treatment from their cancer treatment." NCODA PSO supports this vision and will continue to advocate for future oncology leaders.

NCODA PSO has made momentous strides. However, we feel the journey is just beginning. Until there are zero cancer patients to care for, NCODA PSO will persist in being the elite international oncology student organization.



Cooper Bailey

▲ **Cooper Bailey**, PharmD is the Associate Manager of Student-Centered Initiatives and the MIOP Residency Coordinator at NCODA. In his free time, Bailey likes to golf, play the piano, and run.



PERSONAL BRANDING 101

KRISTEN FELTHOUSEN, MS

WRITING AN EFFECTIVE LETTER OF INTENT AND TIPS
ON ASKING FOR A LETTER OF REFERENCE
PART 2 IN A THREE-PART SERIES ON HOW TO CREATE
YOUR BEST PROFESSIONAL BRAND

What do you think is the best way to communicate your interest in a specific position, area of focus, and how it all pertains to your career aspirations?

Well ... a Letter of Intent (LoI), obviously! Many postgraduate positions require LoIs as a part of the application process. I promise you that the letter is a valuable tool if you know how to use it effectively.

Stop looking at LoIs as necessary evils and embrace them for their purpose — communication. Yes, the initial goal of the LoI is to provide an opportunity to assess a candidate's writing and communication skills. And they are a great tool to introduce yourself and explain why you believe that you are the best candidate for the position.

Now that you have a newfound perspective, let's discuss the fundamentals of how to construct your new marketing tool.

The idea is to capture your reader's attention with a letter that engages your audience and makes them want to have a conversation. This needs to be done in about one page. This is not a diary or your life's history, and it is also NOT a rehashing of your resume/curriculum vitae (CV).

More often than not, less is more, especially for fellowships. It is best to be succinct by getting to the point instead of trying to impress your reader with a lot of extra words.

If you need to use more than one page, that is OK. Never write more than two pages, period. Avoid stretching margins to fit more in the letter. The advice is the same for an LoI as for the CV. The longest one with the most words does not win.

THE FORMAT

OK, let's discuss the format: what to include, context and focus, and the order of information in your document.

The Salutation: Do your homework and address your letter to the correct person (Residency/Fellowship Director or the actual hiring manager) by name and include their credentials. Search the website, online directories and look at the position posting. You can even use LinkedIn. Do not write "To Whom It May Concern." You come across as lazy. Do some searching to figure out these critical details.

Example: Dear Jane Doe, PharmD, BCOP;

Notice that the first and last name of the recipient is included in addition to their Doctor of Pharmacy credentials and their Board Certification in Oncology.

Statement of Interest: Your first paragraph includes an introduction and your declaration of interest. Take time to explain how you learned about the position. Do you have a personal connection? Have you attended their booth at a showcase or completed a rotation or an internship with the company? Great! Include that here. State how this position fits into your professional goals.

Your opening paragraph is the opportunity to capture your reader's attention, and there will be many readers. Yes, you will address the letter to one person in particular, and everyone involved in the selection process will read it, so make sure to keep your audience in mind.

Selling Yourself: Be succinct and include your key skills and experience. Provide two or three directly related Knowledge Skills Abilities (KSAs) that differentiate you from other applicants. Give

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PERSONAL BRANDING

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your reader information about what you will bring to the position and team. Think about it from their perspective and not about what is in it for you. Be specific and provide examples. Transferable skills are vital to include in this section. If you have mastered tasks in other positions, you can perform and improve them in this position.

Why this particular position and why this organization: Read the organization's mission and vision statements on their website. If they are a match with your interests and values, explain that they are, why, and how you embody/demonstrate them in your experience and focus. You need to be authentic. If they are not a fit, then perhaps you are looking at the wrong place and should reconsider your application. Even if you think you can wordsmith something convincing to get to the next phase, I promise that a lack of genuine interest will be apparent in your interview.

So, it is a match! Now you need to answer why this particular position with this particular company/organization/health system. This is where you get the opportunity to explain “why them” in addition to what makes them of interest and importance to you. Make them feel good while also being authentic. Remember, you have a larger audience than just the person you addressed the letter to, and the letter will be shared. Keep that in mind as you write.

Call for Action: Now, it is time to summarize and thank them for their consideration. Offer to discuss your application and interest in further detail and to answer any questions.

Sign Off: Close with your name, Doctor of Pharmacy Candidate and add your school name if you are applying to postgraduate positions.

Hopefully, changing your perspective on leveraging the LoI will help you embrace the opportunity it provides for others to get to know you a little more and ultimately to meet you. Bring on the interview(s)!

TIPS ON ASKING FOR A LETTER OF REFERENCE

So, it is now time to ask for a letter of reference to complete your application. Perhaps one of the most daunting parts of the process. Who do you ask? How do you ask? Being strategic and thoughtful goes a very long way, so make sure to take time to consider who to approach and to give them the tools to write a valuable letter.

Many of us struggle with asking people to be a reference. Sometimes it is because we are not sure who to ask. Often we do not want to “bother” someone to do this favor on our behalf.

Regardless, it is a necessary part of an application so let's discuss how to develop your plan and approach.

As someone who has evaluated letters of reference as part of admission applications — and has developed composite letters for students applying to medical school — I have seen a lot of examples of what NOT to do.

The most frequent mistake that applicants make is asking people with big titles (Dean, President, etc.) to write letters — and thinking the titles will impress the selection committee. Unless that person knows you well, and can speak specifically about you in a way that demonstrates a relationship exists, this approach will not impress. In fact, it often backfires because there is often no valuable content provided to evaluate you against your competition. In essence, it is a wasted opportunity.

Instead, match your recommenders with the programs and positions you are applying to, instead of asking people that are not the best fit to discuss the required KSAs.

Choose people who can and will write a strong letter about you and your problem-solving skills, leadership capabilities, communication skills, professionalism, ability to work in teams and influence others, etc.

If you are applying for clinical positions, consider asking preceptors, residents who you worked with on rotations, and clinical faculty that know you outside of the classroom, perhaps from working together at health fairs.

Have you interned at a hospital, clinic, or community pharmacy? Great! Hopefully, your supervisor or another senior employee who has seen you in action — who knows you — can write a letter for you.

Applying for a more business-focused position like a fellowship? The same rules apply. Identify similarly focused professionals who can write to the skill sets listed above and perhaps to your project management, negotiation and networking skills. Again, look at the position description, assess what they are looking for, identify writers who can address the KSAs required and requested.

This process can be difficult. If you ask someone if they can write a strong letter of recommendation for you and they hesitate or say no, that is a complete and perfectly acceptable answer. It may be painful to hear. Hopefully, that person will give feedback or reasons as to why they are declining to write a letter. This is a learning opportunity for you because most people want to be supportive and do not want to say no.

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NOW HIRING: ONCOLOGY PHARMACISTS!

By Samantha Zimmerman, PharmDc

Cancer treatment is becoming more effective, while remaining highly complex. In 2021, the oncology sector broke its previous record of 20 new chemotherapy drug approvals with 21 drug approvals.^{1,2}

The expansion of chemotherapy options is great news for patients and providers. However, with the increase in therapy options, there is an increasing demand for drug experts. As a result, a multidisciplinary approach to managing cancer care is the preferred method to capitalize on the perspective and expertise of multiple healthcare professionals. Multidisciplinary teams rely heavily on the pharmacist, for a holistic, expert pharmacotherapy perspective.

In light of this development, many institutions are moving toward a standard of incorporating an oncology pharmacist on every cancer patient's care team. Due to the growing number of patients and therapy options, the landscape of oncology pharmacy is changing, leading to many opportunities for the pharmacist to impact an oncology practice.

A UNIQUE SKILL SET

An oncology pharmacist's overall approach to patient care is to optimize efficacy and benefit of chemotherapy while minimizing and managing adverse effects and toxicities. Additionally, studies have shown that when a pharmacist is heavily involved in a patient's oncology care, there is a direct benefit in not only overall patient satisfaction, but also of patient understanding of their medication regimen.³

Pharmacists and student pharmacists interested in oncology practice can find opportunities in multiple patient care settings. Some of the current options include patient-facing roles such as inpatient practice, ambulatory practice, infusion centers and non-direct patient-care roles such as investigational drug or clinical trial pharmacists.

A patient-facing pharmacist will likely be heavily involved in educating patients, caregivers, and family members about the various therapies involved in cancer treatment. This involves the importance of medication adherence, ways to improve adherence if needed, and how to report toxicity events to the U.S. Food and Drug Administration (FDA).

PLETHORA OF OPTIONS

For those interested in compounding, infusion pharmacy is an excellent option. Infusion pharmacists are responsible for working with their technicians to complete sterile compounding of chemotherapy infusions. These infusions are typically provided

to the patient in the hospital or cancer center infusion setting.

Recently, certain health systems have begun offering infusions to patients and caregivers for at-home administration not just as a matter of convenience, but also safety.⁴ Since cancer patients have a relatively weaker immune system, negating a trip to the infusion center is a significant benefit.

For student pharmacists who are primarily interested in oncology, but also have a desire to work with their patients long-term, ambulatory care is an excellent mix. Once the patient has gone into remission, the pharmacist remains involved, especially in the ambulatory setting. Check-ins are required at regular intervals, and patients often remain on medications following the discontinuation of chemotherapy.

In many scenarios, cancer patients have emerged with new onset diagnoses that weren't present prior to their chemotherapy treatment. A pharmacist who has already established a rapport with the patient is perfectly positioned to help the patient understand their new disease state and manage their medications. All oncology pharmacists have to balance the delivery of supportive care medications, as chemotherapy is notorious for causing multiple, often severe adverse effects.

From a broader perspective, oncology pharmacists are looked to for the development of oncology practice. Pharmacists might be called upon to educate other members of the oncology team regarding the various chemotherapy options available and to assist their health system with therapy evaluations. Therapy evaluations could include completing drug utilization reviews (DURs), medication use evaluations (MUEs), or even leading Pharmacy & Therapeutics (P&T) committees to determine the best options to include on formularies. These particularly vital roles might come after a pharmacist has years of working within oncology, and can pull from their detailed knowledge and experience.

For those interested in research and having the potential to publish, there exists a great deal of opportunity within health systems as well as in the clinical trial sector. Oncology pharmacists have the chance to study the effectiveness of a medication or drug regimen in use within their organizations, and track adverse effects to weigh risks versus perceived benefits. This information provides valuable data that can be used to update existing or to create new oncology practice guidelines.

Considering the record-setting amount of chemotherapy drugs approved last year, it is safe to say that drug experts will be needed to write new guidelines and incorporate new drugs



Samantha Zimmerman

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NOW HIRING

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into existing chemotherapy guidelines.

This all goes to show that the benefit of an oncology pharmacist, an expert in building and managing medication regimens, is truly invaluable. The wide breadth of the oncology sector provides a multitude of positions for those looking to step into the oncology field and help treat cancer patients. Cancer care is clearly more than just drug therapy; however, drug therapy remains at the core of treating cancer.

For any student pharmacist with an interest in being involved in oncology, there are myriad ways to be involved in a way that caters to your strengths and career aspirations. You don't need to wait until graduation to seek out ways to help and gain valuable experience. The rapidly evolving oncology sector is growing, and needs competent pharmacists to improve patient care.

I encourage you to find ways to be involved. Volunteer with, work for, shadow, or talk to any oncology pharmacists in your area, and certainly capitalize on IPPE and APPE rotation sites that provide oncology care.

PERSONAL BRANDING

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Maybe you should have approached them sooner. Maybe they do not think they are the correct person and someone else might be a better fit. Do not pressure them for explanations and thank them for their time and consideration. If they are comfortable sharing their reasons, they will.

Context and guidance are key. Provide documentation to your "referees" to help them craft the letter:

- Copy of your updated CV;
- Copy of the position(s);
- Copy of your Letter of Intent or Cover Letter (depending on the position);
- Three to five bullet points of what you would like them to highlight in the letter; and
- Due date/deadline and how to submit

For residencies, you'll want to submit your letter-writer with a copy of or access to the PhORCAS Recommendation Form to provide additional context of what the programs expect in terms of a recommendation.

HELPFUL RESOURCES

The following resources can also be wonderfully beneficial to you during your process:

- **Get the Residency: ASHP's Guide to Residency Interviews and Preparation, Second Edition** (ASHP.org)

▲ **Samantha Zimmerman** is a final-year student pharmacist at University of Arizona R.K. Coit College of Pharmacy. In her free time, She likes to read, solve puzzles, play board games, and play with her Dalmatian.

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• **PURSuing AN INDUSTRY FELLOWSHIP 3.0: Applying for Post-PharmD Fellowships Pre- and Post-Covid** (industrypharmacists.org)

• **PhORCAS Recommendation Form** (<https://www.ashp.org/-/media/assets/professional-development/residencies/docs/phorcass-recommendation-form.ashx>)

If you are asked to choose whether or not to receive a copy of the letter provided by your recommenders, my best advice is to waive your right. This enables the writer to be candid, and the audience will appreciate that you are confident that your recommender is accurate and trustworthy.

If you have followed the process provided in this article, there is no reason to worry about the content provided because you will have chosen your references wisely and provided everything that they need to write a strong and effective letter of recommendation.

FINAL THOUGHTS

With that, we conclude the second part of the Personal Branding 101 series. I hope that you find the information valuable. Now, you have even more tools to be successful this time, next time and moving forward. Good luck with your applications and see you in the next edition when we discuss interviewing strategies.

▲ **Kristen Felthousen**, MS, is the Founder and CEO of Career CRISPR LLC. She is also the Associate Director for the Division of Healthcare and Biopharmaceutical Business at University of Southern California Alfred E. Mann School of Pharmacy and Pharmaceutical Sciences. In her free time, Felthousen likes to watch her favorite TV shows on streaming platforms, hike, scuba dive, read on the beach and work on her garden.



The Leslie Dan Faculty of Pharmacy is the pharmacy school and an academic division of the University of Toronto. An NCDOA PSO chapter was established at the university during the 2020-21 school year.



Overseeing the NCODA Booth at the 2022 September Phrosh Clubs Fair at the University of Toronto are (from left), UT NCODA Professional Student Organization President Jenny Ma, NCODA Associate Manager of Student-Centered Initiatives Cooper Bailey and UT PSO Vice President Huy Pham.

CHAPTER IN FOCUS

UNIVERSITY OF TORONTO

We are excited to return with another **Chapter In Focus** to continue with our series! This time round, we are proud to feature our first ever international chapter – the University of Toronto, which won chapter of the year in both 2020-2021 and 2021-2022.

Shoutout to **Jenny Ma**, PharmD candidate and current PSO president at the University of Toronto, for sitting down with us to chat about her chapter!



Jenny Ma

Inspire: How old is your chapter?

JM: Oh, how time flies! Our chapter is officially three years old. We were established in the 2020-2021 school year as NCODA PSO's first international student chapter. It has been a wonderful journey filled with tremendous success. We hope to continue to uphold the standards that have been set.

Inspire: How do you encourage students to join?

JM: We create unique experiences that allow students to explore their interests in pharmaceutical oncology. We have a passionate, hardworking team that continuously strives to bring forth novel opportunities for their personal and professional development. Students are encouraged to join to become part of a rapidly growing network of oncology professionals and learners, as well as to gain access to useful educational materials and resources.

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The UT PSO chapter participated in the Movember Wall of Mustaches event — a joint collaboration with other Canadian chapters — to raise awareness of men's health issues. Students contributed personalized messages and experiences to our mustache board. Pictured (from left): UT PSO Vice President Huy Pham, Director of Marketing Megan Zhou, Director of Professional Programming Mona Mollaei, President Jenny Ma, and Thomas Cho, Director of Finances & Fundraising.



CHAPTER IN FOCUS

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Inspire: What is something unique that your chapter does?

JM: Our chapter embraces collaboration and works closely with the other three Canadian chapters. Over the past year, our chapter has spearheaded a joint “Movember” event to raise awareness for men’s health issues. Our collaborative efforts were met with a great turnout and meaningful student experiences. We deeply enjoy working with our NCODA peers and look forward to growing our chapters together. Additionally, our chapter engages and recruits members from all years of study at the Leslie Dan Faculty of Pharmacy. We see students joining our team prior to receiving any oncology exposure or any formal education and being involved with events as early as their first semester. Our network also serves students until they graduate. We often find our APPE students on clinical rotations taking interest in NCODA tools and resources. We are thrilled to help guide and support our students throughout the entirety of their training.

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The UT PSO chapter hosted an Oncology Trivia Night in collaboration with other Canadian chapters. The winning team from the local competition (above) moved on to a national-level competition to compete with fellow winning teams from other Canadian schools.

CHAPTER IN FOCUS

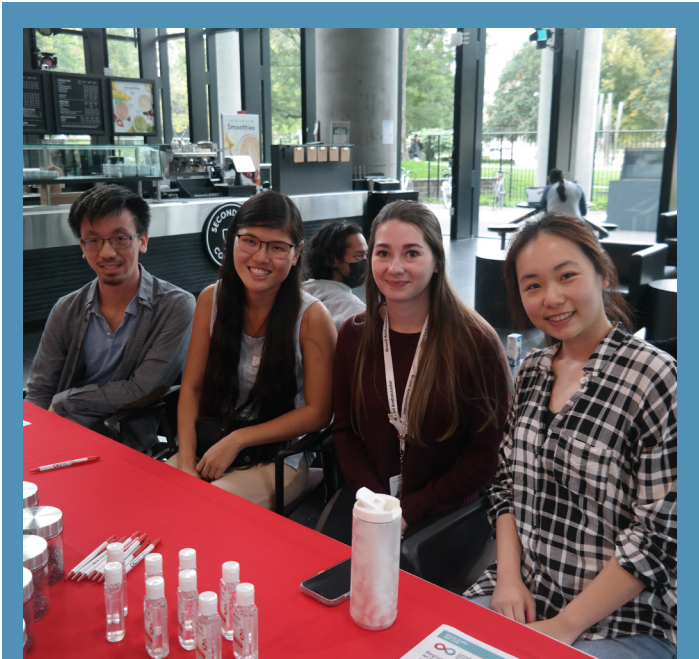
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Inspire: Which part of NCODA's mission connects with your chapter?

JM: NCODA's focus on collaboration resonates deeply with our chapter. We love collaborating with local organizations, student organizations, the faculty, and our fellow Canadian NCODA chapters to bring about novel initiatives. We strongly believe that collaboration enables creative ideas and an overall richer student experience.

Inspire: What is your chapter's favorite NCODA offering for students?

JM: We deeply appreciate how NCODA provides opportunities for professional development on a national and international scale. From scientific writing competitions for a chance at being published in NCODA's Oncolytics Today to conferences such as the Oncology Career Symposium, NCODA creates opportunities that generate strong and lasting impact on students' career paths.



From left, UT PSO Vice President Huy Pham, Mattea Duprey and Rachel Solomon of Canadian Blood Services, and UT PSO President Jenny Ma attend the first Stem Cell Registry Drive at Leslie Dan Faculty of Pharmacy.



The 2022-23 officers of the University of Toronto chapter of the NCODA Professional Student Organization include (from right) Jenny Ma, President, Mona Mollaei, Director of Professional Programming, Huy Pham, Vice President, Thomas Cho, Director of Finances & Fundraising, and Katarina Pessina, Director of Communications. Megan Zhou, Director of Marketing, was not available for the photo.

Inspire: What is your chapter's favorite accomplishment?

JM: Our chapter is proud to have recently established a Canadian NCODA Pharmacy Mentorship Program. In collaboration with fellow Canadian chapters at the University of Alberta, the University of Manitoba, and Memorial University of Newfoundland, we have expanded NCODA's existing Pharmacy Mentorship Program to Canadian students. This program provides our pharmacy students with opportunities to connect one-on-one with oncology pharmacists across the country to explore early careers in cancer care. We are proud that our program has seen a successful launch since its inception in November 2022, and we look forward to seeing it grow and evolve in future years.

Inspire: Do you have any advice for fellow chapters?

JM: Step out of your comfort zone and challenge yourself to new initiatives. Push your creative boundaries and try to introduce events that are different from previous years to maximize engagement. NCODA is a fantastic organization, so be sure to make the most of its networks, events and resources!



PERSONALIZED, TARGETED THERAPY RESEARCH, HER2 SIGNALING AND THERAPEUTIC POSSIBILITIES

By Leili Ahmadizadehtoorzani, PharmDc
& Richard R. Vaillancourt, PhD

Cancer is among the leading causes of death in developed countries with an estimated 1,918,030 new cases diagnosed in the United States in 2022 and an estimated death incidence of 609,360.¹ The five-year relative survival rate in the U.S. was 68.1% for patients diagnosed with cancer between the years 2012 and 2018.¹

Traditional cytotoxic chemotherapy generally affects rapidly dividing normal and malignant cells, having limited therapeutic efficacy due to its dose-limiting major toxicities. Advances in cancer research, have led to the identification of numerous specific molecular targets for drug therapy.² These molecular targets play a key role in the signal transduction pathways which influence cell proliferation and survival.^{2,11}

WHAT IS HER2?

Human epidermal growth factor receptors (HER) belong to the epidermal growth factor receptor (EGFR) family of receptor tyrosine kinases. Dimerization of the receptor results in auto- and transphosphorylation of tyrosine residues within the cytoplasmic domain of the receptor and initiates a variety of signaling pathways leading to cell proliferation and tumorigenesis.³

In breast cancer, the most common HER2 mutation is missense mutations in the kinase domains that indicate



Leili Ahmadizadehtoorzani



Richard R. Vaillancourt

gain-of-function activity, therefore leading to increased cell proliferation when other oncogenes are present.⁴ This can activate oncogenic pathways such as PI3K/AKT/mTOR and RAS/RAF/MEK/ERK.⁵

To assess the possibility of using HER2/3 and HER2/4 as drug targets, it is necessary to study how the receptor interacts with heregulin by heterodimerization with either HER3 or HER4 receptor internalization, and signaling pathway in cancer cells.

POSSIBLE ROLES OF RECEPTOR TYROSINE KINASES INTERNALIZATION AND ERBB2/HER2 TRAFFICKING

The amplitude and kinetics of growth factor signaling are determined mainly by a highly regulated endocytic process, which activates receptors to degradation in lysosomes.⁶

Receptor tyrosine kinase endocytosis involves rapid internalization of an RTK by ligand binding at the cell surface. The activation results in autophosphorylation, which is mechanistically coupled to the recruitment of adaptor proteins and conjugation of ubiquitin to tyrosine kinase receptors.⁷ Ubiquitination mediates interaction between tyrosine kinase receptors and endosome. Therefore, the key regulatory points along the endocytic pathway are internalizations of tyrosine kinase

receptors from plasma membrane, degradation or recycling, and their residence in various endosomal compartments. Disruption in downstream signaling pathways might result in overexpression of receptor tyrosine kinases.

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HER2 SIGNALING

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HEREGULIN SIGNALING PATHWAY

Heregulin (HRG) is a ligand that associates with either HER3 or HER4 which activates signaling pathways involved in cell proliferation and differentiation upon heterodimer formation with HER2 (**Figure 1**).

Activation of HER2/3 heterodimer results in lactate production and secretion, which presumably provides cancer cells with a selective growth advantage over normal cells although the mechanism has not been fully defined.⁸

Overexpression of these signaling pathways has a pathogenic correlation with breast cancer, heart failure, and changes in neuronal development indicating a potential for drug development targeting HER3 and 4, since these HER family members bind HRG.^{5,10,11}

FUTURE ENDEAVORS

The impact of this research benefits both cancer research and the field of oncology. It will increase the collective knowledge of oncology, specifically HER2 and HER3 receptor internalization, drug development, and it will help to discover new biotechnological tools in the oncology area.

In addition, utilizing patient-derived cell lines *in vivo* will help to predict and understand the translation clinical relevance, mechanism of action of drug target, and other possible therapeutic effects. Furthermore, pharmacists can assist in preclinical screening *in vivo* testing and help with the recognition of adverse events, outcome limitations, and resistance mechanisms, which will result in better therapeutic drug development.

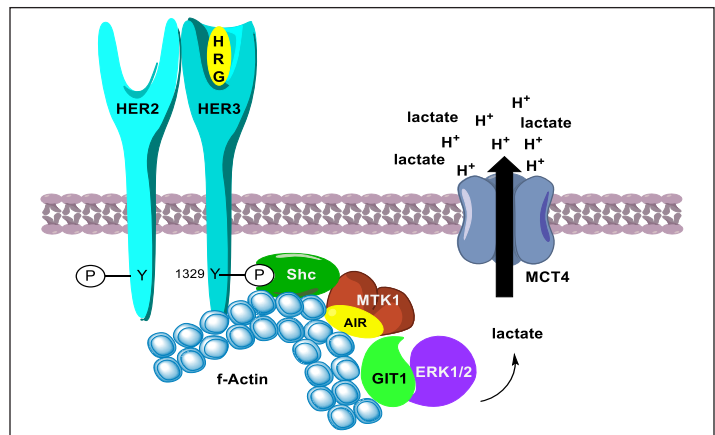
Use of combined anti-HER2 treatments for potent inhibition of the HER2 family signaling has dramatically improved clinical outcomes in all disease stages.⁹

To study and elucidate the interaction between heregulin and HER2/3 and HER2/4 as drug targets, we need to study how the receptor interacts with heregulin, receptor internalization, and the signaling pathways in breast cancer cells. In addition, if any potential drugs were to be tested while studying these processes, heregulin would be needed for use as a control.

Therefore, the ultimate goal of this research is to utilize HRG to better understand HER2/3 receptor internalization as an alternative mechanism for treating HER2-dependent and HER2-resistant cancers.

▲ **Leili Ahmadizadehtoorzani** is a second-year student pharmacist at University of Arizona R. Ken Coit College of Pharmacy. She is the current secretary at her PSO chapter. In her free time, she likes to bake, run, hike, and solve puzzles. **Richard R. Vaillancourt**, PhD, is an Associate Professor of Pharmacology and Toxicology at the University of Arizona R. Ken Coit College of Pharmacy and a member of the BIOS Institute at the University of Arizona. In his free time, Richard likes to garden, hunt, and train his dogs.

FIGURE 1



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BECOMING THE ACTIVE INGREDIENT: THE IMPORTANCE OF SELF-LEADERSHIP

By Negin Namavar, PharmDc, & Dave Bello, PharmDc

What do emerging leaders have in common? How qualified are they to lead? Questions like these are extensively discussed in research and practice literature on leadership, given the importance that leaders play in all aspects of society. To answer this question, we must first understand that leaders will ultimately succeed or fail based on their ability to effectively navigate their most important, complex, and relational situations.

So, what is self-leadership and how does it apply? Self-leadership is the process of influencing oneself to achieve goals.¹ Consequently, improvement of self-leadership skills will naturally radiate outwards, inspiring those to whom leaders are called upon to serve. This article will contain strategies to improve your self-leadership skills to become the active ingredient.

SELF-LEADERSHIP STRATEGIES

At its core, improving self-leadership starts with examining your behavior and examining yourself. There are several tools that an emerging leader can use, as well as strategies to improve their self-leadership skills.

One strategy is to work on cognitive behaviors and reframing how they process certain scenarios. These behaviors are categorized into three groups:

behavior-focused, natural reward, and constructive thought patterns.^{1,2}

Each of these categories includes key points that are essential for working on improving cognitive behaviors:²

- **Behavior-focused:** includes self-observation, self-goal setting and self-cue.¹
- **Natural reward:** includes integrating enjoyable and pleasurable activities for work tasks, and lastly, constructive thoughts include mental imagery, positive self-talk, and evaluating beliefs and assumptions.¹
- **Constructive thought patterns:** aimed at developing one's thinking and prevent or lessen the amount of negativity following difficult or failed tasks. These thought patterns come naturally to leaders and are centered around evaluating one's beliefs and assumptions, using mental imagery to visualize favorable outcomes, and applying positive self-talk strategies to prevent negative thoughts from halting progress.¹

EMOTIONAL INTELLIGENCE AND SELF-LEADERSHIP

Emotional intelligence (EI) is the ability to understand, use, and manage your own emotions in positive ways to relieve stress, communicate effectively, empathize with others, overcome challenges and defuse conflict.³

There are five pillars of emotional intelligence.



Negin Namavar



Dave Bello

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SELF-LEADERSHIP

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They are self-awareness, self-regulation, motivation, empathy and social skill.³

- **Self-Awareness:** the ability to recognize and understand your moods, emotions, and drives, as well as their effects on others.
- **Self-Regulation:** the ability to control or redirect disruptive impulses and moods, the propensity to suspend judgment — to think before acting.
- **Motivation:** a passion to work for reasons that go beyond money or status, a propensity to pursue goals with energy and persistence.
- **Empathy:** the ability to understand the emotional makeup of other people, the skill to treat people according to their emotional reactions.
- **Social Skill:** proficiency in managing relationships and building networks, an ability to find common ground and build rapport.

The important issue to consider here is whether EI can be learned or not. Scientific inquiry strongly suggests that there is a genetic component to emotional intelligence. Psychological and developmental research indicates that nurture plays a role as well. How much of each perhaps will never be known, but research and practice clearly demonstrate that emotional intelligence can be learned.³

THE SOAR MODEL FOR DEVELOPING SELF-LEADERSHIP

The SOAR Model is an effective tool to structure methods for continually developing your style of self-leadership.⁴ There are variations of the meaning behind the SOAR acronym. However, we will discuss one iteration that solely focuses on self-leadership.

The model, at its core, is a continuous process of thinking, reflecting, and adjusting behavior in order to grow and improve.⁴

The components of the SOAR model are self, outlook, action, and reflection. The model is designed in such a way that you will always begin with the “Self” component and end with “Reflection.”²

- **Self:** in essence, this component is centered around your sense of self and understanding the unique you that has evolved based on your one-of-a-kind combination of personality, physical traits, intelligence, habits, beliefs, strengths and weaknesses. A better understanding of yourself and how you work will naturally lead to developing a sense of direction for ways you can improve on your unique leadership style.
- **Outlook:** defined as an awareness of how your biases and emotions can impact your viewpoint. Knowing your outlook is important in managing complex situations that require strong relationships for success. This component is also crucial in understanding ways that your viewpoints might hinder your ability to take action.
- **Action:** consists of conversations that enable you to

successfully advance your most important, complex, and relational situations. This is the part where you take what you have learned about yourself and your outlook to implement actions for improvement.

- **Reflection:** the process of critically evaluating your behaviors, perspectives, habits, and communication from previous actions to gain insights. Reflection is an integral part of growth as a leader since it enables you to adapt to future challenges.

TYING IT ALL TOGETHER

Self-leadership plays an important role in developing one's leadership skills. Leaders ultimately succeed or fail based on how they can effectively navigate complex situations. Strategies to improve self-leadership revolve around utilizing constructive thought processes, fixing negative behaviors while reinforcing positive ones and incorporating natural rewards to make one's tasks more enjoyable.

Successful leaders also show high emotional intelligence and are able to influence those around them by utilizing the different components of emotional intelligence, which overlap with the aspects of self-leadership.

Finally, the SOAR model is a great way to conceptualize your work towards improving your self-leadership and is useful for tracking your progress. Taking all of these components together will provide you with the tools necessary to unlock your potential as a leader by reinforcing a strong sense of internal leadership that will radiate and inspire those around you.

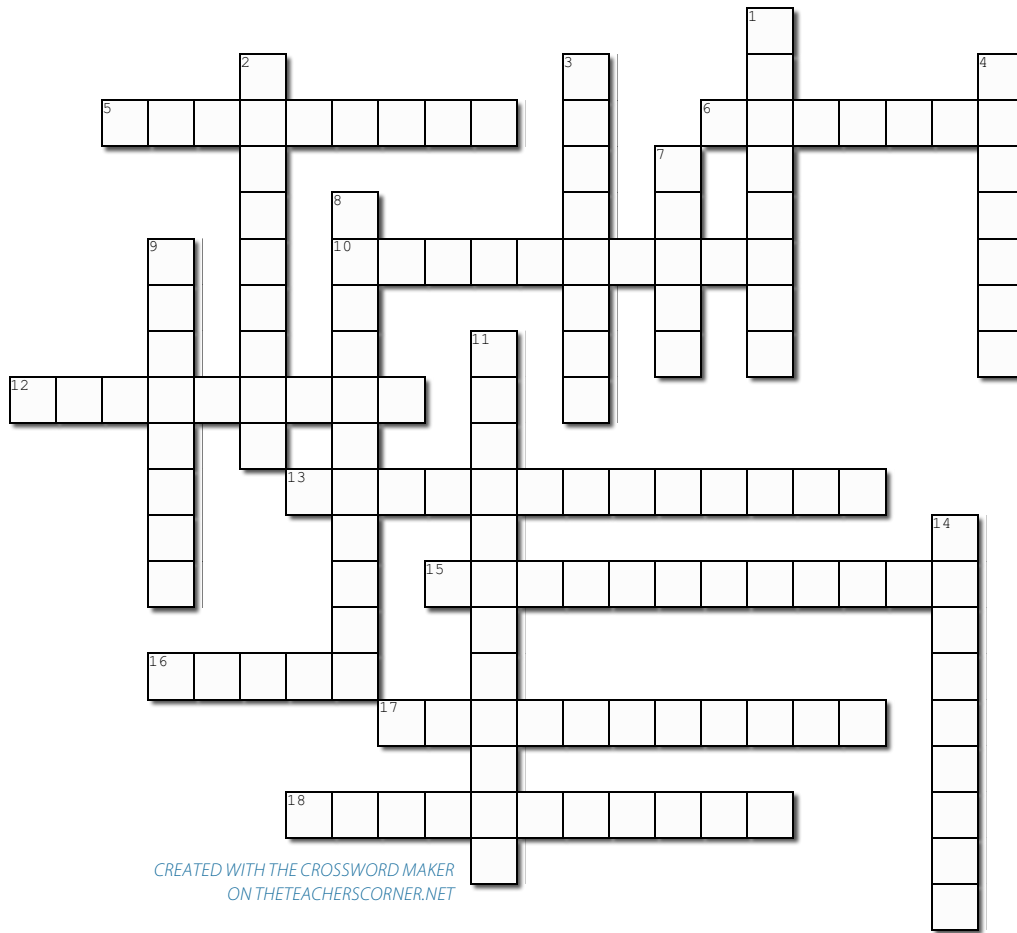
▲ **Negin Namavar** is a final-year student pharmacist at Keck Graduate Institute School of Pharmacy and Health Sciences. In her free time, Namavar likes to hike, go to the gym, play tennis, and cook. **Dave Bello** is a final-year student pharmacist at University of Minnesota College of Pharmacy. He also served as the Vice President of Community Service as a member of the 2022-23 NCODA PSO International Executive Board. In his free time, Bello likes to attend concerts, try new restaurants, and hike.

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Inspire

CROSSWORD



CREATED WITH THE CROSSWORD MAKER
ON THE TEACHER'S CORNER.NET



Gage McInturff

ACROSS

5. A medication that has a maximum cumulative lifetime dose of 400 units due to risk of pulmonary toxicity.
6. Type of cancer that affects connective tissue including fats, muscles, blood vessels and bone.
10. A medication given with fluorouracil (5-FU) to increase its efficacy and helps 5-FU bind more tightly to target enzymes.
12. A first-line treatment for premenopausal females with hormone-sensitive cancer that antagonizes the breast cells.
13. A long-acting colony-stimulating factor that has an adverse effect of bone pain and must be given at least 12 days prior to the next chemotherapy cycle.
15. Drug class of carmustine and lomustine.
16. The lowest point that white blood cells and platelets reach.
17. Type of administration that is fatal for vincristine.
18. A medication known for its cardiotoxicity that can be managed with dexrazoxane.

DOWN

1. A medication used for chronic myeloid leukemia (CML) with Philadelphia chromosome and has an adverse effect of fluid retention.
2. A subcutaneous injection given for prostate cancer that has side effects of hot flashes and impotence.
3. Type of treatment given post-surgery or concurrently with other therapies to eradicate residual disease and lower recurrence.
4. The equation used to calculate carboplatin dose.
7. How often should a 25-year-old female receive a PAP smear (in years)?
8. Men with this syndrome have a higher risk of breast cancer as a result of increased estrogen production.
9. Metabolite that cyclophosphamide produces that concentrates in the bladder leading to hemorrhagic cystitis.
11. Type of chemotherapy induced nausea and vomiting that occurs before chemotherapy and is treated with benzodiazepines.
14. The "A" in the ABCDE warning signs of melanoma skin cancer.

ANSWER KEY ON PAGE 34



NCODA'S NEW MIOP RESIDENCY DESIGNED FOR EMPOWERING LIFELONG LEARNERS

By Cooper Bailey, PharmD

Oncology is a dynamic field in healthcare with continuous research and development of new medications and mechanisms of action. And for good reason. Consider:

- By 2030, the National Cancer Institute predicts an increase of about 2.6 million cancer cases per year.¹
- Cancer is currently the second leading cause of death in the United States.²
- The American Society of Clinical Oncology reports a disproportionate rise in demand for oncology services compared to a rise in cancer cases.¹
- There has been a rapid increase in the development of new oncolytic drugs. Between May 1, 2016, to May 31, 2021, there were 207 oncology drugs approved by the U.S. Food and Drug Administration (FDA).³

In order to stay on top of this rapidly growing

field, there is a vital need for trained oncology drug experts. NCODA has collaborated with a number of its top Medically Integrated Oncology practices to establish an advanced residency training program to expand the number of exceptional oncology pharmacists.

NEW PROGRAM ON THE BLOCK

The new Medically Integrated Oncology Pharmacy (MIOP) Residency Program is designed to train highly motivated pharmacy professionals to become committed lifelong learners who can adapt to multiple oncology practice settings and become empowered healthcare leaders focused on innovating the continuity of cancer care.

A MIOP is a pharmacy within an oncology center of excellence that promotes a patient-centered, multidisciplinary team approach where all team members have access to the Electronic Medical Record (EMR).

Medically Integrated Pharmacy is an



Cooper Bailey

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MIOP RESIDENCY

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outcome-based collaborative and comprehensive model that involves oncology healthcare professionals and other stakeholders who focus on the continuity of coordinated quality of care and therapies for cancer patients.

The purpose of the MIOP Residency Program is to offer new and current pharmacists a comprehensive, medically integrated pharmacy learning experience to develop appropriate skills and knowledge to treat cancer patients with the highest level of care.

Pharmacists who complete an NCODA-accredited MIOP residency will be confident, competent and compassionate oncology care providers. Residents will be accountable for achieving optimal drug therapy outcomes and educating patients and caregivers on appropriate medication use.

The motto of the MIOP residency is “To learn from the best to be the best to provide the best care.” It emulates the designed outcomes of the MIOP residency program.

Practices such as Texas Oncology, Florida Cancer Specialist and Hematology Oncology Associates of Central New York (HOACNY) are touted as some of the best Medically Integrated Centers in the world. Training pharmacists at these centers ensures a positive future for current and future cancer patients.

FEATURES OF THE MIOP RESIDENCY

The MIOP residency is a 12-month intensive program consisting of four main rotations: Oral Oncology Practice, IV/Infusion Oncology Practice, Oncology Business and Leadership, and Oncology Research. Each rotation is designed in collaboration with top MIOP practice leaders to give residents a well-rounded learning experience:

- **The Oral Oncology Practice and IV/Infusion Oncology Practice** are both five-month rotations that focus on clinical oncology practice, interprofessional patient care, oncology care coordination, and education/leadership.
- **The Oncology Business and Leadership rotation** is a two-month rotation focusing on practice/staff management, oncology business and relations, and pharmacy accreditation and policy. Residents may also collaborate with oncology focused pharmaceutical companies to learn about regulations and approval processes.
- **The Oncology Research rotation** is a 12-month longitudinal rotation that focuses around conducting an oncology research study. Residents will be required to present posters and research at the NCODA Spring Forum International meeting and will be encouraged to submit a manuscript for publication. Additional projects include medication use evaluations, continuing education presentations, journal club presentations,

staff education, NCODA collaboration and international clinical resource development.

NCODA is currently in the process of accrediting three programs that are recruiting for the 2023-2024 residency cycle. The programs include Texas Oncology, Florida Cancer Specialist, and Hematology Oncology Associates of Central New York (HOACNY).

Residents will be required to relocate to their selected practice site area (Dallas, Fort Myers, Florida, or Syracuse, New York) after being accepted into the program. Residents may require small amounts of travel depending on the rotation's primary practice site.

Interested candidates for 2023-2024 are required to apply through NCODA's residency portal located on the NCODA residency website (**see QR Code below**).

LOOKING FORWARD TO THE FUTURE

Graduates of the MIOP pharmacy residency program are highly sought by employers, as they have demonstrated a strong commitment to the field and have developed expertise in the management of cancer treatment, leadership, and oncology business. MIOP Oncology pharmacy residents may go on to work in a variety of settings, including medically integrated practices, oncology clinics, academia, research centers and pharmaceutical companies.

Overall, the MIOP pharmacy residency program is an esteemed opportunity for pharmacists looking to further their careers in an exciting growing field. With the increasing prevalence of cancer and the important role that pharmacists play in the management of cancer and cancer treatment, there is a growing demand for trained oncology pharmacists. The MIOP Residency Program provides pharmacists with the skills and knowledge needed to meet this demand and make a difference in the lives of cancer patients.



For more information about NCODA's MIOP residency, scan the QR code above.

▲ **Cooper Bailey**, PharmD is the Associate Manager of Student-Centered Initiatives and the MIOP Residency Coordinator at NCODA.

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CAREER INSIGHTS

EDUCATION | Pharmacy School: Albany College of Pharmacy and Health Sciences, 2016 • **PGY1 Residency:** University of California, San Francisco, 2017 • **PGY2 Residency:** Boston Medical Center, Oncology, 2018

PROFESSIONAL CAREER | 2018-2022: Boston Medical Center, Ambulatory Oncology Pharmacy Specialist, Residency Program Director, Clinical Pharmacy Manager — Specialty Pharmacy and Oncology Services • **2022 to present:** Pfizer, Field Medical Director (Oncology)

NOTABLE ACCOLADES | 25 peer-reviewed publications • \$1 million in grant funding for clinical research/education • Assistant Professor of Medicine at Boston University School of Medicine



DAVID HUGHES, PharmD, BCOP

The best way for new pharmacists to prepare for their careers is to talk with successful professionals in their field. For this reason, we are excited to reintroduce Career Insights. In this edition, we feature **David Hughes**, PharmD, BCOP, a Field Medical Director at Pfizer. Hughes also cohosts *Precept Responsibly*, a podcast geared toward educators and learners.

Inspire: What was your transition into the industry like?

DH: I constantly tell people it is “different.” There are aspects of my prior job that I continue to miss each day — knowing every single patient who walks in my clinic, the strong rapport with oncologists, being able to be autonomous and work at the top of a clinical pharmacist license. However, with these things offset, I can focus and hone in on bringing perspective and experience to other centers that may not have the same structure/opportunity. While the term “different” has a presumed negative connotation to it, it certainly should not imply it. Transitioning to a new title in an institution was hard enough. Transitioning to almost a new career is a challenge, but extremely rewarding.

Inspire: What are some of your more typical roles and responsibilities?

DH: As a Field Medical Director for Pfizer, the role is fairly like a traditional Medical Sciences Liaison. However, I am part of an umbrella of the “organized customer” team. This team focuses more on population-level decisions, where interactions are

focused more so on payers, specialty pharmacies and integrated delivery networks. In this role, we share new clinical information and serve as a medical resource to those who need it.

Inspire: What do you enjoy most about your job?

DH: I love the welcoming culture of Pfizer. The team dynamics are fantastic. From Day One, team leads across the entire organization support growth. The culture creates an environment that I want to grow in. Colleagues constantly reach out with new opportunities and look to use each individual's strengths.

Inspire: What are some skills that are important in your position?

DH: The most important skill, in my opinion, is to be self-driven and a self-starter. Bringing a unique perspective and background to a medical affairs team can be valuable. Many of my colleagues have several different experiences and all have a different lens at dealing with a situation or interacting with healthcare providers. I think that is what distinguishes many in the field. Those that are not OK with the status quo but those that see something new will come in with their own innovative ideas.

Inspire: What do you wish someone had have told you before starting your position?

DH: There are various perspectives on how the industry is viewed in clinical practice. Unfortunately, pharmacy schools

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CAREER INSIGHTS

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do a poor job educating students on the opportunities that exist for pharmacists and how to collaborate with industry partners. A better awareness of industry partners' resources can help support a practice.

Inspire: What do you like to do for fun or to take your mind off work?

DH: I am a huge workout fanatic. Whether it is Orangetheory Fitness or one of the new gyms, Backyahd Boston, I love morning workouts to get energized for the day. Additionally, I love to golf and ski during opposing seasons.

Inspire: You also started the podcast *Precept Responsibly*. Can you talk a little more about this and your goals for the podcast?

DH: This idea came about prior to leaving my last role at Boston Medical Center. My colleague and friend Jason and I were sitting around, trying to think of how to get preceptors more invested in developing preceptor skills for a variety of learners. The American Society of Health-System Pharmacists (ASHP) has standards for preceptor development,

and most view the requirement as a checkbox. Let's face it, preceptors are not incentivized for taking on students, are not given time to do so, and usually do not earn CE credit. Essentially, we asked ourselves, "How do we get preceptors to give a s**t?" With that mentality, we decided to create this podcast as an opportunity to listen to perspectives from all over and reflect on precepting experiences. It's designed to be a casual/enjoyable format to make it an easy listen, but you also can pick up on skills that can be applied in day-to-day practice. We hope to continue this journey in helping young and seasoned preceptors to get a little bit better.

Inspire: If you could give one piece of advice to a current student, what would it be?

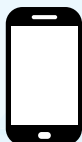
DH: Keep your options open and don't fall into the pressure of "You have to do this." Post-graduate training — residency or fellowship — is a commitment. Many students feel pressured to do what others do to succeed. "That person is studying X hours a day, so I have to do that," or "X is looking at this residency, so it must be good." Without sounding philosophical, you are only as good as you push yourself. Stop comparing yourself to others, think about what you want to do and seek mentors who align with your goals!



PROFESSIONAL STUDENT ORGANIZATION

Empowering The Future Generation of Oncology Leaders

Our focus is to offer an international community for healthcare students with a passion in oncology and pharmaceutical industry. The NCODA Professional Student Organization (PSO) was established for students interested in oncology, association management, healthcare advocacy and policy, and industry leadership.



FOR MORE INFORMATION OR TO SUGGEST NEW CHAPTERS

Email **Cooper Bailey** at cooper.bailey@ncoda.org

Scan to visit, or check out www.ncoda.org/professional-student-organizations



LOCATIONS OF ESTABLISHED PSO CHAPTERS

WAVE HEALTH: USING DATA & TECHNOLOGY TO IMPROVE ONCOLOGY PATIENT CARE

By Matt Lashey, MBA,
& Alex Whitehead, BS

It takes a village to overcome cancer. While oncology patients have always relied on networks of care-givers, oncologists, nurses, pharmacists, and the manufacturers of their medications, how these groups work together to improve outcomes is becoming increasingly complex.

The National Comprehensive Cancer Network's Clinical Practice Guidelines in Oncology have established a ballooning number of clinical decision pathways — a 370% absolute increase — between 1996 and 2019.¹

To cohesively navigate this evolving landscape, care networks require high-quality patient-level clinical data and the technologies to sufficiently capture it. Efficient and reliable capture of patient data is needed to inform value-based care, quality initiatives, and to ultimately benefit oncological care.²

THE ROLES AND EXPECTATIONS OF ONCOLOGY PHARMACISTS

Oncology pharmacists play a critical role in patient education during the early days of a cancer diagnosis. Patients are often overwhelmed by the amount of new information being provided by their oncologists at the time of diagnosis. It is typically a few days later, when patients receive or pick-up their medication, that patients are reminded of persisting questions regarding their treatment and their disease. A specialty pharmacy touchpoint is one of the few instances in U.S. healthcare where a licensed healthcare professional with this specialized knowledge is both free and accessible to patients when they need it most.

Being “on the frontlines” of patient care, oncology pharmacists are also uniquely positioned to use technology to improve outcomes and to collect important data. Studies have shown that pharmacists are integral to improving care, reducing costs and limiting drug complications for patients with cancer.³

With an increasing number of new cancer treatments launching each year,⁴ rising expectations of oncology pharma-



The Wave Health Specialty Pharmacy Platform is offered to NCODA members to utilize within their practices. This platform better connects pharmacists and patients with AI-powered insights and predictive algorithms to analyze what's helping patients feel better and what's not. To learn more, visit www.wavehealth.app.

cists will continue from all sides of the healthcare matrix.

▲ **FROM PATIENTS:** Patients will look to oncology pharmacists for clinical support with 1. side effect education as they start on-board to their new, complex medications, and 2. guidance on when to contact their oncologist regarding their medication. This assistance will help patients and their care teams understand whether to adjust dosing, treatment schedules or switch medications entirely.

▲ **FROM CARE PROVIDERS:** Oncologists will look to oncology pharmacists for support with 1. improving patient engagement and care plan adherence, and 2. summarizing patient health outcomes between provider visits (e.g., nonadherence, treatment-resistance, adverse events). This assistance will help facilitate harmonious patient care across the care network, and ultimately, optimize outcomes.

▲ **FROM PAYERS AND MANUFACTURERS:** Payers and manufacturers will look to oncology pharmacists for support with facilitating patient access to medication through all stages of the treatment journey for 1. medication approval and initiation, 2. adherence over time, and 3. prescription renewal reporting or reporting for downstream business purposes (e.g., value-based contracting). Assistance here will ensure the right patients are receiving the right medication at the right time.

Oncology pharmacists are well-positioned to meet these

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MAIL-ORDER PHARMACIES & CHALLENGES OF MEETING EXPECTATIONS

▲ **INCOMPLETE PICTURE OF PATIENTS AND THEIR EXPERIENCES:** When a mail-order pharmacy receives a prescription, there is little that is known about the patient. Since prescriptions do not come with visibility into the patient's electronic medical record, their diagnostic and demographic information is largely unknown. Pharmacists collect some of this information during scheduled touchpoints, but several factors make it challenging to get complete data (e.g., language barriers, patients not picking up phone).

▲ **LIMITED VARIETY IN WORKFLOWS AND CARE PLANS:** After receiving their initial prescription, patients are typically put onto similar

For example, many oral oncolytic patients follow identical touchpoint schedules (e.g., phone calls at days 14, 30, 90, 180) where pharmacists ask a set of standard questions. Pharmacists then refer patients to the same off-the-shelf content to help with medication and disease management. Care plans are not often set or adjusted based on individualized patient needs.

Monitoring the evolution of a patient's symptoms and side effects is also a challenge. Even for patients who consistently update their pharmacists or complete ePRO instruments, there is no single source that succinctly summarizes data across sources to inform quick care decisions.

HOW A PATIENT'S EXPERIENCE OF THESE GAPS LED TO THE SOLUTION

Born out of that experience, Wave Health was created. This ePRO smartphone app uses data science to educate patients and their care networks about their response to treatment and disease. Based on patient logs, data analysis finds statistically significant correlations between what patients are doing (e.g.,

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WAVE HEALTH

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medications, activities) and how they are feeling (e.g., condition, mood, and side effects).

TTI was founded to help deliver this technology to care organizations and their patients. Since then, to meet the needs of today's mail-order pharmacies, TTI has evolved Wave Health from a stand-alone app to a three-component platform:

▲ An industry-leading patient app⁶ for comprehensive logging, ePRO short form completion, and delivery of correlation insights and relevant content.

▲ A care portal for pharmacists to review and act on succinct patient-level summaries of symptom evolution and ePRO short-form responses.

▲ Comprehensive and standardized data reporting, visualization, and predictive modeling to inform oncological care and downstream organization strategy.

HOW WAVE HEALTH IS FILLING THESE GAPS TODAY

Today, oncology pharmacists are using the Wave Health Platform to close gaps in patient care, to meet the growing expectations of care networks, and to drive better health outcomes.

▲ PROVIDING A COMPLETE PICTURE OF PATIENTS & THEIR EXPERIENCES:

The Wave Health App collects an abundance of meaningful data given its distinctive ability to keep patients engaged. Patients find that providing the app with more data leads to more relevant correlation insights and content back to them.

The outputs of this engagement are presented in the Wave Health Care Portal, where pharmacists access patients' demographic and diagnostic profiles and multi-leveled views of experiences to augment care decisions.

▲ **PROVIDING MORE VARIETY IN CARE PLANS:** To help oncology pharmacists, Wave Health's Care Portal automates patient segmentations based on how patients are logging and responding to ePRO instruments. This enables oncology pharmacists to design and implement segment-specific or individual-specific workflows, and ultimately, provide stronger, more relevant care.

To help patients, the Wave Health App delivers insights and individualized care management content based on that individual's specific logging behavior. This way, patients avoid navigating through cookie-cutter content, and instead, receive the right information at the right time.

▲ PROVIDING AN ABILITY TO MONITOR & PREDICT NEGATIVE OUTCOMES:

The Wave Health Care Portal allows pharmacists to easily monitor the evolution of patients throughout their treatment journey. This facilitates higher-quality patient conversations and individualized care decisions.

However, given busy schedules, oncology pharmacists are unable to monitor all patients all of the time for risks of negative outcomes (e.g., medication nonadherence). To address

this, TTI is developing predictive algorithms that identify patients at-risk of nonadherence, allowing pharmacists to enable relevant care services to patients when needed.

With the right tools, oncology pharmacists will close critical gaps in patient care and will collect the patient data needed for care networks to navigate an increasingly complex oncology care landscape.

We would like to thank Yasmin Saafan, PharmD, BCPS, for her contributions to this article.

▲ **Matt Lashey**, MBA, is the creator of Wave Health and is cofounder & CEO of TTI. In his free time, Lashey likes to go hiking and to cook for friends and family. **Alex Whitehead**, BS, previously led Strategy & Product for Treatment Technologies & Insights (TTI). In his free time, Whitehead enjoys being active outdoors, traveling and attending concerts in his home city of Los Angeles.

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The 2022-2023 PSO International Executive Board (from left) Dave Bello, Audrey Simon, Mattie Kilpatrick, Javier Granados II, Jonathan Rivera and Gage McInturff celebrate following a successful Oncology Career Symposium.

REFLECTING ON OUR JOURNEYS

By Gage McInturff, PharmDc

WE, THE OFFICERS OF THE INTERNATIONAL EXECUTIVE BOARD

The mission of the International Executive Board (IEB) is to lead an international community for healthcare students with a passion for oncology and the pharmaceutical industry. This is accomplished through providing educational resources, leadership positions, outreach programs and networking opportunities for all NCODA chapters. Each position on the board focuses on



Gage McInturff

different paths to ensure that all students can be involved and grow as professionals and as members of the organization. This is demonstrated through the countless new initiatives launched this past year, the resources developed, and the excitement from the organization that continues to grow.

NEW POSITION, WHO'S THIS?

One exciting development was the addition of the Vice President of Legislative Affairs position to the IEB team. This role allows the officer to

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JOURNEYS

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participate as an intern for the NCODA Health Policy & Legislative Affairs internship, participate in monthly meetings with NCODA's Legislative and Policy Advisory Committee (LPAC), and help chapters establish and host legislative affairs events in the oncology space. Audrey Simon, PharmDc and MBA candidate, the first officer to be inducted into this role, said she has enjoyed all the opportunities the position has offered. Her favorite: Educating students and healthcare professionals on how to stay up to date on legislation involving their patients.

MORE THAN A MEET & GREET

The IEB started the year by getting to know the chapter officers personally and professionally through its first Q&A Meet and Greet. This meeting was one for the books. Chapter officers came to get their burning questions answered and to share insights into their goals throughout the year. IEB President Jonathan Rivera, PharmDc, hailed the forum as one of his favorite accomplishments. "I had a great time discussing with NCODA PSO leaders their plans for success throughout the year and helping them utilize all the great resources NCODA has to offer!" he exclaimed. The event was a blast and allowed the IEB to make great connections with future oncology professionals.

WHERE THERE'S A WILL, THERE'S A PROJECT

Throughout the year, all IEB members have focused on different projects to help chapters and patients across the globe. President-Elect Javier Granados II, PharmDc, put into action the social media educational outreach "Cancer of the Month," where he and his team selected a type of cancer to highlight different guidelines, screenings and myths. "As Vice President of Communications, I worked with the European Student Pharmacy

Association (EPSA) to create a breast cancer infographic to help bring awareness to their members on their social media and had the fantastic opportunity of being on the editorial staff of *Inspire*," he said. Vice President of Meetings Mattie Kilpatrick, PharmDc, and Vice President of Community Service Dave Bello, PharmDc, worked on Project Save a Life and Project Oncology Prevention Screening and Equity to heighten cancer awareness and participation in national bone marrow registries. These are just a few of the many projects accomplished this year, and we are excited for those still yet to come.

TAKE THE LEAP

As you can see, there is a lot that goes into being an IEB officer, but becoming a member of the IEB is something that I have cherished in my fourth year of pharmacy school more than I ever thought possible. I have had the opportunity to work with a passionate IEB team, network with fantastic people in the field of oncology, help chapters from all over the world, and complete projects outside of my comfort zone. It's funny to think that I almost missed out on all this due to believing I wasn't good enough for the role. We all have those moments when we doubt ourselves and our abilities. We think we don't have what it takes and push opportunities away because we would rather not try than try and fail. I'm here to tell you to take the leap! Don't let your fear define who you are; let your passion and courage shape your future. Who knows, it might just be the favorite part of your year!

▲ **Gage McInturff** is a final-year student pharmacist at University of North Texas Health Science Center School of Public Health. She also served as the Vice President of Communications as a member of the 2022-2023 NCODA PSO International Executive Board. In her free time, McInturff likes to read, solve puzzles, play board games and spend quality time with her husband and friends.

**NEW
SEASON**





The PQI Podcast, presented by NCODA, hosts clinical and administrative experts in oncology providing insight on important industry topics and how they value the Positive Quality Intervention (PQI) resource for their practice. In addition, the podcast highlights patient stories of hope, determination and how patient-centered care has impacted their cancer journey.

 **STREAMING NOW**

 PASSION FOR PATIENTS **@thepqipodcast**



DISPARITIES IN CERVICAL CANCER AND THE PHARMACIST'S ROLE IN EARLY INTERVENTION

By **Lola Botero, PharmDc**

The Centers for Disease Control and Prevention (CDC) defines disparity in healthcare as “preventable differences in the burden of disease, injury, violence, or opportunities to achieve optimal health that are experienced by socially disadvantaged populations.”¹

Vulnerability to cervical cancer is a case in point. Cervical cancer is the fourth most common cause of cancer among women.² These rates are much higher among women who experience healthcare disparities such as less access to screenings and vaccinations.

Cervical cancer is caused by human papillomavirus (HPV), the most common sexually transmitted infection. In nine out of 10 cases, the disease goes away without health problems.³ But when the infection is unresolved, it can cause many forms of cancer, including genital and oropharyngeal cancer.



Lola Botero

The CDC recommends vaccination against HPV and cervical cancer screenings to prevent and detect the disease as early as possible. Unfortunately, vaccinations and screenings are less frequently sought by disadvantaged populations.

EXISTING DISPARITIES

While the incidence and mortality rates of cervical cancer have declined steadily since 1970, an estimated 13,800 women were newly diagnosed in 2020, and approximately 30% of those women died as a result of the disease.⁴ Cervical cancer continues to cause 10 premature deaths per week in women aged 20-39.²

Health disparities in terms of prevention and intervention factor into these cases. Hispanic women report a lack of recommendations from their providers for cervical cancer screenings. Black, Hispanic and Asian women's perception of discrimination has led to diminished trust in healthcare providers.⁵

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DISPARITIES

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The mistrust and lack of recommendations has profound consequences.

Specifically, in the Black population, women on public insurance experience lower HPV vaccination rates.⁴ Black adolescents have lower initiation and completion rates of the HPV vaccine series compared to other races. Black women experienced only a 58% five-year survival rate after cervical cancer diagnosis as opposed to 71% in White women. Mortality rates also are higher in Black women compared to White women.

In the United States, Southern states observed lower vaccination rates and higher incidences of cervical cancer than other regions of the country.² Incidences of cervical cancer are 7.6 people per 100,000 people in the United States, but the highest incidence was in Arkansas, with 9.8 people per 100,000 people. Texas and Florida were included in the states with the highest number of newly diagnosed cases in 2020.⁴ These rates may be linked to decreased providers in rural areas and increased uninsured patients in this region.

CURRENT RECOMMENDATIONS AND CHALLENGES

The HPV vaccine is recommended as a routine vaccine for all genders beginning at age 9 and, with collaborative decision-making, can be given up to age 45. It is also recommended that women between 21-65 years old get a cervical cancer screening every three years.³

Even with these preventative measures and screenings, many patients still face barriers to getting the care they need.

When the vaccine was approved, the target population was only females. It is now recommended for all genders to prevent cancers caused by HPV and transmission between sexual partners.³

The age recommendation and route of transmission for HPV have created a stigma for receiving the vaccine. There was a perception that the vaccine was used to prevent sexually transmitted infections, which led parents to believe vaccination would increase high-risk sexual behaviors.² This stigma hindered vaccine use and halted much-needed conversations about cervical cancer prevention.

Routine cervical cancer screening can be difficult for patients to obtain. Specifically, underserved groups included racial and ethnic minorities, rural area residents, sexual and gender minorities, those with limited English proficiency, and those with health conditions, disabilities and mental health concerns.⁵

Every day, a pharmacist has the opportunity to make a difference in a patient's life. Awareness of the disparities patients experience can help pharmacists make interventions in our most vulnerable populations.

THE ROLE OF THE PHARMACIST

Pharmacists – the most accessible healthcare providers – can play a critical role in healthy equity. We can provide a direct intervention in preventing cervical cancer by offering the HPV vaccine. We can help educate women on recommendations for routine screenings and provide vaccinations to all who qualify.

Every day, a pharmacist has the opportunity to make a difference in a patient's life. Awareness of the disparities patients experience can help pharmacists make interventions in our most vulnerable populations. By offering education and vaccination, pharmacists can facilitate the elimination of inequalities seen in cervical cancer.

▲ **Lola Botero** is a third-year student pharmacist at University of Arizona R. Ken Coit College of Pharmacy. She is the current president-elect at her PSO chapter. In her free time, Botero likes to go on walks with her dogs and attend concerts.

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INTERNSHIP SPOTLIGHT

A FORMER HEALTH POLICY & LEGISLATIVE AFFAIRS INTERN AT NCODA, HSET MADE SIGNIFICANT CONTRIBUTIONS TO THE ONCOLOGY LEGISLATION TRACKER. HE HOLDS A BA IN POLITICAL SCIENCE AND GOVERNMENT FROM STATE UNIVERSITY OF NEW YORK AT ALBANY, WHERE HE IS NOW WORKING ON HIS MASTER OF PUBLIC ADMINISTRATION.

AUNG HSET, BA

Introducing Internship Spotlight. This is a series that we intend to include in every **Inspire** publication moving forward. We have had some outstanding interns at NCODA and we want to highlight the work that they do.

Inspire: How did you first hear about the Health Policy & Legislative Affairs internship?

AS: I heard about the internship through the History Honors Society at State University of New York at Albany. My personal interest in the policy space combined with my desire to learn more about the U.S. healthcare system piqued my interest in the position.

Inspire: What do you like the most about NCODA?

AS: NCODA's mission stands out. Through my experience as an intern at NCODA, I was very impressed by the organization's commitment to enhancing the oncology patient care experience. This is a very unique aspect of the organization. As someone who is interested in the policy space, I like that NCODA is taking initiatives to educate healthcare workers and patients about legislation and policy. By doing so, they can empower healthcare workers and patients to make the best decisions for themselves.

Inspire: What do you enjoy most about your internship?

AS: The overall learning experience was highly valuable to me, especially all the knowledge gained about the U.S. healthcare system. At the beginning of my internship, I was hardly a health policy guru. But as a result of the internship, I was

able to significantly enhance my knowledge about the U.S. healthcare system. As a result, I am immeasurably grateful for my time as an intern at NCODA.

Inspire: Any tips for those seeking any internships?

AS: Search for internships that either pique your curiosity or genuinely interest you. My rationale is that if you seek an internship to simply pad up your CV, you may not enjoy the experience and it may not add value to your career. In comparison to that, if you did an internship that you enjoyed and brought value to your career, it is very much worth your time.

Inspire: What is your future career goal?

AS: Truthfully, I have not decided on the exact career that I will pursue at this time. I am still exploring options. But one thing I do know is that I want to stay involved in politics and in the policy space. I could see myself working for a lobbying firm or as a member of a politician's team.

Inspire: What do you currently do for school and work?

AS: Currently, I am a graduate student studying public administration at Rockefeller College in State University of New York at Albany. I am currently interning for Dickinson & Avella, PLLC, a lobbying law firm based in Albany, New York.

Inspire: What are your hobbies?

AS: Without a doubt, listening to music. Aside from that, I love to cook. One of my favorite things is creating and trying different cuisine from international recipes found on YouTube or TikTok. But most of all, I just love to go out and find new places to explore.

By Olivia Bukowski,
PharmDc, & Kevin
Standen, PharmDc

BURNOUT

Ever feel like your daily tasks are becoming overwhelmingly difficult to complete? Do you find yourself experiencing long periods of exhaustion and stress from your professional responsibilities?

You may be experiencing an occupational phenomenon known as burnout.

In the 11th revision of International Classification of Diseases (ICD-11), the World Health Organization described burnout as a “syndrome [...] resulting from chronic workplace stress that has not been successfully managed.”¹

Many people who experience periods of burnout report decreased energy, increased frustration with their professional life, and decreased motivation to produce meaningful work.²

Collectively, these symptoms can cause one to feel disconnected from their daily life. They also can spiral to depression, loss of interest and even suicidal ideations.^{2,3}

Aside from the mental impact, burnout can also affect one’s physical health and induce medical conditions such as high blood pressure, recurrent headaches, sleeping issues, and gastrointestinal distress.²

Though burnout is not considered a medical condition itself, it is vital to understand, recognize and validate signs and symptoms to limit mental and physical consequences.⁴

NEXT-GENERATION PHARMACISTS VS. BURNOUT

The profession of pharmacy is a demanding and rewarding career pathway that requires both passion and dedication to serve patients.

Regardless of where you are in your pharmacy journey,



AN ENIGMA FOR THE STUDENT PHARMACIST

you are likely to experience different sources of daily stress. Student pharmacists, residents and fellows find themselves juggling multiple tasks and responsibilities throughout any given week that require them to devote large amounts of time.

Moreover, they also may hold other part-time positions to support themselves financially. This leaves little time for rest, social interaction, and time off from their careers.

In 2020, a study on enrolled student pharmacists at the University of Kentucky was performed using the Oldenburg Burnout Inventory (OLBI) calculator to determine the averages of two components of burnout — disengagement and exhaustion.⁵

The study noted higher averages in total disengagement (2.7 vs. 1.9) and exhaustion (2.9 vs. 2.6) in the responses of student pharmacists compared to general college students.⁵

With a higher likelihood of suffering from exhaustion and disengagement, student pharmacists are likely to bear the negative consequences associated with this phenomenon.

It is estimated that out of students who experience burnout, roughly 10% have suicidal ideations.²

This is dangerous, especially in a high-stress profession. It is important to be aware of the dangers of burnout, and to determine the best solutions to prevent future occurrence.

REST, SLEEP AND BE MERRY

For those experiencing burnout, the first step is to acknowledge and identify the issues that may have led to burnout. After that, we can look to address burnout and find effective methods to combat it.

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BURNOUT

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One of the biggest contributing factors for burnout in healthcare is the immense amount of training and education that is required to be competent.⁴

While one cannot always modify their workload, students can take steps to manage their work-life balance. But easier said than done. This can take time to master.

One way to achieve this is to set timers to limit the amount of time spent on a specific project in one sitting. This can bring variation to your workday. Another option is to incorporate small breaks within your workday to allow for a quick mental refresh.

Longer breaks are tremendously beneficial as well, since spending dedicated time away from work is necessary to maintain a well-balanced life. Suggested activities during these breaks include taking walks in nature, talking on the phone to a friend, practicing yoga and watching your favorite TV shows.

Student pharmacists, residents and fellows have a tendency to work late nights and then get up early in the morning. A stressful lifestyle can cause restless, low-quality sleep. The end result? Poor sleep hygiene.

Establishing good sleep hygiene is essential to ensure that your mind has the ability to rest and recover from a busy day. As such, if you do not have good sleep hygiene, you should take steps to balance your sleep schedule.

One point to remember is that establishing good sleep hygiene does not have to be about making sudden changes. Implementing small changes one at a time in your daily routine can make a world of difference in the long run.¹

No matter where you are in your career, it is likely that you

are experiencing stress, which can lead to burnout.

But keep in mind, your peers are in the same boat and likely feeling the same way.

Recognize and address burnout. It can make a difference not only in our lives, but in others' as well.



Olivia Bukowski



Kevin Standen

▲ **Olivia Bukowski** is a third-year student pharmacist at the University of Toledo College of Pharmacy and Pharmaceutical Sciences in Toledo, Ohio. She is president of the school's NCODA PSO chapter. In her free time, Bukowski likes to travel, take part in hot yoga, and spend time with her loved ones and her guinea pigs, Gus and Gilbert. **Kevin Standen** is a second-year student pharmacist at the University of Toledo College of Pharmacy and Pharmaceutical Sciences. He is the president-elect of the school's NCODA PSO chapter. In his free time, Standen likes to golf, work out, spend time outdoors and socialize with friends.

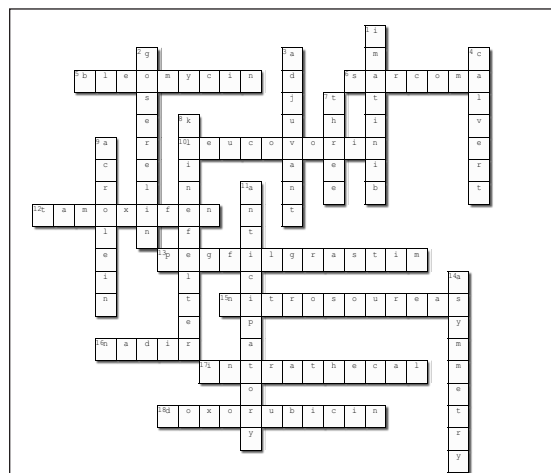
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ANSWERS FOR CROSSWORD, PAGE 20

- | | |
|----------------|-------------------|
| 1. Imatinib | 10. Leucovorin |
| 2. Goserelin | 11. Anticipatory |
| 3. Adjuvant | 12. Tamoxifen |
| 4. Calvert | 13. Pegfilgrastim |
| 5. Bleomycin | 14. Asymmetry |
| 6. Sarcoma | 15. Nitrosoureas |
| 7. Three | 16. Nadir |
| 8. Klinefelter | 17. Intrathecal |
| 9. Acrolein | 18. Doxorubicin |

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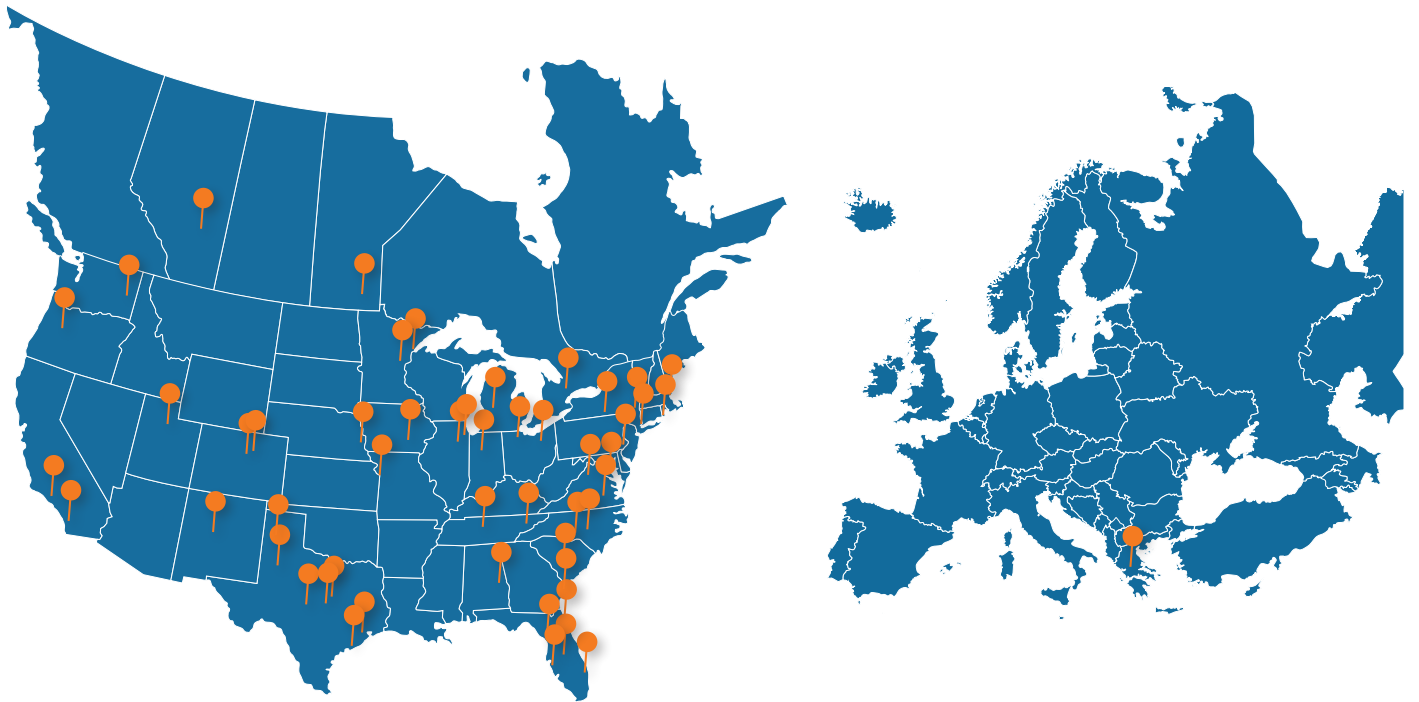


Yarelis Diaz-Rohena
Oncology, Advocacy, Health Policy & Equity Fellow
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If you are looking to reinforce your knowledge of cancer pathophysiology, oncology pharmacotherapy, toxicity management, and more, the Oncology Basics course is for you!

Designed for pharmacy students, residents, fellows, and pharmacists in oncology practice, this course could be beneficial to anyone wanting to brush up on baseline oncology pharmacology concepts.

The PSO Family



“Do not be too timid and squeamish about your actions. All life is an experiment. The more experiments you make the better.”

— Ralph Waldo Emerson