

## INPHARMATION UPDATE

Canadian Society of  
Hospital Pharmacists  
Alberta Branch



Société canadienne des  
pharmaciens d'hôpitaux



# January 2023

Issue 59

### Inside this issue:

- 2 Together 2023 Conference
- 3 Pharmacy Spotlight
- 5 Student Column
- 6 CSHP National Update
- 7 CSHP Research: *Christmas Edition*
- 8 CE Event: *For the Love of Clozapine*
- 9 Short & Snappy Clinical Overviews



**Follow us on Facebook, Twitter, and Instagram!**

[www.facebook.com/cshpab](https://www.facebook.com/cshpab)

[www.twitter.com/cshp\\_ab](https://www.twitter.com/cshp_ab)

[www.instagram.com/cshp\\_ab](https://www.instagram.com/cshp_ab)



# Together 2023 Conference

We are excited to be reuniting in Banff from **March 10 - 12th, 2023!** Our planning committee has been hard at work putting together a fantastic event. We are partnering once again with the Harrison Pharmacy Management Seminar and the Professional Practice Conference for **Together 2023**. This hybrid event will allow participants to join in person or virtually! Sessions will be recorded and available online for two weeks after the event, so you don't have to miss a single one!!

We have a variety of keynote and plenary speakers that will bring smiles and inspire. Paul Walker, the president of the American Society of Health System Pharmacists, will open the conference on Friday. Our distinguished guest will share his passion for advancing pharmacy services and experiential education. Will Flanary, better known as "Dr. Glaucomflecken", will bring light, humor and satire to pharmacy practice on Saturday morning. Fiona Miller will then engage us to focus on climate change and challenge the status quo to inspire us to build sustainable healthcare systems. On Sunday morning, we continue our focus on sustainability with our panel of pharmacy climate action champions from across Canada.

This year's event features two in-person pre-conference opportunities on Friday morning (additional fees apply). Participants may choose to attend our inaugural clinical, interactive, interdisciplinary sim lab that will provide hands-on education broadly applicable to many pharmacist practices. Or you can choose to participate in the engaging Hospital Pharmacy Canada (HPC) survey workshop! This session will help leaders, policy makers and managers understand how to use the HPC data to support evidence-based decision making to find solutions in hospital pharmacy.

Our conference boasts three concurrent streams: clinical, leadership, and technician. Our speakers and topics are carefully curated to provide you with world-class education that will be relevant to your practice: rural or urban, primary care or acute care, frontline or leadership. No matter how you attend, we will have cutting edge seminars that enhance your practice.

Full details are on the conference website: <https://www.cshp.ca/together2023>

We look forward to meeting you in the mountains!

Chloe McMillan  
*Chair, 2023 CSHP Western Branches Banff Seminar*



# Pharmacy Technician Spotlight



## Nneoma Ehimiaghe Technical Practice Leader

*"Find opportunities to stay connected with the pharmacy profession outside of your job and be willing to open your mind for a lifelong learning opportunity."*

**Ayush (interviewer):** Are you able to share a little bit about yourself and your background prior to getting into pharmacy practice?

**Nneoma:** My personal interest in pharmacy practice is rooted in my desire to be involved in the improvement of others' health which stemmed from my involvement in the WHO polio Immunization Plus Days in Nigeria. The polio virus was endemic in most parts of Nigeria, especially the northern part, and my volunteering work with the WHO gave me the insight needed into Public Health and Pharmacy. A significant part of my character was devoted to caring for other people and contributing to their well-being. I had learned that the health professions were all dedicated to the same mission – caring and saving lives.



Over the years, I have come to the realization that efficient health education needed to be conducted to enlighten the at-risk population, which included strategies targeting the internally displaced and migrant populations in rural communities. In order to enable a safe and healthy lifestyle, it is important to provide these communities with useful and easy resource[s] to protect themselves against common health hazards prevalent in their communities. My above experience shaped my desire and dedication to venture into the field of science, particularly preventive science, from simple common ailments prevalent in my neighborhood.

**Ayush:** Can you tell us about your role, and what brings you the most fulfillment out of your role?

**Nneoma:** My role as a Technical Practice Leader (TPL) involves supporting the application, implementation, and maintenance of professional practice standards. We also take on [a] leadership role in professional development, quality improvement and research activities within the profession. TPLs liaise with educational facilities to support technician structured practical placements, professional associations, regulatory Colleges and other appropriate bodies to help inform processes which promote excellence and best practice in professional practice.

What brings the most fulfillment out of my role is seeing the active engagement of TPLs and other relevant stakeholders to generate a body of work that is then implemented by the larger organization.

**Ayush:** Can you share what your biggest piece of learning has been from being involved in the Connect Care launches?

**Nneoma:** I am fortunate to work with a multidisciplinary team that taught me something new each day and am so appreciative of that. This position afforded me a unique perspective into many facets of healthcare.

My biggest piece of learning was the standardization and implementation of standards which was far more complex [than] one would have thought. It required significant time, resources and commitment, from developing standardized concentrations, which requires the efforts of a diverse team. Once identified, these have to be reviewed and approved by the Pharmacy and Therapeutics (P&T) committee.

While [the] standardization process was such a complex and daunting task, the benefits of evaluating where such efforts could best improve processes and then implementing standardization in these areas was very rewarding.

**Ayush:** If you could give any pharmacy professional one piece of advice, what would it be and why?

**Nneoma:** If you notice any skill or knowledge gaps, look for opportunities to gain more experience by volunteering or shadowing another professional. We probably know about the importance of expanding your network, yet many of us interact with colleagues exclusively at work. Find opportunities to stay connected with the pharmacy profession outside of your job and be willing to open your mind for a lifelong learning opportunity. Research the profession too! There are way more opportunities opening up for the profession. I think this is a question that I can answer very simply because in my mind, the answer is not complicated.

## CONTACT US!

*Do you, or someone you know, want to be interviewed for the Pharmacy Spotlight initiative?*

*As part of our initiative to highlight the hard work and dedication of individuals, as well as the many innovative practices within pharmacy, we are publishing interviews with **pharmacists, technicians, and assistants** working in Alberta. If you would like to nominate an interviewee, please submit your request to Caitlyn ([caitlyn.rozmahel@ahs.ca](mailto:caitlyn.rozmahel@ahs.ca)) & Ayush ([achadha@ualberta.ca](mailto:achadha@ualberta.ca)).*

# CSHP-AB Student Column

Hi everyone,

For the first time in two years, the CSHP student committee is back to hosting events in-person! We hope this will be more engaging for students, as well as provide opportunities to network with each other and practicing hospital pharmacists.



To date, we have hosted the annual “**Student Symposium**”, where participants heard from our CSHP Student Representative, Karanvir Deol, as well as CSHP-AB Vision Portfolio Presidential Officer, Catherine Biggs, to learn more about what CSHP has to offer, membership benefits and upcoming events (Turnout: 43 students). In late November, we hosted the “**Day in the Life of Hospital Pharmacist**” where attendees got to hear from four hospital pharmacists about their career journeys and daily routines. We are currently sitting at 70 members, with the majority being third and fourth years—we are currently trying to engage more first and second years by better advertising the benefits and rewards of becoming CSHP Student Supporters.



We have a variety of events and initiatives related to hospital pharmacy practice planned for the upcoming year. One of our biggest opportunities we are trying to promote is the **CSHP Host Program**, which gives CSHP Student Supporters the opportunity to be matched with a hospital pharmacist mentor from across Alberta. Students will be matched in February, and the program runs until the end of December. This is a great opportunity to develop a meaningful mentorship relationship with a hospital pharmacist. Students and pharmacists have consistently found this to be a rewarding experience, and we strongly encourage as many pharmacists as possible to sign up!



We have also been working hard to advertise Canada’s largest annual hospital pharmacy conference, the **Together Conference in Banff (March 10-12)**. Other opportunities coming up include hosting the “**Summer Student Job Panel**”, “**Hospital Pharmacy Career Night**”, the annual “**Evidence Based Medicine Competition**”, plus much more. Please reach out to the CSHP Student Representative, Karanvir ([ksdeol@ualberta.ca](mailto:ksdeol@ualberta.ca)) if you are interested in participating in any of the above events as a speaker or as a guest.



Stay tuned for more updates from the Student Committee!

Alison Cheung, *CSHP-AB Communications Committee Student Chair*  
Karanvir Deol, *CSHP-AB Student Representative*





# CSHP National Update

## Executive for the 2022/2023 Year

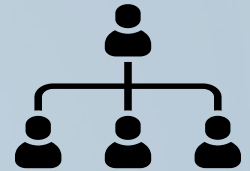
**President Elect** – Ashley Walus (Manitoba)

**President** – Sean Spina (British Columbia)

**Past President** - Zac Dumont (Saskatchewan)

**Treasurer** – Megan Riordan (Ontario)

**CEO** – Jody Ciufo



## Updates from the National AGM and Fall Board Meetings

- CSHP has started partnering with a recently founded organization - **the Indigenous Pharmacy Professionals of Canada (IPPC)**, co-chaired by pharmacists Jaris Swidrovich & Amy Lamb (both from SK)
  - ➔ IPPC was formed to help address the numerous requests coming from different pharmacy groups seeking Indigenous engagement, and is connected with other Indigenous health professional groups
  - ➔ IPPC is beginning conversations with CSHP, CPhA, residency/education groups, advocacy groups, and regulatory bodies to discuss cooperation/collaboration
  - ➔ Pharmacy team members who self-identify as Indigenous and would like to connect in with the group are encouraged to reach out via email - **indigenous@pharmacists.ca**
- The CSHP board is preparing to start work on the next multi-year strategic plan for the organization in early 2023
- Updates to the bylaws and terms of reference for a standing Governance Committee were approved at the National AGM
- The next board meetings are scheduled to occur **virtually at the end of January.**

Please reach out any time with questions or comments related to CSHP National's activities!

Mary Gunther  
CSHP Branch Delegate - Alberta  
mary.gunther@ahs.ca

# Research Committee

## "The Ghost of Rejected Articles Past"

Every year the British Medical Journal (BMJ) publishes a highly anticipated Christmas edition known for its originality and quirky research questions. The AB Branch Research Committee is similar to the BMJ, in that we advocate for evidence-based medicine and improving the dissemination of this evidence. In the spirit of the holidays, here are some of our favourite articles from this year that apply the rigor of the scientific method and are clinically relevant to hospital pharmacy practice.

### XMAS Trial: The Effect of Seasonal Syrups on Blood Sugars

- P** Females between the ages of 18-30 years old living in urban areas between November 3, 2022 and February 13, 2023
- I** Tim Hortons™ Candy Cane Hot Chocolate
- C** Starbucks™ Sugar Cookie Oat Latte
- O** Hemoglobin A1C reduction. Secondary outcomes include patient satisfaction, blood glucose levels and holiday shopping experience



RECRUITING THIS HOLIDAY SEASON!

### Don't Skip out on Cranberry Sauce this Christmas: A Dose Finding Study

**Objective:** To evaluate the safety, tolerability and optimal dose of cranberry sauce for UTI prevention

**Participants:** 162 healthy adults across Canada will be recruited on December 25, 2022.

**Methods:** Participants randomized 1:1:1 to one, two or three helpings of cranberry sauce with Christmas dinner.

**Conclusions:** A total of 95% (n=154) of participants reported an adverse effect with lethargy and over-indulgence being the most frequent. There was no difference in UTI prevention post-Christmas dinner between groups.

### Mistletoe-Associated NoEL-21: A 'KISS' Series

Kissing under sprigs of mistletoe is a Christmas tradition signifying love, romance and good luck.

Researchers from North Pole University have reported their findings of NoEL-21 from last year's holiday season in Alberta. All attendees (n= 258) of the hospital pharmacy holiday party on December 18, 2021 were included. A total of 58 cases of NoEL-21 were linked to this event.



Of all the confirmed cases, there was a significant association (p <0.01) with time spent under the mistletoe. Only one-third of cases were wearing Ugly Christmas sweaters (p =0.08) and one-quarter had the eggnog cocktail (p=0.10). Use of contact tracing and less time spent under the mistletoe could prevent the spread this holiday season.



NORAD, known for their world tracking of Santa's journey has a special announcement for clinicians:

## ELFigliflozin™

ELFigliflozin is now **approved** by Health Canada for the treatment of holiday heart syndrome in patients with or without type 2 diabetes.

Canadian Society of  
Hospital PharmacistsSociété canadienne des  
pharmaciens d'hôpitaux

Sponsored by HLS Therapeutics®



*For the Love of Clozapine:  
A clozapine update and POC presentation*

**Dr. Pierre Chue**

**MBBCh, FRCPC, FRCPsych, DABPN, LMCC, MSc, CCST**

**Register for this complimentary event now!**

**FEBRUARY 8, 2023**

In person sponsored dinner in Red Deer or  
join remotely via ZOOM

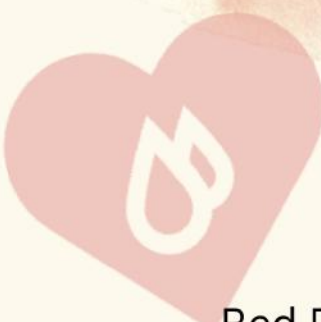
Networking opportunity at 6:30PM followed by  
presentation at 7PM

**REGISTER HERE:**

[IN PERSON](#)

[ZOOM](#)

Red Deer Restaurant information to follow and will be sent  
to registrants once confirmed





# short & snappy

-A CLINICAL OVERVIEW

## The Burning Decision: Gabapentin or Pregabalin for Neuropathic Pain?

Nils Moser, PharmD  
2021-2022 Pharmacy Resident

**Clinical Question:** In patients with chronic neuropathic pain, is treatment with gabapentin more effective at reducing pain severity without increased adverse effects compared to pregabalin?

### Background/Context:

- Neuropathic pain is defined as pain caused by a lesion or disease of the somatosensory system described as sensations of burning, tingling, shooting, lancinating, sharpness, or stabbing (1,2). Guideline recommended first-line agents for neuropathic pain: gabapentinoids, tricyclic antidepressants, or serotonin-norepinephrine reuptake inhibitors (1,2). **Evidence for gabapentinoids in generalized chronic neuropathic pain is limited. Majority of evidence is derived from studies in diabetic neuropathy and postherpetic neuralgia (3,4).**
- Gabapentinoids exert their effect through modulatory action of voltage-gated calcium channels (5,6). Compared to gabapentin, pregabalin is 6 times more potent and exhibits linear kinetics which results in much quicker absorption and a more predictable dose-response relationship (5,6). **Some evidence that substitution from gabapentin to pregabalin may provide additional neuropathic pain relief (6,7).**



| Study   | Population | Outcomes/Results   | Critical Appraisal   |
|---|------------|--|--|
| Kancherla et al. (RCT, 2021) <sup>4</sup> (n=360) | P          | Chronic lumbar radiculopathy                               | <b>1° Outcome:</b> Reduction in NPRS score at baseline and 4, 8 weeks.<br><b>Use of SR pregabalin may account for reduced adverse effects:</b> Not available in Canada.  |
|   | I          | Pregabalin SR 75mg daily                                   | <b>Efficacy:</b> Gabapentin and Pregabalin showed similar efficacy at 2 months.  |
|   | C          | Gabapentin 300mg qhs OR Amitriptyline 10mg qhs             | <b>Safety:</b> Greater sedation and drowsiness with gabapentin vs pregabalin.  |
| Ghosh et al. (RCT, 2012) <sup>5</sup> (n=100)     | P          | Electrophysiological evidence of neuropathic pain          | <b>1° Outcome:</b> Reduction in VAS score at baseline and 2, 4, 8 weeks.<br><b>Author's conclusion based on 2° outcome (PQAS score):</b> Significant baseline differences between groups.  |
|   | I          | Pregabalin 75mg BID  | <b>Efficacy:</b> No significant differences between gabapentin and pregabalin after similar duration of treatment.<br><b>High risk of bias:</b> blinding, confounding variables, confirmation bias.                                  |
|   | C          | Gabapentin 300mg BID                                       | <b>Safety:</b> Drowsiness—no statistically significant differences between groups.<br><b>Overall study quality:</b> very low   |
| Mishra et al. (RCT, 2012) <sup>9</sup> (n=120)    | P          | Neuropathic cancer pain                                    | <b>1° Outcome:</b> Reduction in VAS score at baseline and 2, 3, 4 weeks.<br><b>Pregabalin/gabapentin target doses not equivalent:</b> May contribute to differences in 1° outcome.   |
|   | I          | Gabapentin 1800mg/day                                      | <b>Efficacy:</b> Significant reduction from baseline in all groups. At 4 weeks, mean VAS significantly less for pregabalin than gabapentin.<br><b>Oral morphine for breakthrough pain:</b> May confound results.                     |
|   | C          | Pregabalin 600mg/day OR amitriptyline 100mg/day OR placebo | <b>Safety:</b> Somnolence, dizziness, xerostomia, constipation, nausea. No significant differences between groups.<br><b>Moderate risk of bias.</b><br><b>*Unclear if results can be generalized to non-cancer neuropathic pain.</b> |

NPRS = Numeric Pain Rating Scale; VAS = Visual Analog Scale; PQAS = Pain Quality Assessment Scale.



### Bottom Line:

- **Chronic neuropathic pain is not well defined in the literature and encompasses heterogeneous study populations. Very limited, low-quality evidence directly compares gabapentin to pregabalin in chronic neuropathic pain.**
- **Gabapentin and pregabalin appear to be equally effective at reducing pain severity in chronic neuropathic pain with similar safety profiles.** Rates of adverse effects (drowsiness) are similar between gabapentin and pregabalin regimens.
- **Unclear if results from neuropathic cancer pain can be generalized to chronic non-cancer neuropathic pain.**

#### References:

1. *Neuropathic pain in adults: pharmacological management in non-specialist settings.* London: National Institute for Health and Care Excellence (NICE); September 22, 2020.
2. Moulin D, Boulanger A, Clark AJ, et al. Pharmacological management of chronic neuropathic pain: revised consensus statement from the Canadian Pain Society. *Pain Res Manag.* 2014;19(6):328-335. doi:10.1155/2014/754693.
3. Robertson K, Marshman LAG, Plummer D, Downs E. Effect of Gabapentin vs Pregabalin on Pain Intensity in Adults With Chronic Sciatica: A Randomized Clinical Trial [published correction appears in *JAMA Neurol.* 2019 Jan 1;76(1):117]. *JAMA Neurol.* 2019;76(1):28-34. doi:10.1001/jamaneurol.2018.3077
4. Kancherla N, Chitti Babu G et al. Comparative study of safety and efficacy of pregabalin, gabapentin and amitriptyline in management of neuropathic pain. *Int J Basic Clin Pharmacol.* 2021 Jan;10(1):64-69.
5. Bockbrader HN, Wesche D, Miller R, Chapel S, Janiczek N, Burger P. A comparison of the pharmacokinetics and pharmacodynamics of pregabalin and gabapentin. *Clin Pharmacokinet.* 2010;49(10):661-669. doi:10.2165/11536200-000000000-00000
6. Tocki, K., 2021. Battle of the Gabapentinoids: Gabapentin Vs. Pregabalin. [Blog] *OnePoint Patient Care.* Accessed 15 January 2022. Available from: <https://blog.opcc.com/battle-of-the-gabapentinoids-gabapentin-vs-pregabalin/>
7. Toth C. Substitution of gabapentin therapy with pregabalin therapy in neuropathic pain due to peripheral neuropathy. *Pain Med.* 2010;11(3):456-465. doi:10.1111/j.1526-4637.2009.00796.x
8. Ghosh, AK., Ghosh, A., Kundu, A., Das, A. K., & Bhattacharya, K. B. (2012). Comparative study of efficacy and safety of pregabalin and gabapentin in neuropathic pain. *Asian Journal of Pharmacy and Life Science ISSN, 2231, 4423.*
9. Mishra S, Bhatnagar S, Goyal GN, Rana SP, Upadhyay SP. A comparative efficacy of amitriptyline, gabapentin, and pregabalin in neuropathic cancer pain: a prospective randomized double-blind placebo-controlled study. *Am J Hosp Palliat Care.* 2012;29(3):177-182. doi:10.1177/1049909111412539

# short & snappy

-A CLINICAL OVERVIEW

## High Dose Methotrexate Toxicity: Glucarpidase to the Rescue

Melissa Chan, PharmD,  
2021-2022 Pharmacy Resident

**Clinical Question:** In cancer patients with high dose methotrexate (HD-MTX) induced AKI, does glucarpidase improve renal function and reduce mortality compared to dialysis?

**Background/Context:** HD-MTX induced AKI is an oncologic emergency requiring hydration, urine alkalization to maintain urine pH > 7 and leucovorin rescue guided by serum MTX levels [MTX] (1). Glucarpidase is an FDA approved treatment for toxic [MTX] (>1 µmol/L) and delayed clearance due to renal impairment (2). It is a carboxypeptidase enzyme that converts serum MTX into inactive DAMPA and glutamate metabolites, which are eliminated by the liver. A consensus guideline recommends a single dose of glucarpidase 50 units/kg x 1 dose within 48-60 hours of MTX administration; repeat doses not recommended due to lack of efficacy after 60 hours (1). If glucarpidase is not available, consider dialysis (1,3).



A retrospective cohort study found glucarpidase (n=20) caused greater reduction of [MTX] compared to dialysis ≤ 14 days [98.7% vs 52%] with longer time to renal recovery [22 days vs 16 days] and lower rebound [MTX] increase (2.5-8.8% vs 90-100%) (4). A pooled retrospective analysis (n=476) found 64% of patients with renal impairment ≥ grade 2 recovered to grade 0-1 by 12.5 days (5).

A prospective open label study (n=43) found 93% of patients who received glucarpidase had improvement or normalization of creatinine (6); 23 patients died from complications of MTX toxicity versus 4 patients in a similar study (n=82) (7). Risk factors for delayed MTX elimination include BMI ≥ 25kg/m<sup>2</sup>, co-medications, urine pH < 7, IV fluid intake < 3L/m<sup>2</sup>/24h, hepatic or renal dysfunction, third space and diarrhea. Patients with 3+ risk factors had significantly poorer survival (HR 3.64, CI 1.14-17.54, p=0.03) (6).



A retrospective cohort study found glucarpidase (n=30) compared to + dialysis (n=58) or +/- dialysis (n=701) resulted in shorter length of stay (14.7 vs 40.2 vs 21.9 days) with less days in ICU, and lower inpatient (3.3% vs 50.6% vs 20.7%) and 90 day mortality (13.3% vs 58.6% vs 37.6%) (8). These differences were statistically significant.



### Takeaways & Clinical Pearls:

Glucarpidase is preferred for treatment of HD-MTX AKI compared to dialysis. The benefits may offset drug cost (1 vial = 1,000 units = \$10,000 USD). / [MTKPK.org](https://www.mtkpk.org) is a helpful clinical decision tool (9). / Glucarpidase is accessible through Health Canada via the Voraxane Special Access Program. / Do not administer leucovorin for 2 hours before or after glucarpidase (10). / MTX measured by immunoassay is unreliable for 48 hours post glucarpidase administration (10).

#### References:

- Ramsey LB, Balis FM, O'Brien MM, et al. Consensus Guideline for Use of Glucarpidase in Patients with High-Dose Methotrexate Induced Acute Kidney Injury and Delayed Methotrexate Clearance. *Oncologist*. 2018;23(1):52-61. doi:10.1634/theoncologist.2017-0243
- BTG International Inc. Voraxane. U.S. Food and Drug Administration Website. [https://www.accessdata.fda.gov/drugsatfda\\_docs/label/2012/125327lbl.pdf](https://www.accessdata.fda.gov/drugsatfda_docs/label/2012/125327lbl.pdf). Revised 2012 Jan. Accessed 2022 Feb 4.
- Sakran R, Milo G, Jabareen A, et al. Effective elimination of high-dose methotrexate by repeated hemodiafiltration and high-flux hemodialysis in patients with acute kidney injury [published online ahead of print, 2021 Oct 20]. *J Oncol Pharm Pract*. 2021;10781552211052564. doi:10.1177/10781552211052564
- Widemann BC, Balis FM, Kempf-Bielack B, et al. High-dose methotrexate-induced nephrotoxicity in patients with osteosarcoma. *Cancer*. 2004;100(10):2222-2232. doi:10.1002/cncr.20255
- Widemann BC, Schwartz S, Jayaprakash N, et al. Efficacy of glucarpidase (carboxypeptidase g2) in patients with acute kidney injury after high-dose methotrexate therapy. *Pharmacotherapy*. 2014;34(5):427-439. doi:10.1002/phar.1360
- Schwartz S, Borner K, Müller K, et al. Glucarpidase (carboxypeptidase g2) intervention in adult and elderly cancer patients with renal dysfunction and delayed methotrexate elimination after high-dose methotrexate therapy. *Oncologist*. 2007;12(11):1299-1308. doi:10.1634/theoncologist.12-11-1299
- Buchen S, Ngampolo D, Melton RG, et al. Carboxypeptidase G2 rescue in patients with methotrexate intoxication and renal failure. *Br J Cancer*. 2005;92(3):480-487. doi:10.1038/sj.bjc.6602337
- Demiralp B, Koenig L, Kala J, et al. Length of stay, mortality, and readmissions among Medicare cancer patients treated with glucarpidase and conventional care: a retrospective study. *Clinicoecon Outcomes Res*. 2019;11:129-144. Published 2019 Feb 7. doi:10.2147/CEOR.S188786
- Taylor ZL, Mizuno T, Punt NC, et al. MTKPK.org: A Clinical Decision Support Tool Evaluating High-Dose Methotrexate Pharmacokinetics to Inform Post-Infusion Care and Use of Glucarpidase. *Clin Pharmacol Ther*. 2020;108(3):635-643. doi:10.1002/cpt.1957