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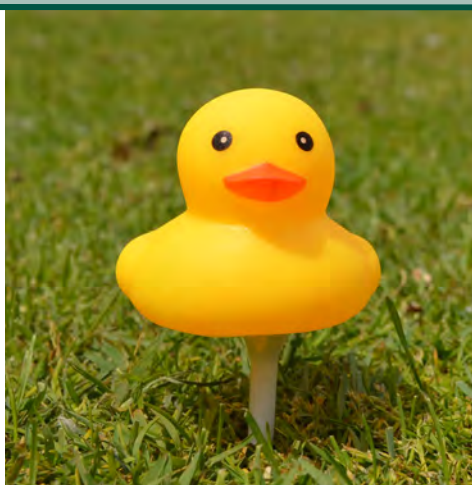
The Journal

of the Pharmacy Society of Wisconsin

2026 Christopher Decker Golf Outing



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Up Front: Choosing the Hard Things

by Danielle Womack, MPH, HIVPCP

The week after the 2025-2026 Wisconsin legislative session adjourned, my family and I traveled to my hometown of Houston, Texas, for a much-needed vacation. After months of committee hearings, meetings with legislators, coalition calls, testimony, amendments, and countless conversations about pharmacy policy, it was a welcome opportunity to step away for a few days.

Like many families with young children, our itinerary revolved around their interests. With space-obsessed kids, another trip to NASA's Johnson Space Center was a must. It was our third visit in as many years. This visit, however, I noticed something I hadn't before. As we walked through the exhibits, I stopped at President John F. Kennedy's famous challenge to the nation:

"We choose to go to the Moon in this decade and do the other things, not because they are easy, but because they are hard."

It was one of those moments where a quote finds you at exactly the right time.

Although President Kennedy was talking about one of our nation's greatest scientific achievements, his words have endured because they're about much more than space exploration. They're about choosing ambitious goals because they matter, even when success isn't guaranteed. They're about recognizing that the most worthwhile challenges are rarely the easiest ones.

As I read those words, I couldn't help but think about Wisconsin's legislative session and our continued work to reform pharmacy benefit manager (PBM) practices.

Like many of you, I left the session frustrated.

For months, pharmacists across Wisconsin shared their stories. They responded to Action Alerts, welcomed legislators into their pharmacies, testified before committees, participated in meetings, and helped educate policymakers about the real-world consequences of PBM practices. PSW worked alongside legislative champions, coalition partners, and healthcare stakeholders to advance comprehensive reforms that would increase transparency, improve accountability, and better protect patient access to pharmacy care.

Despite those efforts, comprehensive PBM reform did not become law.

That outcome was disappointing. It would be easy to judge the entire session by whether the legislation passed.

But advocacy doesn't work that way.

Meaningful public policy is rarely accomplished in a single legislative session. It is built over time through education, persistence, trust, and relationships. Every conversation with a legislator matters. Every patient story matters. Every pharmacy tour matters. Every pharmacist who takes time away from work to advocate for the profession moves the conversation forward.

Progress isn't always measured by a governor's signature.

Sometimes it's measured by a legislator who understands the issue more clearly than they did six months ago. Sometimes it's measured by a committee hearing that brings new voices to the table. Sometimes it's measured by relationships that make tomorrow's victories possible.

This session accomplished all of those things. Perhaps most importantly, it changed the conversation.

More lawmakers understand how PBM business practices affect patients and pharmacies than ever before. During the final hearing of the session, when PBM reform was before the Assembly Committee on Health, the committee chair remarked, "Obviously, we have to do something here." That acknowledgment matters. More employers are asking questions about how prescription drug benefits are managed. More healthcare organizations recognize that reimbursement reform isn't simply about pharmacy economics; it's about preserving access to care in communities across Wisconsin.

The challenges facing pharmacy have not disappeared. Pharmacies continue to struggle with reimbursement that often fails to cover the cost of dispensing medications. Patients continue to experience disruptions in care because of opaque and unpredictable PBM practices. Pharmacy owners continue to make impossible decisions to keep their doors open and serve their communities.

Those realities remind us why this work cannot stop simply because one legislative session has ended.

In many ways, the months between legislative sessions are when some of the most important advocacy happens.

PSW will continue meeting with legislators in their districts, educating policymakers, strengthening partnerships with employers, patient advocates, and other healthcare organizations, gathering data, and refining policy solutions. We'll continue elevating the voices of Wisconsin pharmacists and demonstrating why meaningful PBM reform is essential to protecting patient access to care.

Most importantly, we'll continue relying on you.

One lesson I've learned over the years is that lawmakers remember stories far longer than statistics. They remember the pharmacy owner who couldn't afford to keep a lifesaving medication on the shelf because reimbursement was below acquisition cost. They remember the patient forced to drive farther to fill a prescription after a local pharmacy closed. They remember the pharmacist who stayed late to make sure someone received the care they needed, despite every obstacle the system put in their way.

Those stories change minds.

They also remind us why advocacy matters.

President Kennedy challenged our nation to pursue something extraordinary, not because it would be easy, but because it would demand our very best. Advocacy requires that same mindset. The issues facing pharmacy today are complex. There are powerful interests invested in maintaining the status quo. Progress will require patience, persistence, and the willingness to return to the Capitol again and again until meaningful change is achieved.

That can be frustrating.

But it is also worthwhile.

Our pharmacies are worth fighting for. Our patients are worth fighting for. The future of our profession is worth fighting for.

So while this legislative session didn't end the way we had hoped, it doesn't diminish the importance of the work ahead. Instead, it reminds us why we do it.

President Kennedy didn't challenge America to pursue only the easy victories. He challenged us to pursue goals worthy of our effort.

PBM reform is one of those goals. We pursue it not because it is easy, but because it is hard. Because it matters. Because Wisconsin pharmacists and the patients who depend on them deserve nothing less.

Thank you for continuing to advocate, engage, and share your stories. Together, we'll build on the progress we've made, learn from this session, and return ready for the next opportunity to advance policies that strengthen pharmacy practice and improve care for the patients we serve.

Danielle Womack is the Vice President of Public Policy & Advocacy at the Pharmacy Society of Wisconsin in Madison, WI.

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PHARMACIST CE:

A Pharmacy Preceptor Model for Facilitating Advanced Pharmacy Practice Experience Students' Interprofessional Interactions

by Amanda Margolis, PharmD, MS, BCACP, Maeleigh Tidd, PhD, Magdalena Jasinska, PharmD, Beth Martin, BSPharm, PhD

CE FOR **PHARMACISTS**

Learning Objectives

- Define intentional interprofessional interactions.
- Describe the process preceptors use to facilitate APPE interprofessional.
- List the steps preceptors use to prepare students for interprofessional interactions.
- Explain how preceptors identify APPE interprofessional interactions.

Abstract

The purpose of this evaluation was to explore the process pharmacy preceptors use to prepare, identify, and debrief on students' interprofessional interactions during Advanced Pharmacy Practice Experiences (APPEs). We conducted four virtual focus groups: two with acute care and two with ambulatory care pharmacy preceptors. We analyzed the transcripts using thematic analysis. Findings include that: 1) preparing the students involves appropriate introductions to the multidisciplinary team and their respective roles followed by preceptor modeling to set realistic expectations for interactions with the team members; 2) interprofessional interactions are naturally occurring throughout the day, whether face-to-face, over the phone, or through electronic health records; and 3) feedback to the students is constant, both informal and formal, and begins first with the students' self-reflections. Preceptors can adopt the prepare, identify, and debrief model to increase the intentionality of their APPE students' interprofessional experiences.

Interprofessional experiences are required in health professional curricula to prepare students for interprofessional collaboration in practice.[1-3] When health professionals engage in interprofessional collaboration, they provide higher-quality patient care, resulting in lower mortality rates, lower healthcare costs, improved patient and clinician satisfaction, and increased patient access to specialized care.[4-7] When healthcare trainees participate in interprofessional collaboration, they better understand the roles and responsibilities of different members of the healthcare team and learn from each other to strengthen their clinical knowledge.[8-10]

In pharmacy education, students must be "team ready" by graduation under the Accreditation Council for Pharmacy Education (ACPE) 2025 Accreditation Standards.[1] Standard 2.1.h describes the requirements for interprofessional collaboration: "*the graduate can actively engage and contribute as a healthcare team member by demonstrating core interprofessional competencies.*" Pharmacy programs use the Interprofessional Education Collaborative (IPEC) core competencies to meet ACPE requirements for interprofessional collaboration.[11] The IPEC core competencies are:

1. Values and ethics
2. Roles and responsibilities
3. Communication
4. Teams and teamwork

To achieve the IPEC core competencies, pharmacy students must have sufficient opportunities to develop the skills needed for interprofessional practice and receive coaching and feedback to improve.[12] However, opportunities for interprofessional experiences vary widely based on the type of pharmacy practice site and preceptor involvement.[13-15] Preceptors take varying approaches to teaching interprofessional teamwork based on the practice setting, institutional or workplace policies and norms, and their personal teaching styles.[14-16]

Despite the importance of Advanced Pharmacy Practice Experience (APPE) student development of interprofessional teamwork skills, documented guidance for pharmacy preceptors to standardize interprofessional experiences or implement them is lacking.[17,18] An American Association of Colleges of Pharmacy (AACP) task force on intentional

interprofessional education in experiential education suggested transitioning naturally occurring, non-deliberate interprofessional experiences into intentional learning opportunities.[18] They defined intentional interprofessional educational experiences as "*the explicit effort by preceptors and practice sites to create/foster educational opportunities or activities designed specifically to achieve interprofessional educational competences.*"[18] To create intentional interprofessional interactions, preceptors should be familiar with the IPEC core competencies[11] and how interprofessional interactions support APPE students' progression toward competency.[18]

At the University of Wisconsin-Madison School of Pharmacy, a qualitative evaluation was conducted to refine an APPE interprofessional assessment activity.[19] During focus groups, preceptors described how they supported students' learning before, during, and after APPE interprofessional interactions, and a potential model emerged to improve intentionality of interprofessional experiences. These descriptions offered an opportunity to examine preceptor facilitation practices beyond the original evaluation aims, so we conducted an additional analysis. This secondary qualitative analysis explored how pharmacy preceptors prepare, identify, and debrief students' interprofessional interactions during APPEs.

Methods

This secondary qualitative analysis examined focus group data collected as part of a larger qualitative quality improvement evaluation of preceptor use of the individual teamwork observation and feedback tool (iTOFT) to assess APPE interprofessional interactions. The parent evaluation, including findings related to iTOFT use, benefits, barriers, and opportunities for improvement, has been published elsewhere.[19] The present analysis focused specifically on how pharmacy preceptors described preparing students for interprofessional interactions at their site, identifying interprofessional interactions, and debriefing interprofessional interactions during APPEs. The University of Wisconsin-Madison Education and Social/Behavioral Science Institutional Review Board certified the evaluation as a quality improvement/assurance project.

As part of the parent evaluation, preceptors for required acute care or ambulatory care APPEs were invited by email to participate in the focus groups if they had submitted at least four iTOFT evaluations.[19] Focus groups were conducted virtually using Zoom and organized by practice setting because interprofessional interactions was expected to differ between acute care and ambulatory care environments. Each focus group included two to five preceptors, and participants received a $25 Amazon gift card for their participation.

Two members of the evaluation team facilitated each semi-structured focus group; one led the discussion while the second took notes and asked additional probing questions. The focus group guide comprised six primary questions:

1. What interprofessional interactions students are completing for the iTOFT evaluations
2. How the preceptors prepared students to have these interprofessional interactions
3. How the preceptors are debriefing and providing feedback to students following those interactions
4. What the preceptors perceive as benefits associated with the iTOFT activity
5. What the preceptors perceive as barriers associated with the iTOFT activity
6. How the iTOFT experience can be improved

This secondary analysis focused on the first three questions; findings from questions 4 through 6 are reported elsewhere.[19]

Focus groups lasted about one hour, were recorded, and continued until no new information emerged (i.e., saturation was achieved). The team transcribed the audio recordings using Zoom transcription. A member of the evaluation team performed a 20% transcription quality check against the audio recordings and cleaned and de-identified the data. The transcripts were analyzed using inductive thematic analysis, a method used to identify patterns and themes of salient meaning occurring throughout the data. The research team followed Braun and Clarke's criteria to identify themes.[20,21] Individually, two members of the evaluation team (AM, MT) familiarized themselves with the data by rereading the transcripts, noting initial themes. Next, the evaluation team (BM, AM, MT) reviewed and discussed the initial themes to develop a codebook. The codebook and transcripts were imported into NVivo 12 qualitative analysis software, where the data were analyzed. Individually, two evaluators (AM, MT) coded the transcripts and met weekly to compare and discuss codes. Purposefully, 20% of the transcripts were coded in duplicate to ensure accuracy. The two coders discussed coding questions they could not resolve with a third evaluator.

Results

We conducted four focus groups with 15 pharmacy preceptors. Two focus groups included acute care pharmacists (n=6), and two included ambulatory care pharmacists (n=9). Three major themes or steps were identified based on the focus group guide. This created a model of how preceptors facilitate APPE interprofessional interactions:

1. **Prepare** APPE students for interprofessional interactions
2. **Identify** interprofessional interactions
3. **Debrief** with students following interprofessional interactions

Prepare

In the first step of the model, preceptors prepare APPE students for interprofessional interactions. The steps the preceptors described included introducing the student to the interprofessional team, preceptor modeling, setting expectations, and practicing interactions (Table 1). Preceptors were integrated into interprofessional teams, giving students opportunities to interact with various professions (i.e., dietitians, medical residents, nurses, nurse practitioners, physician assistants, respiratory therapists, and/or social workers). Therefore, preceptors took time to introduce students to interprofessional team members and describe their roles and responsibilities.

Preceptors found it beneficial for students to observe them throughout the day (i.e., modeling their role on the interprofessional team). During these observations, preceptors set expectations for students on how to interact with various team members (e.g., meeting provider

communication needs) and how to prepare for those interactions (e.g., reviewing patient charts beforehand).

A final component preceptors used to prepare APPE students for interprofessional interactions involved role-playing or offering practice interactions. If the student was assigned to a patient to discuss in team meetings or join on rounds, preceptors had the student practice those interactions and offered initial feedback to support a successful report or recommendation.

Identify

Once students are prepared, preceptors identify an appropriate interprofessional interaction for the APPE student. Pharmacy preceptors emphasized that interprofessional teamwork and skills are a key component of their role as pharmacists. Because acute and ambulatory care pharmacists integrate into multidisciplinary teams, interprofessional interactions occur naturally throughout the day. These interactions occur via face-to-face, phone, and through patients' electronic health records (Table 1).

Common interprofessional interactions the preceptors identified for students included medication reconciliation, drug therapy recommendations, and adherence plans. Additionally, some preceptors found it meaningful to involve students in complex case discussions (e.g., a patient with sickle cell anemia), where they simultaneously interact with multiple professionals on the team. When available or applicable, preceptors offered students challenging interactions, allowing them to demonstrate their interprofessional teamwork skills.

Debrief

Following the interprofessional interaction, preceptors debrief with the APPE student. All the preceptors expressed that the first step in providing an effective debrief was students self-reflecting on their interaction before the preceptor offered feedback. Preceptors would have their students express what they think went well and what they could have done differently, which facilitated the debriefing (Table 1). Preceptors noted that students are often their own worst critics, which allowed preceptors to focus more on the positive aspects of the interactions than the negatives.

Preceptors followed a similar approach when providing feedback, including summarizing the student's interaction, identifying what they did well, and then offering ways the student could improve. Concepts preceptors frequently provided feedback on included how the student built rapport with the team and contributed to team performance, and how the student communicated with team members, especially in how they provided insights and recommendations. Additionally, some preceptors stated that during debriefing sessions; they asked students how the preceptors could better prepare for and support their interactions.

Feedback to students occurred both informally and formally and came from both preceptors and other team members students interacted with (Table 1). As students gain independence on their rotations, they eventually have opportunities to join team members without their preceptor (e.g., attending rounds without the preceptor). During those opportunities, the team member they're interacting with provides immediate feedback, and the

TABLE 1. Representative Quotes of Major Findings

Themes	*Components*	*Representative Quotes*
Prepare	Introductions Observe preceptor interactions Set expectations Mock interactions	*"At the beginning of rotation, we will introduce them to the team, discussing their different roles and how we're here to help facilitate them." Acute care preceptor* *"I usually have them observe how I am interacting with the providers for the first couple of times to help them get used to how to work up the patient successfully, while setting expectations for what they should be doing [when interacting with the team members]" Am care preceptor* *"A lot of times it's the modeling of the pharmacist that kind of sets expectations, for you know how to interact with the team that they'll be presenting to/with." Acute care preceptor*
Identify	Naturally occurring Face-to-face Over the phone Through electronic health records	*"Interprofessional interactions kind of just end up happening randomly throughout the course of the day. Given the nature of how the rotation is set up, the experiences just kind of come randomly." Acute care preceptor* *"I sometimes like to look at their written communication, through the electronic health records, either in the actual notes to the doctors or in our routing comments, which can sometimes be a little less formal, and using those as ways to evaluate students' interactions with other providers, as well as their verbal communication skills." Acute care preceptors*
Debrief	Students self-evaluate Who is providing feedback • Preceptors • Other team members students interact with When feedback is provided • Informally, directly after • Formally during evaluations What feedback is provided • What went well • Areas for improvement	*"I think it's super important to get the students' perspective first, and then the idea of pros and cons. You first bolster their confidence with what went well, but then also include areas of opportunity for improvement moving forward. Those are key things with any debriefing, and we do that with every interprofessional interaction." Am care preceptor* *"I ask the student to tell me what they feel went well and maybe what they could improve on. I'll usually also ask what we can do to support the students, so that they feel more confident interacting with the providers and team members in the future." Am care preceptor*

Am care = ambulatory care

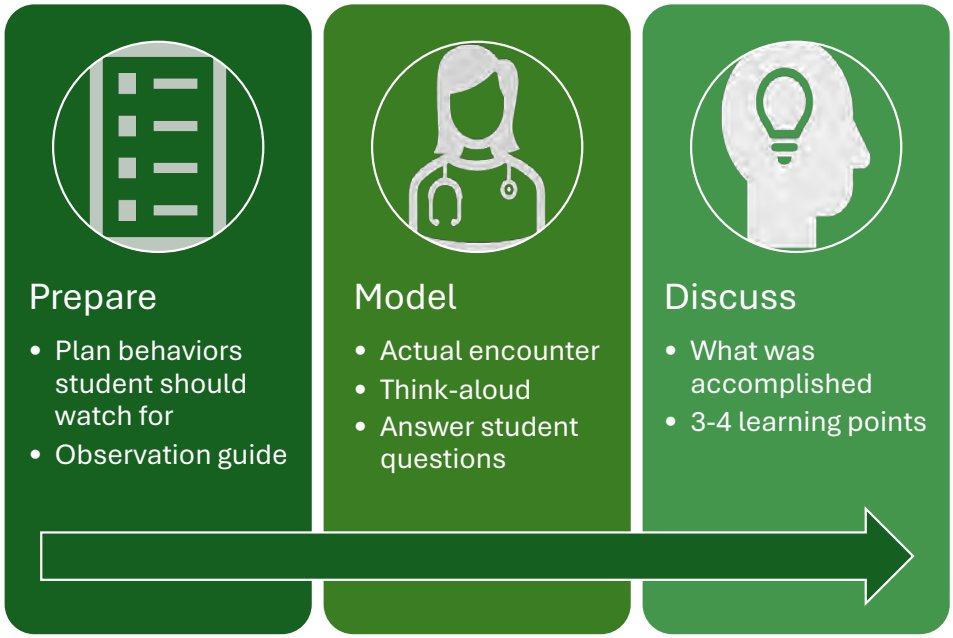
preceptors receive formal feedback to share. The immediate feedback students receive tends to be more informal; however, formal feedback is still provided during weekly check-ins and/or in the mid- and final evaluations. Nonetheless, feedback is constantly occurring.

Discussion

This secondary qualitative evaluation explored the steps ambulatory and acute care pharmacy preceptors use to facilitate APPE student interprofessional interactions. This resulted in a preceptor model to facilitate APPE interprofessional interactions with consideration of how to make those interactions more intentional. Similar "prepare, identify, and debrief" models have been documented for preceptor approaches to creating more intentional learning opportunities for healthcare trainees on clinical experiences.[22,23] Helminen and colleagues described clinical assessment of nursing as three acts: 1) acts performed before, 2) actual situation, and 3) acts performed after.[22] However, this model focused on nursing assessment, not necessarily learning. Therefore, the activities described within each phase differ from the proposed pharmacy preceptor interprofessional interactions model. Similarly, the American Society of Health-System Pharmacists (ASHP) identifies four preceptor roles that begin with clinical rotation interactions and preceptor modeling, then transition to coaching, where the student is observed, followed by debrief/feedback.[23] The ASHP preceptor roles approach is not an identical model either, as it has four roles instead of three steps, and describes the progression of preceptor support as trainees progress versus a model for the purpose of a single activity. Nonetheless, the process that spans before, during, and after an activity is a framework that has been loosely documented and that preceptors can use to support intentionality of experiential activities.

In this evaluation, preceptors prepared APPE students for interprofessional interactions by introducing them to interprofessional team members and having the student observe the preceptor (i.e., modeling). These activities have been described previously as supporting learning across health disciplines.[14,24,25] Students have described learning communication skills through preceptor modeling; however, modeling without discussion is less effective.[14,25,26] Preceptors can use a think-aloud approach during modeling or frame modeling as active observation to enhance this step (Figure 1).[23,26–28] Setting expectations is equally important; lack of student expectations is a documented hindrance to student learning.[14,25,26] Mock interactions are less commonly documented in an experiential setting. However, student practice with preceptor feedback is a common technique expected to support student confidence and competence before interacting with other healthcare professionals.[29]

FIGURE 1. Modeling Process[23,27]



Preceptors in this evaluation primarily described identification of naturally occurring interprofessional interactions for APPE students. This is consistent with literature describing unscheduled interprofessional interactions as being the most common.[14] In general, most clinical teaching and trainee observations occur unscheduled.[26,30] These naturally occurring interprofessional interactions may be preferred to scheduled interprofessional interactions, especially when preceptors observe the student, because they are more authentic.[30] Students and trainees often modify their behavior during pre-planned observations, especially if the observation is for assessment purposes.[30,31] Therefore, naturally occurring interprofessional interactions may give preceptors better insight into students' competence and lead to more accurate, meaningful feedback. Naturally occurring interactions also provide more opportunities for practice than scheduled interprofessional experiences.[30]

In this evaluation, preceptors described debriefing with APPE students following interprofessional interactions as essential. They especially emphasized starting the debrief with student self-evaluation before giving feedback. Kogan and colleagues also highlighted trainee self-assessment as part of the feedback process when they interviewed internal medicine faculty about giving feedback to medical residents.[32] Asking for trainees' thoughts on the encounter served as an icebreaker to start the discussion and, as also described by the preceptors in this evaluation, trainees often accurately identified areas for improvement. This reflective step is essential for APPE student improvement. Time to reflect and debrief allows students to draw insights from their experience, leading to behavior changes and skill improvement.[33] Kogan and colleagues also described how faculty used questions and trainee reflection throughout debriefs to better understand the trainee's thought process and check the trainee's understanding of the feedback provided.[32]

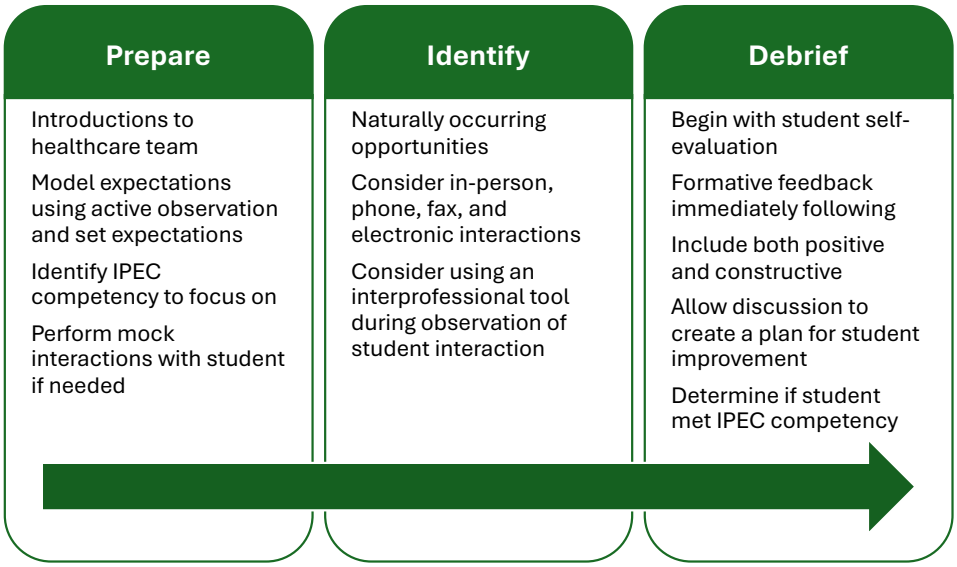
The feedback descriptions shared by the preceptors in this evaluation are consistent with feedback best practices.[29] Formative

feedback is given immediately after an interprofessional interaction and describes well-done behaviors the student should continue, as well as suggestions and plans for improvement.[23,29] Summative formal feedback was also shared at pre-defined time points. Young and colleagues described how medical residents highly valued protected time to discuss encounters and plan how they might perform tasks differently in the future.[34] The medical residents credited the feedback they received and the subsequent discussions as what promoted their growth.

Common APPE student activities, such as interprofessional team rounding or answering drug information questions for other healthcare professionals, are not inherently intentional interprofessional interactions. To be intentional, activities need to be focused on the achievement of interprofessional competencies.[18] **By following the prepare, identify, and debrief model, preceptors can increase the intentionality of their APPE students' interprofessional experiences** (Figure 2). During the preparation step, the student and preceptor can decide which IPEC competency to focus on and set expectations. Competency achievement can be determined during the debrief step. Preceptor use of structured interprofessional assessment tools seems to result in more deliberate, frequent, detailed, and systematic observations leading to more meaningful feedback.[34,35] We encourage preceptors to be cognizant of the prepare, identify, and debrief model, along with the suggested practices for each step; especially embedding discussions about specific IPEC competencies to strengthen student connection and learning.

The largest barrier to facilitating intentional interprofessional interactions is time.[15,18,36] Therefore, we propose that preceptors continue to use naturally occurring interprofessional experiences rather than pre-identifying or creating new interprofessional encounters. While using naturally occurring interactions may limit the ability to fully meet the proposed definition of an intentional interaction, following the proposed model enhances intentionality by deliberately selecting real-world interprofessional interactions and, therefore, improves student learning. Many preceptors already perform preparation steps such as team introductions and modeling,

FIGURE 2. Preceptor Model for Intentional Interprofessional Interactions



IPEC = Interprofessional Education Collaborative

and for many preceptors this would not be a change in practice.[25] Similarly, feedback is integral to the preceptor role.[23] Therefore, for sites that already facilitate APPE student interprofessional activities, the time and effort to transition to intentional interprofessional interactions may be minimal.

This evaluation is not without limitations. This was a secondary assessment, and the prepare, identify, and debrief model was largely driven by the semi-structured focus group questions. That said, the specific activities in each step were derived from the preceptor focus group discussions and are largely supported by literature, suggesting these activities are beneficial to adopt. The interviewers were well known to the participating preceptors, which could have influenced preceptor responses. To manage this, a script was used to ensure questions and prompts were standardized and new and differing ideas were welcome. Lastly, community pharmacists were not included in this evaluation because the larger project assessed a tool required in acute and ambulatory care APPEs.[19] However, APPE interprofessional experiences have also been documented in community pharmacy settings and would benefit from the prepare, identify, and debrief model as well.[37] In the community pharmacy setting, naturally and frequently occurring interactions include medication access questions, drug information requests, and interactions to resolve medication problems. These interactions tend to occur via phone or fax rather than the in-person interactions described by the preceptors in this evaluation.

Conclusion

Pharmacy preceptors outlined specific steps used in the prepare, identify, and debrief model to support their APPE students' interprofessional interactions. During preparation, preceptor modeling facilitates APPE student learning and understanding of expectations. The prepare step can also highlight specific interprofessional competencies to make interprofessional experiences more intentional. Use of naturally occurring interprofessional interactions may allow for more authentic and frequent experiences. Debriefing after interprofessional interactions, especially when it includes student self-evaluation, is essential for student behavior change and learning. Preceptors can adopt the prepare, identify, and debrief model to increase the intentionality of their APPE students' interprofessional experiences.

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Assessment Questions

1. The interprofessional core competencies are published by which organization?
   a. American Association of Colleges of Pharmacy (AACP)
   b. Accreditation Council for Pharmacy Education (ACPE)
   c. Interprofessional Education Collaborative (IPEC)
   d. Liaison Committee on Medication Education (LCME)

2. Which of the following best describes the definition of intentional interprofessional interactions?
   a. Explicit effort by preceptors to create educational activities designed specifically to achieve interprofessional educational competences
   b. Naturally occurring interprofessional interactions but with discussion following to ensure the student appropriately used open-ended questions
   c. Scheduled interprofessional simulations with the intent to certify participants in Advanced Cardiovascular Life Support
   d. Planned APPE student attendance of interprofessional rounds without post-rounding discussion and debrief

3. What process did preceptors describe to facilitate an APPE interprofessional interaction?
   a. Prepare, model, and introduce
   b. Prepare, identify, and debrief
   c. Set expectations, introduce, and self-evaluation
   d. Set expectations, practice interactions, and debrief

4. What are the steps preceptors used to prepare students for interprofessional interactions?
   a. Introductions, review note documentation, set expectations, and self-evaluation
   b. Introductions, orientation, set expectations, and self-evaluation
   c. Introductions, observe preceptor, set expectations, and mock interactions
   d. Introductions, observe preceptor, review note documentation, and mock interactions

5. How were most interprofessional interactions identified by the preceptors?
   a. Naturally occurring
   b. Scheduled with the student and healthcare team

6. What is the recommended first step to debriefing a student following an interprofessional interaction?
   a. Discussion of what the student did well
   b. Suggestions for improvement
   c. Student self-evaluation
   d. The student reviews written feedback

7. How can preceptors enhance their modeling?
   a. Use a think aloud approach
   b. Incorporate student self-evaluation
   c. Schedule an interprofessional interaction in advance to model
   d. Modeling is not effective and does not need to be used

8. During which step of the preceptor process should an interprofessional core competency be selected to focus on to improve the intentionality of APPE student interprofessional interactions?
   a. Prepare
   b. Identify
   c. Debrief
   d. Self-evaluation

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FACT or FALLACY

Amiodarone Loading Dose and Formulation

by Meagan Macalalag, PharmD, Jeffrey Fish, PharmD, BCCCP, FCCM

QUESTION **Is there a clinical difference among the doses within the recommended cumulative loading dose range for amiodarone? Should the difference in bioavailability between the different amiodarone formulations be accounted for in the cumulative loading dose?**

Amiodarone is a potent antiarrhythmic agent widely used to manage both atrial and ventricular arrhythmias. It is a unique class III antiarrhythmic with complex electrophysiologic properties that span all four Vaughan Williams classes.[1] While its use is prevalent across a variety of clinical settings, it is commonly the preferred antiarrhythmic agent in the intensive care unit (ICU) given its versatility in treating a range of arrhythmias, minimal hemodynamic effects, and safe use for patients with structural heart disease. Amiodarone's distinct pharmacokinetics have shaped optimal dosing strategies for clinical efficacy. Amiodarone has a large volume of distribution, making it highly lipophilic and giving it a prolonged terminal half-life.[2] Given its lipophilicity, a loading period followed by a maintenance dosing strategy is implemented to ensure adequate tissue saturation and attain appropriate plasma concentrations. Distribution into the tissues forms a potential reservoir of amiodarone, which contributes to its exceptionally long terminal half-life.[2] Therefore, ensuring adequate tissue saturation is necessary to maintain its antiarrhythmic effects. The recommended cumulative loading dose ranges between 6 and 10 grams and can be achieved using a combination of both enteral and intravenous formulations.[3] Despite the common use of this dosing strategy, clinical differences among various cumulative loading doses within the recommended range remain unclear due to a lack of strong quality evidence.

Literature Review and Evidence Summary

The recommendation of a 6- to 10-gram cumulative load did not stem from a single landmark clinical trial; rather, it evolved from dosing regimens used in key clinical trials that evaluated amiodarone in different patient populations, as well as expert opinion.[4-14] Table 1 presents the referenced clinical trials and their initial amiodarone loading regimens. These trials were focused on determining the efficacy and safety of amiodarone to restore and maintain sinus rhythm in patients with either atrial or ventricular arrhythmias. No randomized controlled trials have compared different cumulative loading doses thus far. However, trials that showed amiodarone was efficacious in converting arrhythmias and sustaining sinus rhythm largely used loading doses at the higher end of the recommended range, suggesting a theoretical benefit of reducing arrhythmia recurrence risk with a higher load. This may be further supported by its pharmacokinetic properties, which suggest that a higher cumulative load may achieve faster and more reliable tissue distribution and saturation.[15] A key consideration when targeting a higher cumulative load is the increased risk of adverse effects, including hepatotoxicity and pulmonary toxicity.[16] Although there is currently no definitive evidence to demonstrate that a specific cumulative loading dose within the recommended 6- to 10-gram range leads to better outcomes, loading closer to 10 grams has been the approach consistently employed in clinical trials and clinical practice.[4-14]

Amiodarone is primarily metabolized in the liver via CYP3A4 and CYP2C8 to its equipotent active metabolite N-desethylamiodarone.[17] Since it undergoes extensive hepatic and intestinal first-pass metabolism, its oral bioavailability is approximately 50% but can range from 35% to 65%.[1,15,17] Intravenous administration, which bypasses the gastrointestinal tract and portal circulation, is rapidly and widely distributed to the tissues. Both enteral and intravenous amiodarone are effective for rhythm control, but studies show intravenous amiodarone restores sinus rhythm faster.[18] The quicker onset of action with the intravenous formulation is due to its bioavailability, leading to immediate plasma exposure and distribution into well-perfused tissues, such as the myocardium. While intravenous amiodarone is appropriate and favorable for rapid rhythm control in the acute setting due to its pharmacokinetic properties, intravenous regimens do not fully accumulate in peripheral and deep tissues, leading to inadequate tissue saturation.[17] Amiodarone tissue saturation is a time-dependent process that requires prolonged exposure to allow for equilibration in low-perfusing tissue compartments and, ultimately, complete tissue saturation given its high lipophilicity and multi-compartmental distribution kinetics.[2] Since intravenous amiodarone is only indicated in the acute care setting and administered for short periods, transitioning to enteral administration is necessary to saturate all tissue compartments and is preferable for maintaining sinus rhythm.[19] Patients in the

ICU who are managed with amiodarone are often of higher acuity, hemodynamically unstable, and unable to receive enteral medications, so it is reasonable to initiate its intravenous formulation. The recommended intravenous regimen consists of a 150 mg dose over 10 minutes, followed by an infusion of 1 mg/min for 6 hours, then 0.5 mg/min, generally continued for at least 18 hours. This regimen delivers approximately 1000 mg over the first 24 hours.[19] Amiodarone should be transitioned to its enteral formulation when it is deemed appropriate by the clinical team. In clinical practice, include the total intravenous dose in the cumulative loading dose calculation. Although the recommended 6- to 10-gram cumulative load may be completed using intravenous and enteral formulations, key clinical trials supporting this recommendation utilized enteral amiodarone regimens.[4-14] Therefore, in accordance with key clinical trials and its pharmacokinetic properties, account for the difference in bioavailability to achieve 10 grams of enteral therapy when calculating the cumulative loading dose. Intravenous doses should be converted to their enteral equivalent dose using an approximate ratio of 1 mg intravenous amiodarone to 2 mg enteral amiodarone.[1,15]

Evidence for a recommended cumulative loading dose of amiodarone is limited. The recommended range of 6 to 10 grams has been extrapolated from key clinical trials that studied amiodarone for various arrhythmias, but it remains unclear whether specific doses within the 6- to 10-gram range are advantageous over others. No comparison data currently show that higher loading doses are clinically superior. However, evidence supporting amiodarone loading doses reinforces the appropriateness of completing a 10-gram load, since various regimens used higher loads approximating 10 grams. Critically ill patients often warrant initiation of amiodarone therapy using the intravenous formulation. The clinical decision to transition from intravenous to enteral amiodarone should be based on urgency, patient acuity, stability, and tolerance. The 6- to 10-gram loading dose range for amiodarone stems from enteral amiodarone regimens and thus refers specifically to the enteral formulation. The recommendation of 6 to 10 grams of enteral amiodarone already accounts for its oral bioavailability. It is intended for adequate tissue saturation that is needed for sustained rhythm control with long-term maintenance therapy. Therefore, consider converting intravenous doses to their enteral equivalents when calculating the cumulative load. Although these recommendations are supported by pharmacokinetic principles, future studies are warranted to clarify whether different cumulative loading doses within the recommended enteral loading dose range have significant clinical impacts on efficacy and safety outcomes.

TABLE 1. Key Clinical Trials That Evaluated Amiodarone Using a Loading Dose Strategy

Randomized Controlled Trial	*Patient Population*	*Initial Loading Regimen*
CASCADE Greene et al.[5] 1993	Patients who survived an episode of out-of-hospital ventricular fibrillation (n = 228)	1200 mg PO per day for up to 10 days = 12 g
CHF-STAT Singh et al.[6] 1995	Patients with congestive heart failure and asymptomatic ventricular arrhythmias (n = 674)	800 mg PO per day for 14 days = 11.2 g
CAMIAT Cairns et al.[7] 1997	Patients with frequent or repetitive ventricular premature depolarizations after myocardial infarction (n = 1202)	10 mg/kg PO per day for 14 days = 140 mg/kg
EMIAT Julian et al.[8] 1997	Patients with left-ventricular dysfunction after myocardial infarction to prevent ventricular arrhythmias (n = 1486)	800 mg PO per day for 14 days = 11.2 g
CTAF Roy et al.[9] 2000	Patients with atrial fibrillation (n = 403)	10 mg/kg PO per day for 14 days = 140 mg/kg
PIAF Hohnloser et al.[10] 2000	Patients with persistent and symptomatic atrial fibrillation (n = 252)	600 mg PO per day for 21 days = 12.6 g
AFFIRM Wyse et al.[11] 2002	Patients with atrial fibrillation (n = 4060)	10 g PO over at least 7 days = 10 g
SAFE-T Singh et al.[12] 2005	Patients with persistent atrial fibrillation (n = 665)	800 mg PO per day for 14 days = 11.2 g
AATAC Di Biase et al.[13] 2016	Patients with congestive heart failure and persistent atrial fibrillation (n = 203)	800 mg PO per day for 14 days = 11.2 g

PO = by mouth

Evidence-Based Recommendation

It remains unclear whether different cumulative loading doses within the recommended range of 6 to 10 grams yield any clinically meaningful difference. However, key clinical trials that evaluated amiodarone used a cumulative loading dose closer to the higher end of the recommended range. Because current evidence has not shown that lower loading doses lead to better outcomes, completing a 10-gram cumulative load using a combination of intravenous and enteral formulations is most appropriate. Although cumulative loading doses may be completed using intravenous and enteral formulations, studies supporting the recommended loading dose utilized enteral amiodarone regimens. When calculating the cumulative loading dose, convert the intravenous dose to its enteral equivalent to achieve 10 grams of enteral therapy.

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PR *This article has been peer-reviewed. The contribution in reviewing is greatly appreciated!*

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Advancing Practice Through an Updated Collaborative Practice Agreement Toolkit

by Lily M. Brabazon, 2026 PharmD Candidate

Wisconsin Act 98, enacted in 2021, recognizes pharmacists as healthcare providers and allows Wisconsin Medicaid to reimburse them for their services. Under this law, pharmacists who enroll as Medicaid providers must be reimbursed by the Wisconsin Department of Health Services (DHS) for services delegated to them under Collaborative Practice Agreements (CPA) with physicians, as outlined in Wisconsin Statute 450.033, or within the scope of the pharmacist's practice, as defined in Wisconsin Statute 450.01(16). Regardless of practice setting, reimbursement for pharmacist-provided clinical services better positions pharmacists to expand access to care and enhance patient outcomes as part of the healthcare team.

Effective January 1, 2025, ForwardHealth released changes to its Collaborative Practice Agreement (CPA) requirements for Medicaid-enrolled pharmacists. This document outlines the required language that must be included in a CPA to receive Medicaid reimbursement. Specific elements required for reimbursement include: participating physician(s) and pharmacist(s) name and license numbers, or the written protocol that identifies the organization's medical committee delegating the authority and is approved by the organization's physician staff, eligible patient populations, delegated services, physician monitoring processes, and pharmacist documentation requirements. In response, PSW has updated the CPA Toolkit to align with ForwardHealth's revised requirements. The updated toolkit is intended to provide pharmacies across the state with clear, accurate, and up-to-date guidance on CPA compliance and implementation at their practice sites.

The updated CPA Toolkit provides comprehensive direction on team-based care, highlights potential CPA opportunities across various disease states, outlines required CPA components, and offers tips for implementing CPAs into different practice settings. Featured disease state examples include anticoagulation, asthma management, diabetes, heart failure, hyperlipidemia, and hypertension. Sample CPA templates are linked in the toolkit to help pharmacy sites update existing CPAs or support the development of new clinical services. Special thanks to both the PSW Ambulatory Care Advisory Committee and the PSW Community Pharmacy Advisory Committee for their valuable contributions to the toolkit and CPA templates.

These templates incorporate the required elements for a CPA in accordance with Medicaid's updated requirements. You can find both the CPA toolkit and templates on PSW's website under the "Resources" tab, then select "Toolkits and Manuals" from the drop-down menu.

The PSW website also includes a wealth of pharmacist provider status

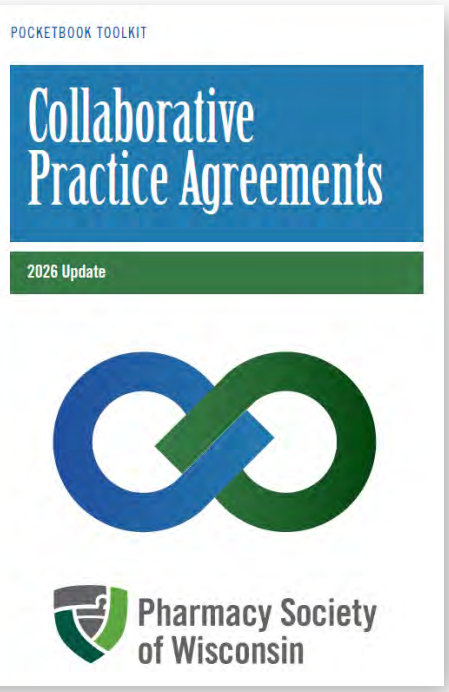
CPA TEMPLATES

The Collaborative Practice Agreements toolkit includes the following CPA templates aligned with ForwardHealth CPA requirements:

- General CPA Template
- 90-Day Supply
- Asthma SMART
- Diabetes
- Peak Flow Meter and Spacer
- Refill Authorization
- Test and Treat: Strep
- Therapeutic Interchange: Asthma Inhaler
- Tobacco, Nicotine, and Vaping Cessation

CPA TOOLKIT

The updated Collaborative Practice Agreements toolkit can be found on the PSW website at www.pswi.org/CPA or by using the QR code below.



implementation resources, including the newly updated Wisconsin Medicaid Billing Code Guide (available only to PSW members when logged into the PSW site) and the Wisconsin Pharmacist Provider Status Certificate Program. This program includes a series of online modules that guide pharmacists through the essential steps and knowledge needed to offer pharmacist provider services. The program covers key topics such as service development, credentialing and privileging, medical billing, CPA creation, and strategies for overcoming common implementation barriers. Upon enrollment, participants receive access to the PSW Pharmacist Provider Status Implementation Guide as an additional resource.

For more details about the CPA toolkit, templates, and updates, please contact Kari Trapskin.

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Medicaid Rules for Collaborative Practice Agreements

Wisconsin law does not dictate the exact structure of a CPA; however, Wisconsin ForwardHealth requires CPAs for services billed to Wisconsin Medicaid to include the following items:

Requirements

The CPA must include:

- One of the following for enrolled physicians:
  - The name and license number of any delegating physicians.
  - The written protocol that identifies the organization's medical committee delegating the authority and is approved by the organization's physician staff.
- One of the following for enrolled pharmacists:
  - The name and license number of any pharmacist who may perform the delegated acts.
  - The written protocol from the delegating authority that identifies the authority delegated to the organization's pharmacist or pharmacists.
- The patient or groups of patients eligible to receive delegated services under the agreement, including any patient inclusion or exclusion criteria.
- The delegated services that the pharmacist may perform.
- The process for the physician or designee of the physician to monitor compliance with the delegation agreement by the pharmacist.
- The process for how the delegated services provided by the pharmacist will be documented or included in the patient's health record.

The physician(s) and pharmacist(s) are required to review the CPA, and it must be renewed no later than every three years for the pharmacist(s) to continue providing delegated services. Payments for services provided by a pharmacist without a current CPA may be recouped.

ForwardHealth Handbook Topic #23317: "Pharmacists"

Above: *Excerpt from the updated Collaborative Practice Agreements Toolkit.*

"MORTAR & PENCIL" CONCORDIA UNIVERSITY WISCONSIN SCHOOL OF PHARMACY STUDENT WRITING CLUB:

Topical Metformin: A Review of Clinical Evidence and Compounding Considerations

by Zachary T. Ladwig, PharmD Candidate 2027

Abstract

Background: Metformin is widely used for type 2 diabetes mellitus, but emerging evidence highlights its anti-inflammatory, antifibrotic, and wound-modulating effects via activation of AMP-activated protein kinase (AMPK). These properties have spurred interest in topical metformin for dermatologic and tissue-healing applications, despite the lack of FDA-approved formulations. This literature review evaluates the safety, efficacy, and compounding considerations of compounded topical metformin, providing rationale and proposed mechanisms for topical use while summarizing preclinical and clinical evidence.

Methods: A comprehensive search of PubMed, EBSCO, Medline, and International Pharmaceutical Abstracts identified English-language studies (January 1, 2019-October 1, 2025) involving topical or locally applied metformin in human or animal models. Exclusions included oral-only metformin studies and systematic reviews. Additional guidance was gathered from United States Pharmacopeia <795> standards, Centers for Disease Control and Prevention or Food and Drug Administration publications, Trissel's Stability of Compounded Formulations, and the International Journal of Pharmaceutical Compounding.

Results: Across 12 studies, topical metformin (concentrations 0.5% to 30%) consistently improved inflammation, pigmentation, scar characteristics, periodontal outcomes, and hair growth, with minimal adverse effects. Evidence is strongest for chronic periodontitis and melasma, with promising early findings in wound healing and central centrifugal cicatricial alopecia. Limitations include small sample sizes, heterogeneous formulations, and lack of pharmacokinetic data.

Conclusion: Topical metformin is a mechanistically rational compounded therapy showing promising therapeutic potential with broad dermatologic applicability. It appears well tolerated and can produce clinically meaningful improvements. Standardized formulations tested in large, multicenter randomized controlled trials are needed to support broad clinical adoption.

Metformin hydrochloride is one of the most widely used antihyperglycemic treatments for type 2 diabetes mellitus worldwide and is traditionally taken orally. Although it is not without risks, metformin has consistently shown a favorable safety profile. In diabetes, metformin works by enhancing insulin sensitivity and promoting glucose uptake in myocytes.[1] Metformin has also shown potential in activating AMP-activated protein kinase (AMPK) pathways, contributing to its insulin-sensitivity-promoting effects. AMPK pathway activation is associated with improved cellular energy balance, reduced oxidative stress, inflammation modulation, and enhanced wound repair.[2] These mechanistic properties have prompted growing interest in metformin's potential use as a topical therapy for dermatologic and wound-related conditions.

Topical metformin has been investigated for several dermatologic conditions that share underlying pathways of chronic inflammation, fibrosis, and impaired tissue repair. Recent studies have explored compounded topical metformin for conditions including chronic periodontitis, melasma, central centrifugal cicatricial alopecia (CCCA), and diabetic wound healing. Chronic periodontitis is an inflammatory disorder of the teeth-supporting structures that results in pocket formation and bone destruction. Melasma is an acquired condition characterized by hyperpigmented macules on the face resulting from dysregulated melanogenesis. Central centrifugal cicatricial alopecia is a type of scarring hair loss that leads to irreversible follicular destruction, typically focused on the crown of the scalp. Poorly healing diabetic wounds commonly arise from prolonged inflammation, oxidative stress, and impaired angiogenesis in the presence of poor healing conditions propagated by hyperglycemia. Topical administration offers an appealing route for medications intended to exert local effects while minimizing systemic exposure and gastrointestinal intolerance. However, the United States Food and Drug Administration (FDA) has not approved topical metformin for any indication, and much of the available evidence is early-stage, heterogeneous, and limited by small sample sizes. Multi-center clinical human trials and

evaluations of community compounding viability are limited.

This literature review summarizes current clinical and preclinical findings on compounded topical metformin, outlines safety and toxicology considerations, and discusses compounding principles relevant to certain dermatologic and wound-care practices such as chronic periodontitis, melasma, central centrifugal cicatricial alopecia, and diabetic wounds. The authors identify and discuss gaps in the research literature to guide future research and support evidence-based prescribing.

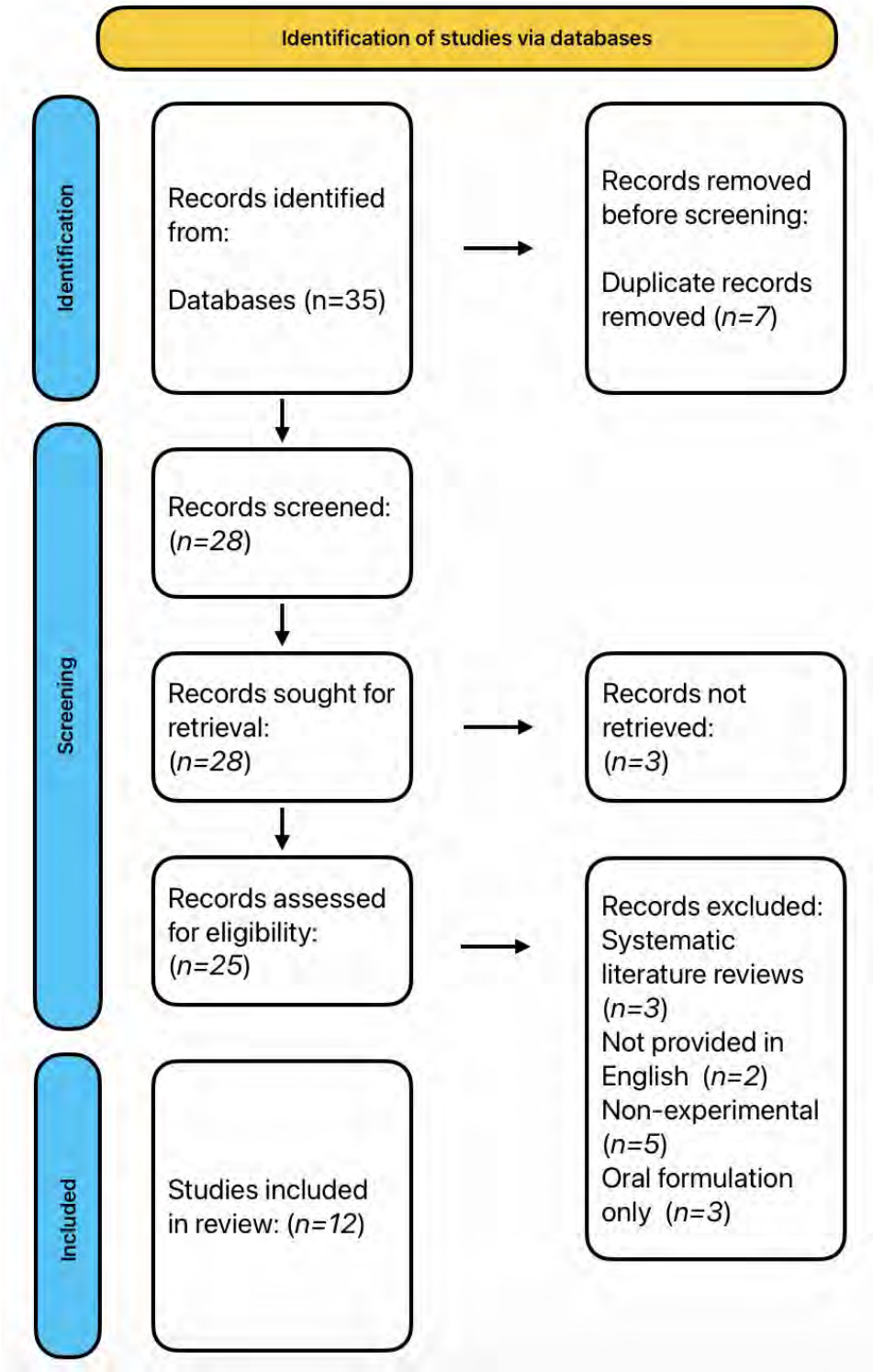
Materials & Methods

We conducted a comprehensive literature review to evaluate the safety and efficacy of compounded topical metformin. Eligible studies included animal or human data published between January 1, 2019, and October 1, 2025, written in English, and involving topical or locally applied metformin formulations. This timeframe was selected because compounded topical metformin formulations are an emerging area of interest, with most clinical studies, case reports, and practical compounding applications appearing in the literature after 2018. Exclusion criteria included studies evaluating only oral metformin and systematic reviews.

Databases searched included PubMed, EBSCO, Medline, and International Pharmaceutical Abstracts using the keyword phrase "compounded topical metformin." Additional guidance was gathered from United States Pharmacopeia (USP) <795> standards, Centers for Disease Control and Prevention or FDA publications, Trissel's Stability of Compounded Formulations, and the International Journal of Pharmaceutical Compounding.

We generated a PRISMA flow diagram and an overview of referenced studies to summarize the search process (Figure 1 and Table 1).

FIGURE 1. PRISMA Flow Diagram of the Study Selection Process.



Results

Chronic Periodontitis

Each chosen study evaluating topical metformin for chronic periodontitis included prior treatment with scaling and root planing (SRP), the standard first-line treatment, along with improved dental hygiene. After this initial evaluation and treatment, participants received a 1% to 1.5% metformin gel, chip, or biofilm applied to the treatment site, compared with placebo.

A randomized, placebo-controlled trial involving 15 men and 15 women involved placing 1.5% metformin gel at the site of SRP and placing an identical placebo gel in the control group.[3] Periodontal status was measured using numerous clinical and radiographical variables from baseline to 3 and 6 months, including plaque index (PI), sulcus bleeding index (SBI), probing pocket depth (PPD), and clinical attachment level (CAL). The authors found statistically

significant differences in each treatment measurement from baseline to 6 months and suggest that 1.5% metformin gel may be an SRP adjunctive treatment that improves long-term dental health. Another randomized placebo-controlled trial involved 25 patients and the placement of a biodegradable 1% metformin chip at the site of SRP compared to identical placement of a placebo chip in the control group.[4] The described metformin chip included a 1% metformin solution incorporated into a polyethylcellulose membrane developed by PerioBiologics LLP. Periodontal status was measured from baseline to 3 months using PI, PPD, CAL, modified sulcus bleeding index (mSBI), and a microbial load quantified by measuring *Porphyromonas gingivalis* CFUs. Statistically significant improvements were seen in PI, CAL, and P. gingivalis CFUs, and the authors again suggest that a 1% metformin product may be an effective SRP adjunctive treatment that improves long-term dental health. Another randomized placebo-controlled trial involving only eight patients assigned to four treatment groups compared placement of a 1% metformin biofilm with plasma rich in growth factor (PRGF) to PRGF only, 1% metformin only, and SRP only.[5] Periodontal status was measured from baseline to 3 and 6 months using gingival index, vertical probing depth, and vertical clinical attachment level measurements. Digital subtraction radiography was performed at baseline and at 6 months. These radiographic measurements showed a statistically significant improvement in the 1% metformin with PRGF biofilm group; however, clinical measurements did not reveal any treatment advantage.

Melasma

Each chosen study evaluating topical metformin for melasma compared it with a control group using common melasma treatments as well as placebo. Melasma is often treatment resistant and may require repeated use of agents with significant risk.

A randomized controlled trial involving 40 patients compared applying 30% metformin cream to the face once daily at night with a triple combination cream commonly referred to as Kligman's formula, which includes hydroquinone, tretinoin, and hydrocortisone, once daily.[6] Clinical outcome was measured from baseline to 8 weeks and included the melasma area severity index (MASI) score. No statistically significant difference was observed between the treatment groups, although both showed statistically significant and similar improvements in MASI. The authors also assessed adverse effects, and the metformin group reported fewer events. The authors suggest that a 30% metformin cream may be a more tolerable treatment option than the common Kligman's formula while also minimizing topical corticosteroid exposure.

TABLE 1. Overview of Referenced Studies

Article & Year	Topic	Study Type	Sample Size	Treatment Protocol	Follow-Up	Results
Patil et al. (2022)	Periodontitis	RCT	30	SRP + Placebo gel vs. SRP + Metformin 1.5% gel	3 & 6 month	Improved PI, PPD, SBI & CAL in metformin treatment group
Soundarya et al. (2025	Periodontitis	RCT	25	SRP + Placebo chip vs. SRP + Metformin 1& chip	3 month	Improved PI, PPD, CAL, mSBI & CFU in metformin treatment group
Shabnam et al. (2019)	Periodontitis	RCT	8	PRGF vs. PRGF + Metformin 1% biofilm vs. Metformin 1% biofilm vs. SRP	3 & 6 month	Improved radiographic measurements in metformin + PRGF group
Eldahshan et al. (2021)	Melasma	RCT	40	Metformin 30% cream vs. TCC (Kligman's)	8 week	Improved MASI & ADR in metformin treatment group
Shamma et al. (2024)	Melasma	RCT	20	Metformin 30% facemask vs. Placebo facemask	12 week	Improved hemi-MASI in metformin treatment group
Hussein et al. (2024)	Melasma	RCT	62	Metformin 30% cream vs. Hydroquinone 4% cream	12 week	Improvement in treatment goals met
Granja et al. (2024)	CCCA	Case report	1	Metformin 10% cream	6 month	Significant hair regrowth
Araoye et al. (2024)	CCCA	Case report	2	Metformin 10% cream	6 month	Significant hair regrowth
Bao et al. (2024)	CCCA	Case series	12	Metformin hydrochloride LD + adjuvant	N/A	Decreased scalp pain, pruritus & inflammation with hair regrowth
Tombulturk et al. (2023)	Wound/Scar	Animal	24	Saline vs. Metformin 3 mM sponge	14 day	Marker decrease in metformin treatment group
Elsayed et al. (2019)	Wound/Scar	Animal	30	Metformin niosomal 100mg/kg vs. Metformin oral	14 day	Inability to produce systemic effect
Hesami et al. (2022)	Wound/Scar	RCT	53	Placebo gel vs. Metformin 0.5% gel	3 month	Improvement in VSS in metformin treatment group

Abbreviations: ADR, adverse drug reaction; CAL, clinical attachment level; CFU, colony-forming units; LD, low-dose; MASI, melasma area and severity index; mSFI, modified sulcus fluid index; PI, plaque index; PPD, probing pocket depth; PRGF, platelet-rich growth factor; RCT, randomized controlled trial; SBI, sulcus bleeding index; SRP, scaling and root planing; TCC, triple combination cream; VSS, Vancouver scar scale

A randomized, placebo-controlled trial of 20 female patients involved placing a facemask with a split-face design: placebo on one half and a 30% metformin solution on the other. Clinical outcomes were measured from baseline to 12 weeks using a modified Hemi-MASI score that allows for split-face evaluation. Outcomes were reassessed at 12 weeks post-treatment, alongside tolerability assessments throughout the treatment course. The metformin group showed a statistically significant difference in Hemi-MASI score at 12 weeks, followed by a 12-week post-treatment assessment with no significant adverse events reported. The authors suggest this may be a unique therapeutic option given the minimal dosing (facemask applied only once weekly), tolerability, and proposed durability. Another randomized controlled trial including 62 patients compared a 30% metformin cream with a 4% hydroquinone cream.[8] Clinical outcome was measured from baseline to 12 weeks, and again 4 weeks post-treatment, utilizing the MASI score. Based on MASI measurements, the authors deemed 80.6% of metformin-treated patients to have met treatment goals, whereas only 58.1% in the hydroquinone group did; however, they found no statistically significant difference between treatment groups. Although tolerability profiles were similar across treatment groups, the authors concluded that 30% metformin cream may be a safer and more effective melasma treatment.

Central Centrifugal Cicatricial Alopecia

Central centrifugal cicatricial alopecia (CCCA) is a scarring hair loss condition that is often resistant to traditional treatment options. These studies evaluate metformin as a last-line option with potential but not guaranteed results.

One case report described the use of a 10% metformin cream in a single patient with recalcitrant CCCA.[9] This patient had severely advanced hair loss and was refractory to all prior treatment attempts. Significant hair regrowth was reported, and the author suggests that, based on other evaluated reports, topical metformin CCCA treatment deserves further investigation. Another case report described the use of a 10% metformin cream for recalcitrant CCCA, applied daily by two patients.[10] As before, both patients had advanced hair loss and were refractory to all prior first-line treatment attempts. Both patients reported significant hair regrowth, with minimal, if any, adverse or toxic events. In one case, metformin was used alone, and hair regrowth was seen in 6 months; in the other, metformin was used adjunctively, and benefits were reported after 4 months. A separate case series of 12 patients with treatment-refractory CCCA treated with low-dose oral metformin for diabetes found that nine patients experienced decreased scalp pain, pruritus, and inflammation, with six patients reporting increased hair growth. Evidence of CCCA-related gene expression modulation by metformin in this series also supports the direct application of topical metformin as a potential treatment modality for CCCA by minimizing inflammation.

Diabetic Wounds

In diabetic wounds, prolonged inflammation is associated with additional barriers to proper healing. Hyperglycemic conditions increase oxidative stress, resulting in fibroblast apoptosis and a weakened collagen response. Metformin is theorized

to mitigate this hyperglycemia-associated oxidative stress and delayed healing effects, with the potential to also provide anti-inflammatory benefits when applied locally to non-diabetic wounds.[11]

A full-thickness incisional wound animal trial involved 12 diabetic and 12 non-diabetic mice randomized to four groups receiving either topical metformin or topical saline treatment.[12] Metformin was applied to the wounds locally using a sterile 3 mM metformin sponge, although it is unclear whether the wound was packed. Percent wound closure utilizing a simple equation was measured from baseline to 14 days, as well as measurements for collagen I/III, p53, c-jun mRNA expression, and apoptosis via TUNEL assay. A statistically significant increase in wound closure and decrease in all inflammatory markers was seen in the diabetic metformin treatment group, with every marker except apoptosis seen in the non-diabetic metformin treatment group as well. A preclinical and pharmacological study successfully created a niosomal metformin gel demonstrating biphasic release properties.[13] This product was evaluated in a mouse study, which showed similar antidiabetic efficacy when compared to oral metformin. The mice were also intentionally wounded, and the niosomal metformin gel showed potential for significantly improved diabetic wound healing when applied locally, with an increase in relevant growth factors. Although the study used a gel preparation, the authors theorized the potential use of a metformin niosomal patch for local diabetic wound healing. A randomized blinded clinical trial involving 53 patients exhibiting hypertrophic or keloid scarring involved the comparison of a 0.5% metformin gel and a placebo gel applied twice daily.[14] Scar improvement was measured from baseline to 3 months using the Vancouver Scar Scale. The metformin group showed statistically significant improvements in scar height, vascularity, pliability, and pigmentation. No adverse events were reported with metformin, and the authors suggest it may benefit scar healing but recommend further evaluation of dosing and application criteria to develop a standard protocol.

Safety

Systemic metformin is associated with gastrointestinal intolerance and rare lactic acidosis. Topical administration largely avoids systemic absorption, and across all human studies reviewed, adverse effects were minimal and primarily limited to mild localized irritation. Dermal toxicology data suggest no significant systemic accumulation at compounding concentrations (0.5–30%), although long-term safety remains insufficiently characterized.

Compounding and Formulation Considerations

Throughout the evaluated studies, compounded vehicles included gels, creams, ointments, sponges, membranes, films, and niosomal carriers. Concentrations ranged from 0.5–5.0% for wound and scar applications, 1.0–1.5% for periodontal applications, and 10–30% for CCCA and melasma. Preliminary compounding research indicates metformin is stable in hydrophilic ointment bases and compatible with several semisolid vehicles.[15] Standard USP <795> principles apply and include assigning appropriate beyond-use dates, documenting excipient compatibility, considering pH and solubility, and selecting vehicles that promote adequate skin penetration without irritation.[16]

Given metformin's mechanistic role in inflammation and wound modulation, future compounded formulations, such as combinations with antimicrobials or growth-factor-modulating agents, warrant further evaluation.

Compounded topical metformin, used off-label for dermatological conditions, presents notable regulatory and ethical considerations. These formulations fall under FDA section 503A, which exempts them from full FDA approval and certain manufacturing requirements. Mandates do remain for patient-specific prescriptions, adherence to USP standards, and oversight by state boards to mitigate risks. Ethically, clinicians must prioritize informed consent, ensuring patients understand the absence of rigorous FDA efficacy and safety evaluations. This includes a recommendation to use compounded options only when FDA-approved alternatives are inadequate or unavailable.

Discussion

Although metformin shows potential as an effective topical treatment, evidence supporting topical metformin remains early and heterogeneous. Most human studies are small, short-term trials or case reports, significantly limiting generalizability. Additionally, compounded formulations differed widely across investigations, with variable strengths, vehicles, and application schedules.

Despite these limitations, topical metformin consistently demonstrated a favorable tolerability, clinically meaningful improvements across several dermatologic conditions, low systemic risk, and practical compounding feasibility. This profile supports the viability of metformin as a topical therapy, particularly in patients seeking alternatives to less tolerable or more toxic regimens, or those suffering from difficult-to-manage and treatment-resistant chronic conditions. Metformin maintains a mechanistic rationale for anti-inflammatory and wound-healing effects. However, standardization of dosing, vehicle selection, and application frequency remains a critical need. Future investigations should prioritize randomized controlled trials with consistent formulations, longer follow-up periods, and patient-reported outcomes to establish clinical protocols. For wound healing and scar modulation, early findings indicate anti-inflammatory, anti-fibrotic, and growth factor–modulating effects, but optimal dose-response relationships remain undefined.

As compounded topical metformin therapies gain viability in medical practice, topical metformin represents an emerging option that balances mechanistic sophistication with practical advantages such as safety, affordability, and formulation flexibility. Prescribers may consider topical metformin when patients experience irritation with standard agents, require steroid-sparing options, or would benefit from targeted therapy with minimal systemic exposure. Pharmacists and prescribers should collaborate closely to ensure evidence-based application, appropriate patient counseling, and monitoring for tolerability and effectiveness. Real-world data will ultimately determine whether topical metformin warrants broader clinical adoption.

Conclusion

Compounded topical metformin shows promising therapeutic potential across chronic periodontitis, melasma, wound

healing, and CCCA. Current evidence suggests that topical delivery is well tolerated, mechanistically plausible, and capable of producing clinically meaningful improvements. Ideally, compounded topical metformin would be evaluated using a consistent formula in varying strengths, compared with placebo, with check-ins at various points throughout the treatment process. Although further evaluation will continue to improve evidence-based prescribing of compounded topical metformin, it currently stands as an affordable, safe, and mechanistically rational treatment option for chronic periodontitis, diabetic wound healing, melasma, and hair regrowth.

Large, multicenter randomized trials employing standardized formulations are needed to support broad clinical adoption. Until then, topical metformin represents a mechanistically sound, affordable, and potentially valuable option when prescribed and compounded responsibly.

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PR *This article has been peer-reviewed. The contribution in reviewing is greatly appreciated!*

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Leadership, Partnership, and Possibility: Reflections from the NASPA Leadership Conference

by Sarah Sorum, PharmD, CAE and Diane Erdman, PharmD, BCPS, CDCES, BCACP, FASHP

In May, PSW President-Elect Diane Erdman and PSW CEO Sarah Sorum traveled together to Washington, D.C., to participate in the annual National Alliance of State Pharmacy Associations (NASPA) Leadership Conference for state pharmacy association CEOs and presidents-elect. Hosted at the headquarters of the United States Pharmacopeia (USP) and sponsored by Pharmacists Mutual, this conference has become one of the most valuable leadership development experiences PSW attends each year; one that PSW leadership intentionally prioritizes with our incoming PSW Presidents-Elect.

One of the most meaningful aspects of this conference is that it is designed specifically for the partnership between the association CEO and the incoming chief elected officer. Diane and Sarah traveled together, attended sessions together, and spent time connecting with other pharmacy association leaders from across the country who are preparing for their own leadership transitions. Those conversations help build community, trust, and perspective not just for the two days we are together, but for the year of leadership ahead. Some of these conversations also inspired Diane and Sarah to consider how PSW could implement ideas presented by other state associations.

A major focus of this year's conference centered on association leadership and management best practices, drawing heavily from principles established by the American Society of Association Executives (ASAE). Discussions emphasized that strong associations do not happen by accident. They require intentional governance, healthy relationships between volunteer leaders and staff leaders, strategic thinking, sound financial stewardship, and a willingness to evolve continually.

Throughout the conference, one theme emerged repeatedly: the relationship between the CEO and the elected president matters deeply. In his book *The Five Dysfunctions of a Team,* Patrick Lencioni writes that trust is built through vulnerability, which forms the foundation of a high-functioning team. This conference allowed Diane and Sarah to be vulnerable in their conversations, which increased their trust in each other. When that partnership is grounded in trust, communication, and shared vision, associations are far better positioned to navigate challenges and pursue opportunities on behalf of members.

We also discussed what keeps

pharmacy association leaders up at night. Unsurprisingly, many of the concerns are shared nationally: workforce challenges, reimbursement pressures, rapid healthcare transformation, political uncertainty, and the pace of change affecting pharmacy practice. Yet despite those realities, the conference tone remained overwhelmingly optimistic.

A highlight of the event was hearing from a panel of national pharmacy association leaders representing organizations including the National Community Pharmacists Association (NCPA), American Pharmacists Association (APhA), American Society of Consultant Pharmacists (ASCP), National Association of Chain Drug Stores (NACDS), Pharmacy Quality Alliance (PQA), and NASPA. While each organization brings a different perspective and focus area, the group aligned on one important idea: pharmacy has tremendous opportunity ahead, and national associations are working closely together to meet those opportunities.

Rather than becoming consumed by obstacles, leaders were encouraged to shift toward possibility thinking, identifying where pharmacists and pharmacy technicians can lead, innovate, collaborate, and demonstrate value in new ways. Leaders must resist negativity and recognize that optimism is not a personality trait, but a deliberate choice. That mindset strongly aligns with the direction PSW continues to pursue as we work to advance practice transformation and strengthen the profession in Wisconsin.

Of course, not every meaningful leadership conversation happened inside the meeting rooms. One evening, Diane and Sarah took the opportunity to experience a nighttime tour of the monuments in Washington, D.C. Standing together at places like the Lincoln Memorial and the Martin Luther King, Jr. Memorial provided a powerful moment to reflect on leadership, service, and the responsibility we share in helping shape the future. Those reflections felt especially meaningful this year as the United States marks the 250th anniversary of our nation's founding, reminding us that progress is built through generations envisioning something better for those who follow.

PSW is grateful for volunteer leaders like Diane who invest their time, energy, and talents in serving PSW and the profession. Experiences like this remind us that while pharmacy faces significant challenges, we are also surrounded by passionate, thoughtful leaders who are committed to building something even stronger for the future.

Sarah Sorum is the Executive Vice President & CEO of the Pharmacy Society of Wisconsin. Diane Erdman is the Director of Ambulatory Care Pharmacy Services for Ascension Wisconsin and President-Elect of the Pharmacy Society of Wisconsin.

Disclosure: This recap has been prepared with the assistance of ChatGPT. The AI tool has been used to support content organization. Final content has been reviewed and revised for accuracy, relevance, and alignment with the PSW goals and values.

2026 Christopher Decker Golf Outing

Christopher Decker Scholarship Golf Outing Recap: A Final Chapter of Impact

by Christa Paskey, 2027 PharmD Candidate

Some traditions fade with time and end quietly. Others leave a legacy that continues to shape lives long after the final chapter closes. That legacy was on full display on June 1, 2026, as pharmacists, student pharmacists, family members, friends, and supporters gathered at the Wild Rock Golf Club in Wisconsin Dells for the fifth and final Christopher Decker Scholarship Golf Outing. The day celebrated Christopher Decker's influence on pharmacy practice and future pharmacists for years to come.

Attending this year's event was especially meaningful to me. As one of the recipients of the 2024 Christopher Decker Scholarship and a future pharmacist currently completing my first Advanced Pharmacy Practice Experience (APPE) rotation with the Pharmacy Society of Wisconsin (PSW), my attendance at the event was a full-circle moment. During the reception, I spoke with attendees about how the scholarship has influenced my pharmacy journey. Sharing my story reinforced the scholarship's lasting impact and the important role it plays in supporting future "Difference Makers" in pharmacy.

The Christopher Decker Scholarship Fund was established by the Decker family in 2022 to honor Chris's commitment to innovation, collaboration, and mutual respect within the pharmacy profession. Through a partnership with the Iowa Pharmacy Foundation and the Wisconsin Pharmacy Foundation, the scholarship is awarded each year to two student pharmacists in Iowa and three student pharmacists in Wisconsin.

Thanks to the generosity of the Decker family and all who have participated in this fundraising event over the last five years, the Christopher Decker Scholarship Fund has grown to ensure a lasting impact for future pharmacists. With this milestone achieved and the final 18 holes now complete, I was reminded that Chris Decker's influence on the profession is far from over. While the event marked the closing of a chapter, future pharmacists will continue to benefit and carry forward the spirit of being a "Difference Maker."

While the scholarship's impact remained at the heart of the event, the golf outing was filled with friendly competition, laughter, and plenty of memorable moments on the course. Golfers teed off across the scenic course at Wild Rock Golf Club, with several on-course contests that added energy and excitement. At hole three, the golfers tested their short game with the "Chip It In" contest, while hole six featured the always entertaining "Beat the Pro" contest. With a $10,000 reward on the line, hole 11 raised the stakes with a "Hole in One" contest sponsored by Pharmacists Mutual. Hole 13 featured "Whack a Duck," where golfers teed off rubber ducks to send them the farthest, squeaking several strategies along the way.

As play ended and golfers returned to the clubhouse, the attention shifted to the leaderboard, which displayed the scores of all 14 teams. Finishing with a 58 through 18 holes and a total score of -14 under par, the team of John Decker, Steve Rough, Kate Schaafsma, and Meghann Voegeli secured first place. The scores may have determined the winners, but they captured only a small part of the day's impact. All 14 teams contributed to the outing's camaraderie, enjoyment, and fundraising success. Together, the donors, sponsors, and participants helped raise an estimated $25,000 for the scholarship fund. That achievement reflected the event's even greater purpose: a shared commitment to remember Chris and support the scholarship fund.

As attendees settled in for the reception, the conversation moved from drives and putts to a celebration of the fifth and final Christopher Decker Scholarship Golf Outing. Kate Hartkopf, Managing Director of the Wisconsin Pharmacy Foundation, highlighted the event's significance and created an opportunity to celebrate what the scholarship has become. The reception provided an opportunity to toast the final golf outing.

Steve Rough delivered the first toast, bringing what he calls the "Decker Archives." Drawing from his experiences with and memories of Chris, Rough remarked that while the weather forecast predicted clouds for the golf outing, "the sunshine came out right at tee-off." He closed his toast by reminding attendees of one of Chris's guiding beliefs: "Everyone can lead because leadership begins with serving others." The toast brought back the same values that inspired the event from the start and served as a call to action to continue

Below: *Christa Paskey reflecting on what the Christopher Decker Scholarship meant to her during the reception remarks.*

being “Difference Makers” for the pharmacy profession.

As the glasses from the first toast were set down and the microphone was passed off, Steve Mullenix delivered the second toast. He described Chris as a mentor to many in the pharmacy profession. Mullenix also spoke about Chris's emphasis on relationships and the importance of building genuine connections with others. He shared that Chris viewed relationships as one of the most meaningful parts of the pharmacy profession, and of life. With the glasses raised for a second time, Mullenix's toast reinforced how Chris's influence will continue to shape the future of the pharmacy profession.

Following the toasts, Chris’s three children reflected on the growth of the scholarship fund throughout the five-year history of the golf outing. Joe Decker remarked, “It means so much to see the support surrounding the Christopher Decker Scholarship and how the event has grown over the years. Seeing the course and the room filled today is fantastic.” The Decker family's remarks closed with genuine gratitude to everyone who made the event possible, specifically calling out the attendees and the PSW Staff.

Before the recipients of the 2026 Christopher Decker Scholarship were announced, I shared a few remarks with those in attendance at the reception. With my unique perspective as a 2024 Christopher Decker Scholarship recipient and current fourth-year student pharmacist completing my first APPE rotation with PSW, I spoke about how the scholarship has significantly shaped my journey in the pharmacy profession. With the microphone in hand and the room attentive, it was meaningful to reflect on how the tremendous support I received as a second-year student pharmacist has now connected me to a community that invests in the future of the pharmacy profession. When I received the scholarship, I was encouraged to be a “Difference Maker.” Looking back, I now have a deeper appreciation for what that call to action looks like in practice.

As the reception came to an end, Kate Hartkopf announced the 2026 Christopher Decker Scholarship recipients, reported the winners of the on-course contests, and provided closing remarks. The fifth and final Christopher Decker Scholarship Golf Outing stood as both a conclusion and a continuation. It marked the end of an annual tradition, but it also highlighted the scholarship fund's long-term impact. Even though some traditions fade with time and end quietly, the legacy of Chris Decker will continue long after the final tee shot at Wild Rock Golf Club and through every future “Difference Maker” encouraged and supported by the scholarship.

Christa Paskey is a 2027 Doctor of Pharmacy Candidate at Concordia University Wisconsin in Mequon, WI.

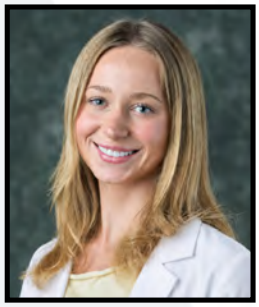
2026 CHRISTOPHER DECKER SCHOLARSHIP RECIPIENTS

Samantha Halada, 2027 PharmD Candidate
Medical College of Wisconsin School of Pharmacy

Receiving this scholarship is especially meaningful to me because the values it represents, kindness, positivity, collaboration, and being a “Difference Maker”, closely align with the type of pharmacist and person I hope to continue becoming. Through my experiences in pharmacy, volunteering, and working with individuals with a wide range of physical and developmental disabilities, I have learned how meaningful compassion, inclusion, and genuine connection can be. Those experiences have shaped my commitment to always putting others first and striving to make even small interactions meaningful. This recognition is both humbling and encouraging as I continue my journey in pharmacy. I hope to continue leading with empathy, advocating for patients, and creating environments where people feel heard, valued, and supported. I am incredibly grateful for the opportunity to carry forward the legacy this scholarship represents and to continue striving to make a positive impact within my community and the profession of pharmacy.

Hooda Hasan, 2028 PharmD Candidate
Concordia University Wisconsin School of Pharmacy

Receiving the Christopher Decker Scholarship is deeply meaningful to me because of the values it represents. Throughout pharmacy school, I have learned the importance of staying positive, supporting those around me, and continuing to grow both personally and professionally. I hope to carry those same qualities of innovation, collaboration, mutual respect, and making a difference into my future career as a pharmacist. I am excited to continue my education and will continue striving to make a meaningful impact on the patients and communities I serve.



Alana Higgins, 2029 PharmD Candidate
University of Iowa School of Pharmacy

I am honored and thankful to receive the Christopher Decker Scholarship for the University of Iowa. Beyond the financial support, this scholarship serves as a reminder of the type of pharmacist I aspire to become. Chris Decker's legacy of leadership, innovation, collaboration, and commitment to being a "difference maker" inspires me to continue seeking opportunities to make a difference in the lives of patients, my community, and the pharmacy profession.

Isaac Ramírez Linares, 2028 PharmD Candidate
Drake University College of Pharmacy

I am deeply honored and sincerely grateful to be selected as the 2026 Drake University College of Pharmacy recipient of the Christopher Decker Scholarship. As I continue my journey toward becoming a pharmacist, this recognition means far more to me than financial support. It serves as a reminder of the impact that pharmacists can have on their patients, colleagues, and communities through compassion, innovation, collaboration, and service. Learning about Christopher Decker's legacy has inspired me to reflect on the type of pharmacist I hope to become, someone who not only strives for professional excellence but also seeks to make a meaningful difference in the lives of others.

Hayley Smith, 2027 PharmD Candidate
University of Wisconsin-Madison School of Pharmacy

Being a recipient of the Christopher Decker Scholarship is a meaningful honor that strengthens my dedication to serving patients through compassion, collaboration, and innovation. As I work toward expanding access to care in rural communities, this recognition motivates me to continue striving to be a Difference Maker in pharmacy.

Pharmacist Spotlight: Becky Klipstine

by Wendmy Nida Carene Moyenga, 2026 PharmD Candidate

Becky Klipstine, BSPharm, is the Assistant Manager of Pharmacy Services at Group Health Cooperative of South-Central Wisconsin (GHC–SCW), a nonprofit health maintenance organization (HMO) that serves as both a provider and an insurer of healthcare. Her career path evolved through a willingness to embrace opportunity. She reflects, "I kind of fell into it… I just kept saying "yes" as things developed." Klipstine graduated from the University of Wisconsin–Madison in 1994 with a Bachelor of Science in Pharmacy. She began her career working at her father's independent pharmacy in Amery, Wisconsin, where she quickly assumed a leadership role as pharmacy manager. This early experience provided a strong foundation in operations, patient care, and decision-making that helped her transition to GHC–SCW as a staff pharmacist and eventually into management, serving as pharmacy manager at Capital Pharmacy for over a decade. Currently within GHC, she supports multiple clinic-based pharmacies while contributing to clinical and managed care services.

Day-To-Day Practice

Klipstine supports pharmacy operations across retail, clinical, and insurance-based services, including formulary management and prior authorizations. Klipstine shared that pharmacists within GHC practice in an integrated model, managing a wide range of disease states rather than focusing on a single specialty. GHC pharmacists team up with medical providers through collaborative practice agreements, allowing pharmacists to play an active role in supporting patients as they make care decisions.

GHC's cooperative structure supports this innovative care delivery model, which focuses on patient care, technology, and infrastructure. Klipstine emphasized that the GHC cooperative structure enables a focused, patient-centered approach, where patient need and positive outcomes drive the organization's mission.

Raising The Bar

Although Klipstine's current role is not always directly patient-facing, she plays a critical role in supporting GHC pharmacy teammates who provide direct patient care. Her focus is ensuring GHC pharmacy teams have the staffing, technology, and operational resources needed to deliver high-quality patient care. One unique aspect of that focus is developing advanced pharmacy technician roles. Many technicians at GHC begin in retail/community-based pharmacy settings and often transition into specialized clinical or insurance-based roles, improving workflow efficiency and supporting career advancement.

Bumps in the Road

One of the primary challenges Klipstine faces is navigating the growing integration of technology into healthcare operations. Many clinical and patient care expansion initiatives at GHC require close collaboration with the Information Technology (IT) department to ensure solutions are implemented effectively and aligned with organizational priorities. Because IT supports numerous departments across the organization, project timelines may occasionally need to be adjusted to accommodate competing priorities.

As technology continues to evolve, Klipstine has embraced opportunities to expand her understanding of technology and its impact on patient care and pharmacy operations. By learning new systems, engaging in technology-driven projects, and fostering strong partnerships with IT colleagues, she has strengthened her ability to lead initiatives, identify solutions, and successfully implement new services.

Klipstine also highlights the importance of mentorship in her career, noting that strong support systems helped her advance into leadership roles despite limited formal business management training. She learned on the job from others, and offers that same support to others learning a new task, practice, or role. Klipstine shared that staffing challenges, particularly for pharmacy technicians, remain a significant issue across healthcare systems in Wisconsin, and GHC is also impacted by these shortages in skilled pharmacy staff. Klipstine emphasized that

Below: *Becky Klipstine (left) and London Roberts, CPhT (right) at the GHC Sauk Trails Pharmacy*

maintaining adequate staffing is essential to ensuring safe, effective patient care, and that strong mentorship connections can help build strong teams.

One of the greatest barriers in Klipstine's career was internal. "You don't always know what you're getting into," she reflects, but rather than letting uncertainty hold her back, she chose to lean into it. Stepping outside of her comfort zone often felt uncomfortable, and at times even anxiety-provoking, but those moments became defining growth opportunities. By embracing the unknown and trusting her ability to adapt, Klipstine not only built confidence in herself, but also discovered new strengths that ultimately shaped her success.

Moving Forward

Looking ahead, Klipstine sees continued growth in integrated pharmacy practice, with a strong focus on workforce development and succession planning. She emphasizes the importance of identifying team members' strengths and preparing and mentoring future leaders within the organization. Technology, particularly artificial intelligence, is expected to play an increasing role in pharmacy operations. Klipstine anticipated that technology and artificial intelligence (AI) will play an increasingly important role in successful pharmacy operations. Klipstine shared that she believes AI can improve efficiency, support policy development, and enhance preparedness for challenges such as system downtime or cyberattacks.

Klipstine's journey reminds us that growth in pharmacy leadership is rarely linear and often begins with the willingness to step into the unknown. By embracing uncertainty, investing in her team, and continuously adapting to an evolving healthcare landscape, she has helped shape a practice model that is both resilient and forward-thinking. As pharmacy continues to transform, Klipstine's story underscores the power of curiosity, courage, and commitment to patient-centered care in driving meaningful progress.

Wendmy Nida Carene Moyenga is a 2026 Doctor of Pharmacy Candidate at the Medical College of Wisconsin in Milwaukee, WI.

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