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FALL 2025 EDITION

Pediatric Pharmacy Association Newsletter

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READ NOW

Promoting Resiliency, Minimizing Burnout and Increasing Retention in the Pharmacy Team

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Burnout: A Real Risk to the Profession

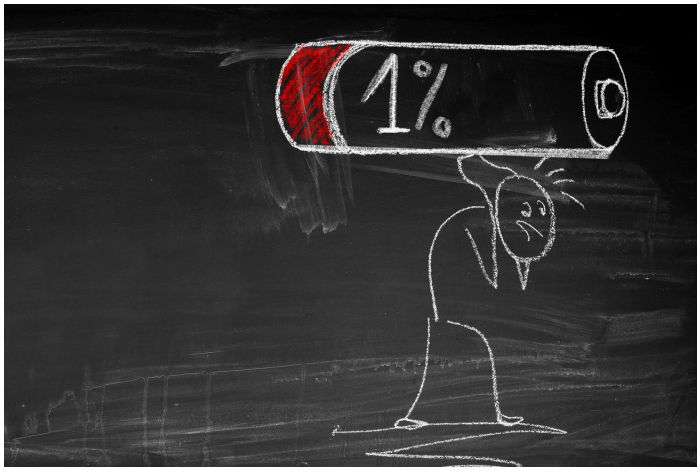
"Human Services" related burnout was described in a 1981 Journal of Organizational Behavior article by Maslach and Jackson as "a syndrome of emotional exhaustion and cynicism that occurs frequently among individuals who do 'people-work' of some kind."[1] This article described three consequences of burnout: 1) emotional exhaustion, 2) negative, cynical attitudes and 3) negative self-evaluation of work-related accomplishments. The authors suggested that burnout, "appears to be a factor in job turnover, absenteeism and low morale." This groundbreaking article also introduced one of the first assessment tools to measure burnout, the Maslach Burnout Inventory (MBI), which is still used today.[1]

The World Health Organization (WHO) more recently characterized burnout as a "syndrome conceptualized as resulting from chronic workplace stress that has not been successfully managed." They also describe three dimensions that are very similar to those described in the 1981 study.

These three dimensions include: 1) feelings of energy depletion or exhaustion, 2) increased mental distance from one's job, or feelings of negativism or cynicism related to one's job, 3) reduced personal efficacy.[2] Burnout is included in the International Classification of Diseases (ICD-11), although not as a medical condition but rather an occupation-related syndrome or phenomenon. Despite the longevity of burnout descriptions and measures, we are still challenged with responding to this phenomenon and fostering a resilient and committed pharmacy workforce. This challenge has only been exacerbated by the COVID-19 pandemic, which added pressures and stressors secondary to increased workloads, rapid changes in patient care and work format.[3]

While the prevalence of pharmacist burnout varies by practice setting, it increased in all sectors during the pandemic. A 2022 systematic review found that over half of pharmacists acknowledge experiencing burnout. While rates have decreased since the pandemic began, they have not returned to pre-pandemic levels.[3] The significance of this sustained increase cannot be ignored. There is an abundance of literature linking healthcare worker burnout with decreased patient safety.[3-7] A 2021 publication surveyed 614 hematology-oncology pharmacists and found that pharmacists experiencing burnout were four times more likely to self-report a major medication error in the prior three months. They were also more likely to leave their current positions. Similarly, a 2012 study of nurses found that the risk of infection increased in patients cared for by nurses experiencing burnout, even when controlling for patient severity and other hospital and nurse factors.[5] Error self-reporting also increased in a study of physicians experiencing burnout, fatigue and lower work unit safety grades, where each of these factors were independently associated with an increase in the risk of error self-reporting.[8] Several other studies corroborate the above findings.[3-4,6-7]

With the recent and sustained increase in burnout rates among pharmacists and other healthcare workers as well as the negative impact to individual pharmacists, pharmacy teams and patients, it is imperative that we identify ways to address this ongoing challenge. While individual strategies have been suggested, it is important to take a multipronged approach involving both the individual and area leaders.



Individual Strategies

Burnout among healthcare professionals is a persistent and complex issue, exacerbated by high workloads, emotional labor, and systemic inefficiencies. While organizational reform is essential, much of the literature continues to emphasize individual strategies as the frontline defense against burnout. This section evaluates the effectiveness and limitations of these approaches, including wellness perks, Employee Assistance Programs (EAPs), boundary-setting, and work-life balance.

Wellness Perks

A Starting Point, Not a Solution

Healthcare organizations often offer wellness perks—such as gym memberships, mindfulness apps, and healthy snacks—as part of their burnout prevention efforts. These initiatives promote physical and emotional well-being and are supported by evidence. A systematic review by Maresca et al., identified physical activity, self-care, and emotional distancing from work as effective coping strategies among healthcare professionals.[9] Unfortunately, these perks can be superficial if not embedded within a broader culture of wellness. Montgomery and Lainidi argue that focusing on what we can do—like offering perks—may distract from what we should do, such as addressing systemic issues and fostering dignity in the workplace.[10]

Employee Assistance Programs (EAPs): Valuable but Underused

EAPs offer confidential support for employees dealing with stress, anxiety, and burnout. Catapano et al. found that individual-level interventions such as Cognitive Behavioral Therapy (CBT), mindfulness, and relaxation techniques—including art therapy and Emotional Freedom Techniques—were effective in reducing burnout and improving quality of life.[11] Despite their proven benefits, EAPs are often underutilized due to stigma, lack of awareness, and concerns about confidentiality. For these programs to be impactful, organizations must actively promote them and normalize their use.

Creating Boundaries: Empowerment Through Limits

Setting boundaries is a critical individual strategy for managing burnout. Maresca et al. highlighted boundary-setting as one of the coping mechanisms associated with reduced burnout, alongside clinical variety, realistic expectations, and passion for one's work.[9] However, boundaries are difficult to maintain in cultures that reward overwork or lack clear expectations. There is a significant need for training of front-line managers to help employees feel competent and appreciated, while supporting their efforts to set and maintain well-being boundaries.[10]

Work-Life Balance in the Digital Era

Achieving work-life balance is often seen as a key to preventing burnout. In the digital age, this balance has become more complex. Győrffy et al., found that self-consciousness and communication are essential for establishing digital work-life boundaries.[12] They advocate for integrating these principles into training curricula and institutional policies as part of preventive measures against burnout. While individual awareness is crucial, systemic support—such as flexible scheduling and realistic workload expectations—is necessary to make balance achievable.

Individual Strategies Need Systemic Support

Individual strategies are vital tools in the fight against burnout. They empower healthcare professionals to take control of their well-being and build resilience. However, without organizational backing and cultural change, these strategies may offer only temporary relief. Institutions must move beyond surface-level solutions and invest in systemic reforms that address the root causes of burnout—creating environments where individual strategies can truly thrive.

How can leaders intervene?

Despite these many individual strategies we can focus on for our own well-being, they are not making the big impacts that are necessary to maintain a resilient workforce. By looking deeper into the causes of stress relating to burnout, one can see that these issues are systemic and engrained into our institutions. Healthcare touts high rates of burnout compared to other professions. The finite time in each day can easily be consumed by a myriad of tasks that are difficult to relate back to the underlying purpose of our profession; taking care of our pediatric patients.

Requirements such as electronic health record documentation, USP compliance, and prior authorizations can feel like an administrative burden instead of something to benefit patients.

As leaders, we have the unique role and responsibility to shape the daily work of our teams. It is imperative that we must act to ensure the work required of our pharmacy workforce does not continue to feed the burnout seen in our profession. To implement meaningful change, we must understand the work of our teams. This starts with listening. Here are some ideas to engage team members and find out more about the factors contributing to burnout.

- Round regularly with team members. Ask specific questions related to workflows that could be optimized. Solutions for Patient Safety outlines the 4Ds framework.[13] These questions prompt team members to identify something difficult, dangerous, dumb, and different about their work as conversation starters.
- Hold dedicated listening sessions. Don't just focus on the what, but also the how work is being done in current state to identify target areas for change.
- Distribute an anonymous survey. Give team members the opportunity to share their thoughts candidly without the fear of repercussions.
- Have team members complete time studies of their work. Time studies help to evaluate time spent on tasks and can be compared between individuals and teams. Collect qualitative information as well such as how team members perceived a task or if there is specific feedback on how the task is completed.

Armed with a strong understanding of current state, leaders can compare what is being done in a day versus the required elements of the job. This can often vary greatly and is helpful to create a shared understanding to build from. Team members are key partners in developing changes that impact their day-to-day work. Creating a representative work group to address concerns and implement improvements is one way to ensure engagement in the process and that interventions are meaningful to team members.

As a clinical support service, pharmacy services can often relieve work previously completed by other healthcare team members. Pharmacy leaders should be a strong advocate for their teams to thoughtfully take on new services only if and when it is determined to be sustainable. In the current climate, justifying additional personnel resources can be challenging. Thus, critical conversations both internally and externally surrounding expansion of services may also include what may need to be cut to maintain a reasonable workload.

Creating a sustainable workload is a crucial first step in preventing burnout, however, five other factors have been identified in the causes of burnout which should be addressed as well. These include mismatched values, perceived lack of control, poor relationships, lack of recognition/reward, and lack of fairness.[14] All of these factors can be impacted a higher level. We need to focus our efforts on creating a culture that supports our teams at an upstream level enabling them to thrive instead of survive.

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FROM POLAR TO PRODUCTIVE

USING ARTIFICIAL INTELLIGENCE (AI) TO CHOOSE YOUR WORDS WISELY

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Pharmacists often navigate sensitive conversations — with colleagues, providers, or patients — where word choice can determine whether the exchange builds trust or creates conflict. In today's polarized climate, language that once seemed neutral may now be perceived as politically charged. This shift poses challenges for pharmacy professionals who must remain clear, collaborative, and professional. Polarization is increasingly recognized as a threat to public health that all health care providers need to address.[1] A study conducted in 2022 looked at people whose political opinions varied from those around their state; they found that people who identified as more distant from the average voter in their state, also reported worse physical and mental health than their peers.[2] As healthcare professionals, our dedication to patient well-being and evidence-based practice must remain steadfast, even as language evolves. To truly connect and make an impact, we may need to adapt how we communicate. Avoiding language that risks crossing into unproductive conflict can preserve civility and prevent communication breakdown. Artificial intelligence (AI) is a powerful tool which is becoming increasingly integrated into pharmacy practice and may be leveraged to filter our communication to help us achieve our goals.

Large language models (LLMs) are a type of AI. Some of the most commonly used programs include ChatGPT, Claude, or Perplexiity. Use of these tools makes some tasks easier than ever before. LLMs generate language patterns that mirror conventional professional communication styles, and as such are heavily predictive in their output as far as word choice, semantics, and overall tone of the message being conveyed.[3] Users can use LLMs to write, research, or edit communication in a variety of ways. In this context, a user can input their draft communication (email, manuscript, position statement, social media post) into the program and ask for softened verbiage that still retains the core message.

An analysis by the University of Science and Technology of China showed that commercially and publicly available AI was less emotional than human users when discussing climate change.[4] This same idea can be applied to other polarizing content.

Take the following example: "Our residency program is committed to promoting diversity, equity, and inclusion by recruiting candidates from underrepresented backgrounds." This phrase contains some buzzwords some institutions may have to avoid. However, using a prompt to soften the language, a LLM may return with the following: "Our residency program is committed to building a team with a focus on diverse backgrounds and equity, ensuring all candidates feel welcome to apply." At this point in prompting, a step back to evaluate the effectiveness is important. While the above phrase does eliminate some of the potentially contentious phrasing -- it now avoids the term inclusion -- is this really the best it can do? Sometimes more specific prompting can be used to get a better response. Prompting the LLM again to use synonyms for "diversity" and "equity", the next iteration is as follows: "Our residency program is committed to building a team with varied perspectives, experiences, and backgrounds, ensuring all qualified candidates feel encouraged to apply." While all versions reflect a commitment to underrepresented populations receiving opportunities, the third statement does not send up the same signs of potential controversy that the first and even second option may. At the very least, it avoids the nomenclature that can potentially trigger an unproductive response.

AI functions as a practical resource that pharmacists can integrate into daily professional practice. Some researchers have already found success using AI as a resource to review their own article submissions.[5] Using AI to flatten scientific language so that it may be more easily understood demonstrates its value both as a tool generally and in augmenting language in a way that is valuable for the case presented here, as well. Integrating AI may seem daunting, but small applications can help providers become comfortable while enhancing daily practice. To support efforts and streamline communication, we've compiled a selection of tailored prompts that can be used with the AI platform of your choice to help refine and soften your language:

- Rewrite the following text so it retains its original meaning but removes any politically charged or polarizing language. Keep the tone professional and inclusive.
- Rephrase the following so it's neutral and non-partisan, but still conveys the same commitment and intent. Make it acceptable to audiences with differing political views.
- Rewrite the following to sound collaborative and constructive, removing any language that might be read as combative or dismissive. Keep it clear and confident.
- Reword the following so it's understandable and persuasive to someone who may be skeptical of this topic, avoiding jargon and emotionally charged terms.
- Reframe the following so it emphasizes evidence and shared goals rather than ideology. Replace any phrases that could be seen as slogans with plain, precise language.
- Analyze the following text and point out any words or phrases that might be perceived as politically charged or polarizing. Suggest alternatives for each.

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Additionally, here are some links articles to commercially available, large-language model AIs that have been reviewed by Georgetown University.[6]

- https://www.perplexity.ai
- https://www.anthropic.com
- https://www.chatgpt.com

As pharmacists continue to serve diverse patient populations and collaborate across healthcare teams, maintaining language that is professional, precise, and accessible is critical. AI offers one emerging strategy to support these goals, provided it is applied thoughtfully and with human oversight.

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Pharmacogenetics and Proton Pump Inhibitors: A Focus on CYP2C19 Genotype-Guided Dosing in Pediatrics for Eosinophilic Esophagitis

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Background

Proton pump inhibitors (PPIs) are used extensively for acid suppression and include dexlansoprazole, esomeprazole, lansoprazole, omeprazole, pantoprazole, and rabeprazole. PPIs work by irreversibly inhibiting the H+/K+ ATPase proton pump on parietal cells to inhibit hydrogen ion secretion into the gastric lumen, decreasing gastric pH. Enzymatic metabolism of PPIs takes place primarily in the liver by cytochrome P450 (CYP) 2C19 and to a lesser extent by CYP3A4. However, the extent to which CYP2C19 contributes to metabolism differs among PPIs, with omeprazole showing the greatest dependence, followed by lansoprazole, dexlansoprazole, and pantoprazole with esomeprazole and rabeprazole appearing to be least affected by CYP2C19.[1] Genetic variation in the CYP2C19 gene can lead to differences in the activity level of the CYP2C19 drug metabolizing enzyme, ultimately impacting the safety or efficacy of certain PPIs. The Clinical Pharmacogenetics Implementation Consortium (CPIC) published a guideline in 2020 regarding CYP2C19 and PPI dosing (Table 1).[2]

Use in Pediatrics:

Overview

PPIs are approved for use in children over the age of 1 year for gastroesophageal reflux disease, erosive esophagitis, peptic ulcer disease, and H. pylori eradication.[3] High dose PPIs have become standard of care for the treatment of Eosinophilic Esophagitis (EoE). The current CPIC CYP2C19-guided PPI recommendations apply to pediatric patients as well.[3] While most of the data used to construct the CPIC PPI Guideline stems from adult studies, there have been several studies specifically highlighting the impact of genetic variation in CYP2C19 on PPI response in pediatric patients.

Utilizing genotype-guided dosing prior to pH probe testing has been found to more accurately depict PPI efficacy and response in pediatrics.[4] Additionally, for children appearing to fail PPI therapy and needing anti-reflux surgery, preemptive CYP2C19 testing and more aggressive PPI dosing for normal, rapid, and ultrarapid metabolizers may help to avoid escalation to surgery.[4]

Table 1. Summary of CPIC Guidelines

CYP2C19 Phenotype	Implication	Recommendation	Strength of Recommendation
Ultrarapid Metabolizer (UM)	Decreased plasma concentrations of PPIs compared to CYP2C19 NMs; increased risk of therapeutic failure.	**Increase starting dose by 100%.** May be given in divided doses. Monitor for efficacy.	Optional
Rapid Metabolizer (RM)	Decreased plasma concentrations of PPIs compared to CYP2C19 NMs; increased risk of therapeutic failure.	**Standard starting daily dose. Consider increasing dose by 50-100% for the treatment of *H. pylori* infection and erosive esophagitis.** May be given in divided doses. Monitor for efficacy.	Moderate
Normal Metabolizer (NM)	Normal PPI metabolism; may be at increased risk of therapeutic failure compared to CYP2C19 IMs and PMs.	**Standard starting daily dose. Consider increasing dose by 50-100% for the treatment of *H. pylori* infection and erosive esophagitis.** May be given in divided doses. Monitor for efficacy.	Moderate
Intermediate Metabolizer (IM)	Increased plasma concentration of PPI compared to CYP2C19 NMs; increased chance of efficacy and potentially toxicity.	**Standard starting daily dose. For therapy >12 weeks and efficacy achieved, consider 50% reduction in daily dose.** Monitor for efficacy.	Optional
Poor Metabolizer (PM)	Increased plasma concentration of PPI compared to CYP2C19 NMs; increased chance of efficacy and potentially toxicity.	**Standard starting daily dose. For therapy >12 weeks and efficacy achieved, consider 50% reduction in daily dose.** Monitor for efficacy.	Moderate

Eosinophilic Esophagitis

Eosinophilic Esophagitis (EoE) is an immune-mediated chronic condition of the esophagus affecting both adults and children. Understanding the appropriate management and treatment is important given the increasing incidence and prevalence of the condition. The standard of care for pediatric EoE is PPI therapy. PPIs have been found to have several novel mechanisms for EoE management including decreasing the expression of the primary cytokine (eotaxin-3) that is involved in recruiting eosinophils to the esophagus, improving barrier function of the esophagus, and helping with esophageal epithelial transcriptional homeostasis management.[5] Despite this, only 30-60% of patients with EoE respond to PPI therapy. As PPI concentration varies based on CYP2C19 phenotype, pharmacogenomics can be a useful tool in optimizing dosing and achieving desired outcomes. A prospective cohort of 92 children diagnosed with EoE were studied, and it was found that having a CYP2C19 gain of function allele (ultrarapid and rapid metabolizers) resulted in 8.2-fold higher odds of failing PPI therapy in comparison to children who did not carry a gain of function allele (normal, intermediate, and poor metabolizers).[6] When reviewing PPI dosing, children who were carriers of the increased function allele and received doses between 1.54 and 2.05 mg/kg/day were more likely to be non-responsive to PPI therapy (OR = 7.71). The data suggest utilizing genotype-guided PPI dosing may help maximize PPI-responsiveness for pediatric patients with EoE.

The risk of adverse effects from PPI use appear to be minimal in pediatric patients, but current research suggests that chronic use of PPIs could be linked to several adverse effects.[7] Children on short-term courses of PPIs could experience headaches and gastrointestinal effects such as nausea, constipation, or diarrhea.[8] Chronic PPI use has been associated with an increased risk of bone fractures, gastrointestinal and lower respiratory tract infections, and development of allergy disorders.[9] CYP2C19 intermediate and poor metabolizers may face an increased risk of adverse effects and toxicity if maintained on standard doses for extended periods of time. Genotyping and tailoring PPI dosing may help mitigate the risk of experiencing short-term and potentially reduce long-term adverse effects.

Conclusions

PPIs are useful agents for managing acid-related conditions in pediatric patients. CYP2C19 genetic variability has been found to significantly impact PPI metabolism and treatment outcomes in children. While most research originates from adult studies, there is increasing pediatric specific evidence supporting pharmacogenomic informed PPI use. CPIC currently provides genotype-based dosing guidance for PPIs applicable to children. Health care providers should be aware of genotype-guided recommendations to optimize PPI therapy in pediatric practice.

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Ulcer-Proofing Your Treatment: Using Gastroprotective Agents with NSAIDs and Steroids in Pediatrics

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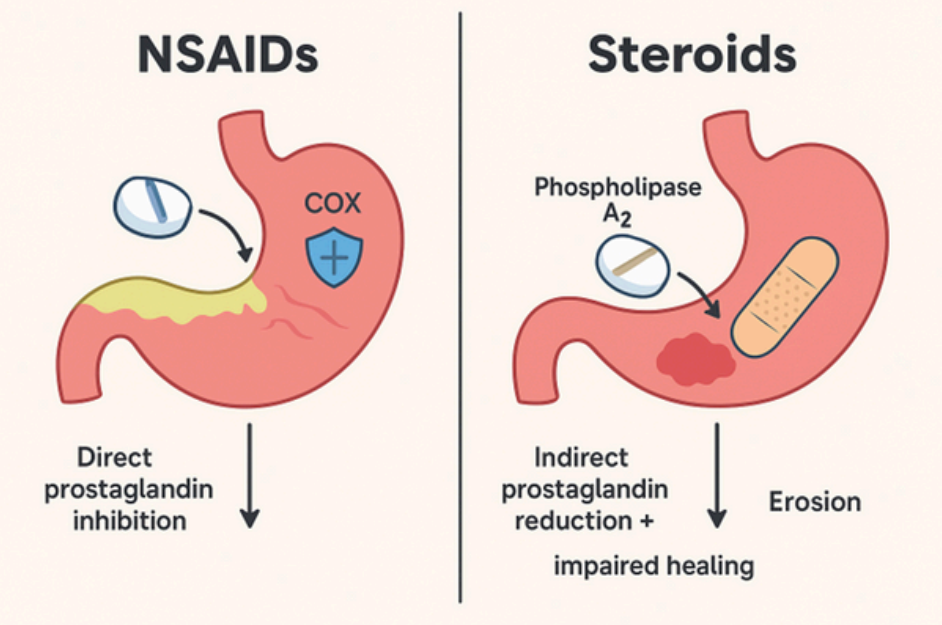
OVERVIEW

A prevalent adverse effect of both non-steroidal anti-inflammatory drugs (NSAIDs) as well as corticosteroids is gastrointestinal (GI) injury, including risk of GI bleed and gastritis. Despite lack of clear evidence or guidelines, acid suppression is often used for gastroprotection in conjunction with long-term use of NSAIDs or corticosteroids, or with higher dosing regimens as defined below.[1] Mechanistically, the injury occurs through the disruption of the gastric mucosa via decreased gastroprotective prostaglandin, localization of acid production, and delayed wound healing.[2-4] With symptoms masked by the anti-inflammatory properties of these medications, these injuries may have delayed recognition and treatment.



NSAIDs have limited evidence for increased risk of GI bleed or gastritis in pediatrics within any age group and without any association to duration or dosing.[5-7] However, more robust data in adults have shown dose-dependent increase in risk of peptic ulcer bleeding. One study of ibuprofen comparing total daily doses of <1200 versus ≥1800 milligrams (mg) saw a 6-fold increased risk of peptic ulcer bleeding.[8] While chronic use is associated with increased risk, the exact duration is unclear. Some data indicates no increased risk with less than 7 days but increased risk with over 14 days of therapy.[9-10]

NSAIDs inhibit both protective as well as inflammatory prostaglandins via cyclooxygenase (COX) 1 and 2 respectively. While COX-2 enzymes are found at sites of inflammation, COX-1 enzymes are found in the GI tract and platelets which offer physiologic protection from GI adverse events. As a result, selective inhibitors of COX-2, celecoxib and rofecoxib, have lower risk of GI bleed due to reduced COX-1 inhibition.[11] In adults, the risk reduction using a selective COX-2 NSAID was comparable to non-selective inhibitors taken with a proton pump inhibitor (PPI).[12] Even within non-selective NSAIDs, ibuprofen and diclofenac have shown lower risk of bleed.[13]

More recently in pediatrics, corticosteroids have been associated with a 1.5-times increased risk of GI bleeding within a month of initiation.[14] Adult studies have shown GI adverse events to be associated with higher doses, greater than an equivalent of 20 mg daily or a 1000 mg cumulative dose of prednisone.[15-16] However, there was no correlation with duration of therapy and increased GI events.[16]

Risk factors are not well defined for the pediatric population, but generally include high dose, long duration, and concomitant use with other medications that disrupt the mucosal lining or increase bleed risk.[17] To mitigate risk of GI injury, proton pump inhibitors (PPIs) and histamine 2 receptor antagonists (H2RAs) have been used, as they inhibit gastric acid suppression, theoretically preventing and allowing for healing of gastric injury.[18] Misoprostol, a synthetic prostaglandin E1, works more directly to stimulate protective mucus and gastric healing.[19] Of note, all of these agents may benefit the upper GI tract, but not the lower GI tract. None of these therapies have established strong safety and efficacy pediatrics, with one study showing that even with gastroprotective agents, gastric adverse events still had early onset, as early as one week.[20]

REVIEWING THE LITERATURE: CORTICOSTEROIDS

Roberts et al. conducted a retrospective study evaluating stress ulcer prophylaxis (SUP) use in pediatric ICU patients admitted for critical asthma.[21] The study included 30,177 children from 42 institutions, all of whom received systemic corticosteroids such as dexamethasone, methylprednisolone, prednisone, prednisolone, or hydrocortisone. The duration of corticosteroid use was not well-defined, with average hospital stays ranging from three to five days. The median patient age was 8.3 years. From the sample population, 34.4% received SUP. Of those, 81.6% were prescribed an H2RA and 18.4% received a PPI. The researchers assessed rates of GI bleeding, gastritis, enteric ulceration, and SUP-related complications between patients who received prophylaxis and those who did not. No GI bleeding events occurred in either group. Gastritis was reported in just 0.1% of patients, with no difference between the groups. These results raise concern about the routine use of SUP in children receiving corticosteroids and suggest that its use be reevaluated.

REVIEWING THE LITERATURE: NSAIDs

No direct studies exist for the pediatric population comparing the use of H2RAs, PPIs, or misoprostol in NSAID-related gastric injury. For the adult population, the American Journal of Gastroenterology (AJG) notes that while H2RAs have a role in reducing duodenal ulcers, they are not efficacious in the prevention of NSAID-related gastric ulceration.[1] A Cochrane review by Rostom et al. assessed medications to prevent NSAID-induced gastroduodenal ulcers in adults. Misoprostol, PPIs, and high-dose H2RAs all reduced ulcer risk, with PPIs showing the best efficacy and tolerability.[12] With conflicting evidence and lack of recommendations for any one gastroprotective agent even within the adult population, extrapolation to pediatrics proves difficult. In pediatric patients, experience is limited, however a retrospective review by Gazarian et al. evaluated misoprostol therapy in 25

children receiving NSAIDs.[19] Of these 25 children, 82% achieved GI symptom resolution with the only adverse effect being reports of diarrhea in 1 child. The AJG suggests that misoprostol has similar efficacy to PPIs for the prevention of NSAID-related upper GI injury, though diarrhea may be a dose-limiting side effect.[1] While misoprostol is not commonly utilized in children, further studies evaluating its role in gastroprotection could expand its use.

ADVERSE DRUG REACTIONS WITH USE OF ACID SUPPRESSIVE THERAPIES

The primary concern with the use of acid suppressive agents in the pediatric population is their impact on overall growth due to altered absorption of nutrients in a less acidic environment. In addition, use of acid suppressive therapies for a duration longer than two weeks may increase risk of adverse drug reactions such as hypomagnesemia, acute kidney injury, fractures, clostridium difficile, and pneumonia.[25] With H2RA's, common adverse effects include headache, constipation/diarrhea, and dizziness.[24] Common adverse effects of misoprostol include diarrhea, abdominal pain, and flatulence.[1] Considering that many of these reported adverse drug reactions tend to occur with longer duration of use, it would be prudent to continuously revise indications and benefits of therapies periodically. Additionally, from a practical lens, the use of an H2RA or PPI requires patients and caregivers to incorporate an additional medication into their therapeutic routine, thereby increasing barriers to adherence.

CONCLUSIONS

- The need for NSAID or corticosteroid monotherapy is not an indication for concomitant acid suppressive therapy.
- It is important to consider where in the GI tract damage should be minimized; acid suppressive therapy is not effective in preventing lower GI tract damage.
- Acid suppression can be beneficial, however careful consideration should be taken to consider the harm versus benefit.
- Patients with high-risk characteristics such as history of peptic ulcer disease, higher NSAID doses, concomitant use of anticoagulation/antiplatelets/steroids, could be possible candidates for acid suppressive therapy.
- Current pediatric SUP guidelines focus on critically ill patients, not routine NSAID or steroid use. With limited evidence supporting its benefit, routine SUP should be avoided in children without additional gastrointestinal risk factors beyond NSAID or steroid use.
- More evidence is needed to provide clear guidelines.

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STUDENT CHAPTER HIGHLIGHTS

University of Connecticut

Pajama Day

Instagram: @uconn_sppag

Last September, our chapter organized a School of Pharmacy wide Pajama Day to stand in solidarity with children affected by childhood cancer. The event aimed not only to highlight September as Childhood Cancer Awareness Month but also to support a pediatric focused organization through fundraising. Participation was strong, with students from every class wearing pajamas to show their support. In addition, members contributed baked goods, which were sold during the event. Collectively, these efforts raised over $500, which was donated to the American Childhood Cancer Organization (ACCO).

University of Connecticut

Pajama Day!

Benefitting childhood cancer research

2024 GUIDELINE UPDATES FOR VTE IN PEDIATRIC PATIENTS

Authors: Brooke Stamey PharmD candidate 2026 and Katlyn Etheridge PharmD

BACKROUND

Before the 2024 venous thromboembolism (VTE) guideline updates, the last update was from 2018 and there has been a tenfold increase in the number of children involved in VTE trials. Venous thromboembolism includes deep vein thrombosis (DVT) and pulmonary embolism (PE). This article summarizes the updates to VTE treatment from recent data and examine the use of direct oral anticoagulants (DOACs) in children. It focuses on when to treat versus not to treat in specific clinical situations.

Changes from 2018

The updated 2024 guidelines include some recommendations that remain unchanged from the 2018 version, some that have been revised, and others that are entirely new.

Recommendation 1: In pediatric patients with symptomatic deep vein thrombosis (DVT) or pulmonary embolism (PE) the ASH guideline **suggests** using anticoagulation rather than no anticoagulation.

- 2018 recommendation 1: Recommends → suggests
- Recommends= strong recommendation
- Suggests= conditional recommendation

Recommendation 3: for select pediatric patients with provoked VTE, the ASH/ISTH guideline panel suggests 6 weeks rather than 3 months of anticoagulation.

- Exclusions: PE, recurrent VTE, persistent occlusive thrombus at 6 weeks, cancer associated thrombosis, patients with persistent antiphospholipid antibodies or major thrombophilia, and ongoing VTE risk factors.
- **New recommendation**

Anticoagulants	
Heparin	Parenteral anticoagulant
Enoxaparin (Lovenox)	Low molecular weight heparin
Warfarin (Coumadin)	Vitamin K antagonist

Recommendation 5: In pediatric patients with cerebral sinus venous thrombosis (CSVT) with and without hemorrhage secondary to venous congestion, the ASH/ISTH guideline panel **suggests** using anticoagulation rather than no anticoagulation.

- 2018: Recommendation 22a and 22b
  - Recommends → suggests

Recommendation 7a: **For neonates** and pediatric patients with right atrial thrombosis, the ASH/ISTH guideline panel suggests anticoagulation rather than no anticoagulation for patients **with high risk. features** and low perceived risk of bleeding

- 2018: did not include neonates or differentiate between high and low risk features.

Recommendation 7b: **For neonates** and pediatric patients with right atrial thrombosis and the **absence of high risk features** or with unacceptable perceived risk of bleeding, the ASH/ISTH guideline **suggests no anticoagulation** over anticoagulation.

- 2018: did not include neonates or differentiate between high and low risk features.

Recommendation 12a: For pediatric patients with superficial vein thrombosis secondary to IV cannulation in the upper limb, the ASH/ISTH guideline panel suggests no anticoagulation rather than using anticoagulation.

- **New recommendation**

Recommendation 12b: For pediatric patients with superficial vein thrombosis in the upper limb, which is not cannula related, or in the lower limbs associated with cancer or varicose veins, the ASH/ISTH guidelines panel suggests anticoagulation rather than no anticoagulation.

- **New recommendation**

Recommendation 13: For pediatric patients with proximal DVT, the ASH/ISTH guideline panel suggests using anticoagulation alone rather than thrombolysis followed by anticoagulation.

- **New recommendation**

Recommendation 14: For pediatric patients with PE and echocardiographic or biochemical evidence of right ventricular dysfunction but without hemodynamic compromise, the ASH/ISTH guideline panel suggests using anticoagulation alone rather than thrombolysis followed by anticoagulation.

- **New recommendation**

Recommendation 16: For pediatric patients with symptomatic CVAD-related thrombosis who no longer require venous access or whose CVAD is nonfunctioning, the ASH/ISTH guideline panel suggests **either immediate removal or delayed removal of the CVAD.**

- 2018 recommendation 11: suggested delayed removal of CVAD rather than immediate removal.

DOAC's	
Rivaroxaban (Xarelto)	Factor Xa inhibitor
Dabigatran (Pradaxa)	Direct thrombin inhibitor

Doac's have entered the chat

Recommendation 17: For pediatric patients with VTE, the ASH/ISTH guideline panel suggests using DOACs over standard-of-care (SOC) anticoagulants (LMWH, UFH, vitamin K antagonists, and fondaparinux).

Recommendation 18: For pediatric patients with VTE, the ASH/ISTH guideline panel suggests using rivaroxaban over SOC anticoagulants.

Recommendation 19: For pediatric patients with VTE, the ASH/ISTH guideline panel suggests using dabigatran over SOC anticoagulants.

Recommendation 20: For pediatric patients with VTE, the ASH/ISTH guideline panel suggests using either rivaroxaban or dabigatran.

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