Seventh Annual Capstone Research Symposium

The University of Dubuque
Master of Science in
Physician Assistant Studies

2025

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University of Dubuque
Linda Chlapaty Hall
University Science Center

Letter of Recognition

Dear Friends and Colleagues,

The University of Dubuque Master of Science in Physician Assistant Studies Program is pleased to honor the talent and dedication of our students, faculty, and staff through the Class of 2025's Capstone Research Symposium. This research symposium is the culmination of each student's yearlong effort to pursue a relevant inquiry of their choosing, based on a clinical case encountered during their final year of the PA program. In addition to this presentation, each student authored a publication-ready, scholarly article that underwent extensive peer, faculty, and external review to refine their knowledge as evidence-based clinicians and develop inter-professional relationships fundamental to their role as future Physician Assistants.

The pursuit of clinical research is integral to each student's development, and we take pride in their achievements. We believe their ambition and commitment will shape the future of not only the PA profession but also the trajectory of medicine overall. We hope this symposium will contribute to the dissemination of research findings into everyday clinical practice.

The success of our students would not be possible without dedicated faculty, staff, and external reviewers and evaluators who prepare our students for evidence-based decision making which integrates clinical expertise, patient values, and clinical research in the process of patient-centered, clinical decision making.

We appreciate your attendance and look forward to the interprofessional discussion and engagement.

Sincerely,

Ms. Rachel Rokser, PA-C
Capstone Director
MSPAS Program

Ms. Addy First, MS
Capstone Advisor
MSPAS Program

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Abstracts

1. **Abigail McGrain**

Effects of Phenol versus Surgical Excision with Primary Closure on Recurrence Rates of Pilonidal Disease

Background: Sacrococcygeal pilonidal disease (SPD) is a chronic disease of the natal cleft that impacts thousands of people each year by imposing immense physical, emotional, and financial burdens, yet there is no recommended gold standard treatment for definitive cure.

Objective: This systematic review assessed recurrence rates of SPD after treatment with phenol therapy versus surgical excision with primary closure.

Methods: On January 31st, 2025, scientific databases, including PubMed and Trip, were searched yielding two randomized controlled trials (RCTs) and one meta-analysis that met eligibility criteria. Inclusion criteria included research in the last 10 years, primary-uncomplicated pilonidal disease in adolescents or adults, studies that evaluated recurrence rates, use of topical liquid or crystallized phenol, and follow up at least 24 months after treatment for recurrence. Exclusion criteria included patients with allergies to phenol, patients unable to undergo surgery, patients taking immunocompromising agents, unspecified surgical technique, excision with open healing, flap procedures, or patients with active infection/bacteremia/sepsis. The Center for Evidence-Based Medicine's critical appraisal guide was used to assess the quality of each study through evaluation of bias, randomization, blinding, and attrition rates.

Results: All three studies included in this systematic review were of moderate quality. In two studies, phenol therapy resulted in slightly higher recurrence rates, while in the third study, surgical excision with primary closure resulted in higher recurrence rates.

Conclusion: Phenol therapy should be considered an effective method to prevent recurrence of pilonidal disease.

2. **Alexis Markley**

Electromagnetic Navigational Bronchoscopy vs. CT-guided Biopsy for Pulmonary Lesion Diagnosis

Background: Pulmonary lesions are a common finding among adults and is the leading cause of cancer death. CT-TB is considered first line for the diagnosis of lesions but with increased rates of complications such as pneumothorax and the desire for improved access to difficult lesions, alternative diagnosis modalities such as ENB would aid in the diagnosis of pulmonary lesions.

Objectives: The aim of this research was to evaluate the diagnostic yield of CT-TB and ENB for the diagnosis of pulmonary nodules in adults.

Methods: A literature search was conducted within PubMed, TRIP, and Google Scholar between April 9th through 12th, 2025. Search terms included electromagnetic bronchoscopy [MeSH Terms] AND CT guided biopsy [MeSH Terms] AND pulmonary lesion [Free Text]. Literature including patients 18 years of age or older with a confirmed pulmonary lesion, conducted at a tertiary care center, and used direct comparison between ENB and CT-TB were included. Studies that were published prior to 2015, not in English language, or that were not a meta-analysis, systematic review, randomized controlled trials (RCTs), or observational studies were excluded. Three moderate quality studies (two retrospective studies and one RCT) were analyzed using the Center for Evidence-Based Medicine's Critical Appraisal Worksheets.

Results: The two retrospective studies found superiority in the diagnostic yield of CT-TB compared to ENB while the RCT found no difference in the diagnostic yield between the two.

Conclusion: ENB may be used as an alternative modality for the diagnosis of pulmonary nodules if CT-TB cannot be performed or is contraindicated.

3. **Alexus Jensen**

Enhancing SSRI Treatment in OCD: The Role of N-Acetylcysteine Augmentation

Background: OCD involves intrusive thoughts and repetitive behaviors that may be resistant to standard serotonin-reuptake inhibitor (SSRI) treatment. Due to limited success associated with augmentation therapies, NAC has been thought to reduce OCD symptoms by modulating glutamate levels, increasing dopamine release, and reducing oxidative stress.

Objective: The objective of this research is to determine whether adding NAC to SSRI therapy improves OCD symptoms in adults compared to SSRI monotherapy.

Methods: A literature search was conducted using PubMed, Google Scholar, and ClinicalTrials.gov on March 19, 2025. Inclusion criteria included studies involving participants 18 years or older, concurrent SSRI use, and OCD severity rated on the Yale-Brown Obsessive-Compulsive Scale (Y-BOCS). Studies involving other psychiatric conditions or SSRI use for other conditions were excluded. Four RCTs and one meta-analysis were included in the final review. Critical appraisals were performed using centre of evidence-based medicine (CEBM) worksheets.

Results: NAC showed moderate potential for reducing OCD symptoms when combined with SSRIs, although findings remain mixed. While Kishi et al. (moderate quality) and Afshar et al. (low quality) showed significant Y-BOCS score reductions; Costa et al. (moderate quality) did not.

Conclusion: Findings remain mixed if NAC can benefit as an adjunctive therapy with SSRIs. To confirm its efficacy, standardized protocols and larger sample sizes are needed. For now, clinicians may consider NAC as a well-tolerated alternative to antipsychotic augmentation, but definitive recommendations await stronger evidence.

4**. Ally Flint**

Nirsevimab Monoclonal Antibody for Use in Prevention of RSV Hospitalization

Background: Respiratory syncytial virus (RSV) is a widespread infectious illness, which is particularly concerning for children under five due to its high hospitalization rates and healthcare impact. The most effective prevention method for RSV related hospitalizations are monoclonal antibodies (MA). Although MA have been an effective prevention strategy since 1998, a recently developed one named nirsevimab has shown promise in significantly reducing RSV hospitalization rates compared to the previous preventative measures.

Objective: This research aims to determine if receiving nirsevimab reduces the risk of hospitalization due to RSV infection in children under five years old.

Methods: A search of scientific databases was conduced in April 2025. Three high-quality systematic reviews and meta-analyses (2022-2024) from PubMed and Trip were critically examined. The inclusion criteria consisted of systematic reviews or meta-analysis, outpatient settings, nirsevimab as the primary intervention, and a patient population of children under five years old. Studies with individuals unable to receive monoclonal antibodies and children with co-occurring respiratory infection were excluded. Critical appraisal of each article was accomplished using Centre for Evidence-Based Medicine worksheets.

Results: All reviews found nirsevimab significantly reduces RSV-related hospitalizations. Ricco et al. found an 88.40% immunization efficacy (0.42% hospitalized for immunized vs. 4.25% for non-immunized infants). Turalde-Mapili et al. identified a 76% reduction in hospitalization risk, or 22 fewer hospitalizations per 1,000 infants. Sun et al. reported 54 fewer hospitalizations per 1,000 participants. Reviewed studies were of high quality.

Conclusion: This analysis confirms nirsevimab is highly effective in significantly reducing RSV-related hospitalization rates in children under five. A single dose offers effective prevention throughout an infant's first RSV season, establishing it as an effective prevention strategy against RSV.

5. **Alysha Brickl**

GLP-1 Medications for the Treatment of Obstructive Sleep Apnea

Background: Obstructive Sleep Apnea (OSA) is known to affect a majority of the world. Continuous positive airway pressure (CPAP) remains the first-line treatment but is limited by patient adherence. Glucagon-like peptide-1 receptor agonists (GLP-1 RAs), initially developed for type 2 diabetes, may reduce apnea-hypopnea index (AHI) by promoting weight loss and improving upper airway patency.

Objective: This systematic review aimed to determine whether the efficacy of GLP-1 RAs in reducing AHI in adults with OSA on CPAP compared to standard care or placebo.

Methods: A database search of PubMed and Google Scholar from March to April 2025 identified studies published within the last 10 years. Inclusion criteria were adults ≥ 18 years, BMI ≥ 30 kg/m2, OSA diagnosis (AHI > 5), and current CPAP therapy. Exclusion criteria included central/mixed sleep apnea, surgical OSA treatment, pregnancy, and any contraindications to GLP-1RAs. Two randomized controlled trails (RCT) and one systematic review and meta-analysis met specific criteria. Quality appraisal utilized CEBM worksheets.

Results: Three moderate-to-high quality studies demonstrated AHI reduction with the use of GLP-1 RAs combined with CPAP. Overall, GLP-1 RA therapy led to significant improvement in OSA severity, with the greatest reductions observed among patients with type 2 diabetes. However, combination therapy did not consistently outperform CPAP alone.

Conclusion: Results suggest GLP-1 RAs can reduce AHI and improve OSA severity in adults with obesity, particularly when metabolic comorbidities are present. They may be considered as adjunctive therapy to CPAP through shared decision-making, though long-term efficacy, adherence, and cost-effectiveness require further research.

6. **Amanda Sifuentes-Smith**

Assessing Xanomeline-Trospium's Efficacy in Alleviating Negative Symptoms of Schizophrenia Versus Baseline Symptoms

Background: First- and second-generation antipsychotics are first-line treatments for schizophrenia. Despite these existing treatments, negative symptoms of schizophrenia persist in many patients. This highlights the need for effective therapeutic interventions for treatment of negative symptoms of schizophrenia.

Objective: The objective of this research is to assess the efficacy of xanomeline-trospium chloride (XTC) in alleviating negative symptoms of schizophrenia versus placebo based on the PANSS in adults with schizophrenia.

Methods: PubMed and Google Scholar were searched on April 10, 2025, for this systematic review. Inclusion criteria included participants 18-65 years old, primary diagnosis of schizophrenia with negative symptoms, inpatient setting, utilization of PANSS, and comparison to placebo. Exclusion criteria included a history of treatment resistant schizophrenia defined as no response to two adequate courses of antipsychotic medications. Three randomized controlled trials were utilized for this review. Centre for Evidence-Based Medicine critical appraisal worksheets were used for the appraisal of each article.

Results: The three articles included in this review were of moderate quality. Two of the three articles found XTC to be effective in treating negative symptoms of schizophrenia, while the third article did not find statistically significant changes in negative symptoms compared to placebo.

Conclusion: XTC is effective in treating acute negative symptoms of schizophrenia, though long-term studies are required to assess full efficacy of the drug.

7. **Anjali George**

Acne Vulgaris: Blue Light Therapy versus Benzoyl Peroxide

Background: Acne vulgaris (AV) affects many adolescents and adults. A common treatment is Benzoyl peroxide (BPO) but it has adverse effects such as dryness and irritation in which patients may find it difficult to follow the treatment. As improvements in technology have developed, there has been growing interest in non-pharmacologic treatments such as blue and blue-red light therapy due to their antibacterial and anti-inflammatory effects. Current research for light therapy is limited by small sample sizes, variable devices within studies, and short-term follow- up. This makes it difficult to draw long-term conclusions. Long term and independent studies would better assist in understanding the role of light therapy in AV.

Objective: This review aims to answer the PICO question of: Can acne vulgaris in patients aged 15 and older with mild to moderate acne vulgaris be treated with blue or blue-red light therapy compared to topical benzoyl peroxide in reducing acne lesions?

Methods: Databases such as PubMed and Cochrane were used between March 20th and April 6th of 2025. Inclusion criteria involved participants 15 years and older with mild to moderate acne vulgaris, blue (415 nm) and blue-red light (415+660nm) therapy, and control groups using 5% topical benzoyl peroxide. Eligible studies included randomized controlled trials, cohort studies, systematic reviews, or meta-analysis that reported quantitative outcomes (lesion count or severity scores), were conducted in humans, and published in English. Studies were excluded if the participants had severe or cystic acne, wavelengths other than 415 and 660 nm, lack of direct comparison to 5% topical BPO, qualitative outcomes, or lack of lesion measure counts or severity scores. Animal or in vitro studies, other skin conditions, or concurrent acne treatments were also excluded. After applying these criteria, three studies were found to be eligible and were further assess using the Center for Evidence based Medicine's (CEBM) Critical Appraisal Worksheets to help determine risk of bias and assess the quality of each study.

Results: The included studies were rated as low to moderate quality and demonstrated a similar reduction in acne lesions between blue/blue-red light therapy and BPO.

Conclusion: Blue and blue-red light therapy is a reasonable alternative to BPO for patients with mild to moderate acne but cost, accessibility and non-inferiority to traditional treatments are limiting factors.

8. **Ashley Luecke**

Metformin Efficacy in Limiting Growth of Abdominal Aortic Aneurysms in Patients with Type II Diabetes Mellitus

Background: Abdominal aortic aneurysm (AAA), dilation of the body's largest vessel, can progress slowly and silently over time leading to rupture, shock, and death. AAA rupture has extremely low survival outcomes and there is no preventative treatment option for non-surgical candidates. Evaluation to find effective treatment for limiting AAA expansion would decrease AAA-related mortality.

Objective: This systematic review aimed to investigate whether metformin limits AAA expansion in adult and elderly patients with type 2 diabetes (T2DM).

Methods: A literature search within PubMed and Google Scholar was conducted from April 5th, 2025 to April 14th, 2025. Studies included were randomized controlled trials (RCTs), cohort studies, meta-analyses, and systematic reviews. Inclusion criteria required participants over the age of 18 with T2DM and AAA being followed in an outpatient setting for at least 6 months. Studies were excluded if participants had history of surgical AAA repair or rupture, or if published prior to 2015. Two systematic review and metanalyses (SRMAs) and one cohort study were analyzed through utilization of the Center for Evidence-Based Medicine's (CEBM) Critical Appraisal Worksheets.

Results: Three studies were deemed appropriate and ranged from moderate to moderate-high quality. All included studies showed a decrease in AAA events in patients treated with metformin. Both SRMAs showed metformin use was associated with significantly reduced aneurysm annual growth rates.

Conclusion: Results illustrated metformin reduces the incidence of AAA events, including rupture, surgical repair, and death, and aneurysm growth in the presence of type 2 diabetes. RCTs with severity measures and standardized intervention are needed to implement a recommendation.

9**. Breanna Runksmeier**

Use of Tranexamic Acid to Reduce Postpartum Hemorrhage in Cesarean Deliveries

Background: Postpartum hemorrhage (PPH) is a leading cause of maternal morbidity and mortality worldwide. Cesarean delivery carries an increased risk for PPH due to surgical blood loss. Tranexamic acid (TXA), an antifibrinolytic agent, has been proposed as a prophylactic intervention to reduce blood loss when administered before or during cesarean delivery.

Objective: This systematic review aimed to evaluate whether prophylactic administration of TXA in women undergoing cesarean section reduces blood loss compared with standard obstetric care alone.

Methods: A literature search within PubMed and Trip was conducted from March 10th, 2025, to April 14th, 2025. Search terms included Tranexamic Acid [MeSH term] AND prevention and control [Subheading] vs placebo AND Postpartum Hemorrhage [MeSH term]. Publications including pregnant adult female patients undergoing cesarean section were included. Studies that were not a meta-analysis, systematic review, or RCT or were published prior to 2015 were excluded.

Results: Within the selected publications, there were 6,290 adult female patients (TXA = 3,155; placebo = 3,135). Publication quality ranged from low to moderate quality. Patients had a decrease in blood loss during cesarean delivery when administered TXA in addition to standard of care.

Conclusion: Evidence suggests that prophylactic use of TXA in cesarean deliveries can effectively reduce blood loss and PPH. However, variability in dosing regimens and timing of administration warrants further investigation to establish standardized guidelines. Incorporating TXA into obstetric protocols may be a valuable strategy.

10**. Carolyn Frett**

Efficacy of 5-Fluorouracil versus Imiquimod for Field-Cancerization Actinic Keratosis

Background: Actinic keratosis (AK) is a common precancerous skin condition affecting approximately 14% of the global population with the risk for progression to squamous cell carcinoma. Several topical therapies like 5-fluorouracil (5-FU) and imiquimod demonstrate efficacy, but there is no established standardized treatment. Evaluation of evidence-based treatment would enhance patient outcomes and reduce recurrence.

Objective: This systematic review aimed to evaluate the comparative efficacy of topical 5-FU versus imiquimod in the treatment of field-cancerization AK in immunocompetent adults and elderly populations.

Methods: A literature search was conducted from January 2025 to February 2025 using PubMed, Cochrane, and Trip. Search terms included actinic keratosis [MeSH term] AND (5-Fluorouracil [MeSH term] OR Fluorouracil [MeSH term]) AND Imiquimod [MeSH term]. Inclusion criteria were systematic reviews, meta-analyses, randomized controlled trials (RCT), and cohort studies with participants over the age of 18 with a diagnosis of AK and treated with 5-FU or imiquimod. Studies were excluded if patients were immunocompromised, any animal studies or were published prior to 2015. Two meta-analyses and one RCT were analyzed through utilization of the Center for Evidence-Based Medicine's Critical Appraisal Worksheets (CEBM).

Results: Across studies, 5% 5-FU achieved approximately 20-25% higher clearance rates compared to 5% imiquimod. Publication quality ranged from moderate to high quality. Despite heterogeneity in baseline characteristics and follow-up durations, consistent findings support superior efficacy.

Conclusion: Current evidence illustrated that 5-FU demonstrated superior efficacy than imiquimod in lesion clearance for field-cancerization AK in immunocompetent adults. However, future research should address standardized protocols and long-term efficacy.

11. **Emily Bui**

Efficacy of Vonoprazan Versus Proton Pump Inhibitors in Mucosal Healing of Erosive Esophagitis

Background: Erosive esophagitis (EE), a complication of gastroesophageal reflux disease (GERD), is treated with proton pump inhibitors (PPIs) as first-line. However, PPIs failed to heal mucosal lesions in some patients. This study evaluated the efficacy of an alternative drug in mucosal healing in patients with EE.

Objective: This systematic review assessed the efficacy of vonoprazan compared to PPIs in mucosal healing of EE through endoscopic evaluations.

Methods: PubMed and Cochrane Database of Systematic Reviews were searched from February to March 2025. Inclusion criteria were systematic reviews, meta-analyses, and randomized controlled trials (RCT) comparing vonoprazan to PPIs. Exclusion criteria were observational studies and RCTs without reported endoscopic healing. Three systematic reviews and meta-analyses were conducted in this review and given a quality rating based on the critical appraisal worksheets from the Center for Evidence-Based Medicine (CEBM).

Results: All three moderate-quality reviews found vonoprazan 20 mg qd was superior to lansoprazole 30 mg qd in healing EE LA grade C/D at eight weeks.

Conclusion: In patients with severe EE, vonoprazan 20 mg qd was superior to lansoprazole 30 mg qd in mucosal healing at eight weeks. High-quality, long-term studies are needed to evaluate safety, compare additional PPIs, and assess maintenance efficacy.

12. **Emily Corazzi**

IV Ferric Carboxymaltose Versus Placebo For Reducing Hospitalizations In Iron Deficiency Anemia and HFrEF Patients

Background: Iron deficiency anemia affects 50% of heart failure (HF) patients and contributes to millions of hospitalizations for HF exacerbations each year. Oral iron replacement has been shown to be less effective and more poorly tolerated than intravenous (IV) replacement.

Objective: The objective of this research was to investigate whether IV FCM therapy reduces hospitalizations in HFrEF patients with iron deficiency anemia compared to placebo.

Methods: PubMed and Trip were searched from March 2025 to April 2025 for randomized controlled trials (RCT), systematic reviews, and meta-analyses. Inclusion criteria involved adults and elderly (age eighteen and up) treated with IV FCM or placebo. Participants without concomitant iron deficiency anemia and HFrEF, participants with heart failure with preserved ejection fraction (HFpEF), and articles published more than 10 years ago were excluded. Two moderate-high quality RCTs and one high quality meta-analysis comprised this review. Critical appraisal of each study was performed utilizing the Center for Evidence Based Medicine's (CEBM) critical appraisal worksheets.

Results: Ponikowski et al. showed that total HF hospitalizations were significantly reduced when patients were treated with IV FCM compared to placebo. Mentz et al. showed a reduction in HF hospitalizations in the IV FCM group but was not statistically significant due to hierarchical testing. Ahmed et al. showed a significant reduction in first HF hospitalization using IV FCM compared to placebo.

Conclusion: Treatment with IV FCM is shown to significantly reduce hospitalizations in HF patients, but further research with long-term follow-up is needed to guide treatment regimens.

13**. Erin Tupy**

Roflumilast Efficacy in Treatment of Mild-to-Moderate Atopic Dermatitis

Background: Atopic dermatitis (AD) is a common inflammatory skin disease causing erythema and pruritis. While topical corticosteroids are first-line there is concern for chronic skin changes with long term use. Evaluation to find effective alternatives with increased tolerability would be beneficial in atopic dermatitis treatment.

Objective: This systematic review aimed to assess the efficacy of roflumilast as a treatment for mild-to-moderate AD.

Methods: Pubmed and Google Scholar were searched from February through March 2025. Inclusion criteria specified history of mild-to-moderate AD, based on vIGA-AD scoring, assessing use of roflumilast 0.15% cream published within 10 years. Exclusion criteria restricted concurrent use of other therapies for atopic dermatitis or presence of other dermatologic diseases. This resulted in two randomized control trials (RCTs) and one open label extension (OLE) trial using PRISMA methodology. The studies were analyzed using the Center for Evidence-Based Medicine's critical appraisal tools.

Results: Publication quality ranged from low to moderate quality. Two moderate quality studies showed significant improvement over 4 weeks of daily therapy. One low quality OLE trial demonstrated improvement over 52 weeks although it lacked evidence of significance.

Conclusion: Data indicates roflumilast significantly improves AD severity, especially short term, and could provide an alternative option to current therapies.

14**. Isabella Koutsopanagos**

Beta-Blockers as an Adjunct to Immunotherapy: Evaluating Survival Outcomes in Melanoma Patients

Background: Melanoma is an aggressive skin cancer with high mortality in advanced stages. While immunotherapy improves survival, it is costly and may cause significant side effects, creating a need for safe, cost-effective adjunct therapies. Beta-blockers may influence tumor progression by modifying angiogenesis, inflammation, and immune activity, suggesting a potential adjunctive role.

Objective: The following PICO question was addressed: In adults with melanoma, does the addition of beta-blockers to immunotherapy improve survival outcomes compared with immunotherapy alone?

Methods: A literature search was conducted using PubMed and Google Scholar from March 1st-3rd 2025. Inclusion criteria were 18 years or older with history of melanoma, randomized controlled trials, meta-analyses, systematic reviews, oral beta-blocker use, immunotherapy, English language, and human participants. Exclusion criteria included other types of skin cancer. Three studies met criteria: one cohort study, one retrospective RCT analysis, and one meta-analysis. Study quality was evaluated using Center for Evidence-Based Medicine critical appraisal worksheets.

Results: The low-quality cohort study showed an 80% reduction in disease recurrence with propranolol. The low-moderate quality retrospective analysis of the RCT found no statistically significant interaction between beta-blocker use and immunotherapy efficacy. The moderate quality meta-analysis indicated improved disease-free survival with non-selective beta-blockers. Overall, study quality was deemed moderate, limited by small sample sizes, heterogeneity in treatment regimens, and reliance on observation or retrospective study designs.

Conclusion: Early evidence suggests non-selective beta-blockers with immunotherapy may improve survival in melanoma patients, but high-quality randomized controlled trials are needed before implementing in clinical practice.

15. **Jared Kort**

Medication Adherence of Lithium versus Divalproex Sodium for Bipolar Disorder: A Systematic Review

Background: Bipolar disorder is a chronic psychiatric condition characterized by mood instability, often requiring long-term pharmacologic management. However, medication nonadherence presents a major barrier to effective treatment.

Objective: This systematic review examined all-cause discontinuation rates as a measure for treatment acceptability between lithium and divalproex sodium (Depakote) in adults with bipolar disorder to support evidence-based decisions.

Methods: A comprehensive search of PubMed, APA PsycInfo, and APA PsycArticles was conducted from March 6-8, 2025, to identify randomized controlled trials (RCTs), systematic reviews (SRs), and meta-analyses (MAs) reporting discontinuation rates for lithium and divalproex in adults diagnosed with bipolar I or II disorder per DSM or ICD criteria. Exclusion criteria included use of non-protocol psychotropic medications, unstable neurologic or substance use disorders, pregnancy or breastfeeding, and inability to provide consent. The search yielded one low-to-moderate quality RCT, one moderate-to-high quality SR with MA, and one high-quality SR with MA via citation searching, all critically appraised using Centre for Evidence-Based Medicine worksheets.

Results: Available evidence indicates no statistically significant difference in all-cause discontinuation rates between lithium and divalproex in adults with bipolar disorder.

Conclusion: While adherence rates appear comparable between lithium and divalproex, conclusions are limited by sample sizes, attrition, and heterogeneity. Most studies primarily assessed monotherapy despite frequent use of combination regimens in practice. Future research should prioritize large, head-to-head trials across diverse populations. Clinicians should tailor mood stabilizer selection to individual patient needs, considering comorbidities, prior response, tolerability, and access, given the impact of adherence on long-term outcomes.

16. **Kennedy Smith**

Tenecteplase for Improved Functional Independence when Administered 4.5 to 24 Hours from Stroke Onset

Background: Stroke is a leading cause of disability and mortality in the United States. Tenecteplase is a thrombolytic medication that has been shown to reduce disability when administered within 4.5 hours of stroke symptom onset. However, a majority of stroke patients present to the hospital after 4.5 hours of symptoms. Assessing the efficacy of tenecteplase after 4.5 hours could expand treatment eligibility and benefit a large number of additional patients.

Objective: To assess the efficacy of tenecteplase for improved functional independence when administered 4.5 to 24 hours from symptom onset in acute ischemic stroke.

Methods: Databases utilized in the search included PubMed and Trip. Inclusion criteria included adults 18 years or older with acute ischemic stroke, comparison of outcomes > 4.5 hours versus antiplatelet therapy, salvageable brain tissue on diagnostic imaging and use of modified Rankin score at 90 days to assess functional independence. Exclusion criteria included hemorrhagic stroke and underlying disability. The search resulted in three RCTs that were analyzed using the Center for Evidence-Based Medicine's Critical Appraisal Worksheets.

Results: All RCTs analyzed were of moderate quality. Xiong et al. found that tenecteplase does improve functional independence when administered 4.5 to 24 hours from acute stroke onset; however, Albers et al. and Cheng et al. found that tenecteplase does not improve functional independence.

Conclusion: There is not enough evidence to support the hypothesis that tenecteplase improves functional independence when administered 4.5 to 24 hours from symptom onset in acute ischemic stroke.

17**. Kevin Armbruster**

Efficacy of Standard Dose Adrenaline vs Placebo in Out-of-Hospital Cardiac Arrest Neurological Outcomes: A Systematic Review

Background: Adrenaline has been used in cardiac arrest (CA) by the American Heart Association (AHA) since 1961. The standard dose of adrenaline was initially based on expert opinion rather than evidence-based research.

Objectives: The purpose of this review is to discern if Standard Dose Adrenaline (SDA) effective in increasing rates of favorable neurological outcomes (FNO) as opposed to placebo.

Methods: The search was conducted on PubMed and Google Scholar utilizing MeSH terms and free text terms for articles published within the last 10 years. Inclusion criteria were a meta-analysis, systematic reviews, or randomized controlled trials on adult CA, written in English, and involving adrenaline. Fourteen initial records were screened by title, leaving six for eligibility assessment. After further review, four were selected. After review of Finn et al., Jacobs et al (2011) and Perkins et al (2018) were included. Study quality was assessed using the Centre of Evidence Based Medicine worksheets.

Results: Between the three studies, SDA showed increased rates of Return of Spontaneous Circulation (ROSC), but SDA was noninferior to placebo for rates of survival to hospital discharge and rates of FNO at discharge.

Conclusion: SDA was shown to be noninferior to placebo for improvement of FNO. Therefore, this review emphasizes the priority of providing high-quality Cardiopulmonary Resuscitation (CPR) and defibrillation as indicated before the administration of SDA.

18**. Kristen Petti**

Impact of Early vs Late Surgical Stabilization of Multiple Rib Fractures on Duration of Intubation

Background: SSRF is an evolving treatment option for trauma patients with multiple displaced rib fractures and/or flail chest. These injuries are associated with significant morbidity, often leading to respiratory failure, prolonged mechanical ventilation, pneumonia, and extended intensive care unit (ICU) stays. The timing of SSRF has recently emerged as a potential factor influencing short-term clinical outcomes, with early intervention hypothesized to improve recovery.

Objective: This review evaluated whether early SSRF (≤48 hours) reduces the duration of mechanical ventilation compared to delayed SSRF (>48 hours) in adult and elderly trauma patients.

Methods: A focused literature search was conducted from January to March 2025 using PubMed and Google Scholar. Inclusion criteria included adults ≥18 years with ≥3 displaced rib fractures and/or flail chest caused by trauma, with reported ventilation duration. Exclusion criteria included non-displaced fractures, severe comorbid injuries, pregnancy, hemodynamic instability, or contraindications to surgery. Three studies met eligibility: one moderate-quality randomized controlled trial (Wang et al., 2023), one low-to-moderate-quality retrospective cohort study (Iqbal et al., 2018), and one moderate-quality retrospective cohort study (Pieracci et al., 2017). All were appraised using the Center for Evidence-Based Medicine's Critical Appraisal Worksheets.

Results: Wang et al. reported a reduction in ventilation duration with early SSRF (3.67 vs. 4.55 days; $p<0.001$). Iqbal et al. found similar results (2.0 vs. 4.8 days; $p=0.03$). Pieracci et al. observed no significant univariate difference ($p=0.25$), but adjusted analysis showed each additional day of surgical delay increased the odds of prolonged ventilation by 27% (OR 1.27, 95% CI 1.12–1.43, $p<0.01$).

Conclusion: Early SSRF may reduce ventilation duration and related complications in appropriately selected trauma patients. Further multicenter randomized trials are needed to confirm optimal timing and long-term outcomes.

19**. Madison Bohlken**

Single-dose vs Multi-dose Quadrivalent HPV Vaccinations in Preventing Cervical Cancer in Young Females

Background: Cervical cancer is the second most common cancer in women under 65 worldwide and a leading cause of cancer-related mortality. The quadrivalent HPV vaccine (types 6, 11, 16, 18) effectively prevents oncogenic HPV infection, yet multi-dose regimen adherence remains a barrier. This review evaluates whether a single dose provides comparable protection to two- or three-dose schedules in females aged 9-26 years.

Objective: The objective of this study was to determine the efficacy of a single dose of quadrivalent HPV vaccine (types 6, 11, 16, 18) compared to multiple doses when considering patients who encounter barriers to care in getting multiple doses.

Methods: PubMed and Cochrane databases (January-April 2025) were searched for studies comparing quadrivalent HPV vaccine dosing schedules. Three studies met inclusion: a multisite U.S. case-control study (2008–2014) of women aged 18–39 assessing HPV 16/18–positive cervical intraepithelial neoplasia grade 2 (CIN2+) lesions by dose, a systematic review of nine observational studies from Medline and Embase (2007–2021) evaluating HPV-related outcomes across dosing regimens, and a large Indian cohort study (2009–2019) of females aged 10–18 comparing persistent HPV infection rates by dose and to unvaccinated controls. Data were narratively synthesized and quality appraised using the Center for Evidence-Based Medicine's Critical Appraisal worksheets.

Results: Single-dose vaccination demonstrated high efficacy, frequently matching multi-dose regimens. Case-control findings showed 47% efficacy for one dose, 55% for two, and 74% for three against CIN2+ lesions. The systematic review reported protection across all schedules, with several studies showing comparable single-dose outcomes. Cohort data indicated significant single-dose efficacy over 10 years, similar to that of two doses and three doses.

Conclusion: A single quadrivalent HPV vaccine dose confers durable, high-level protection against HPV 16/18–related disease and may serve as a practical alternative in settings where completing multi-dose schedules is challenging.

20**. Madison Bowers**

Buprenorphine- Naloxone Efficacy for Withdrawal in Symptoms in U.S Adults with Kratom Use Disorder (KUD)

Background: Kratom (Mitragyna speciosa) use is increasing in the United States, with growing reports of dependence, withdrawal, and relapse. No standardized guidelines exist for managing kratom use disorder (KUD), creating a clinical gap in care. Buprenorphine, alone or combined with naloxone, has been proposed as a potential treatment based on its established efficacy in opioid withdrawal.

Objectives: To evaluate the efficacy of buprenorphine-naloxone in preventing relapse and managing withdrawal symptoms in adults with KUD.

Methods: A systematic literature review was conducted (PubMed, Trip, Google Scholar; April 6-15, 2025) using MeSH and free-text terms related to buprenorphine, naloxone, kratom, and withdrawal. Inclusion criteria encompassed adults ≥18 years and evaluated buprenorphine with or without naloxone for kratom withdrawal or relapse prevention, including case reports/series, systematic reviews, and randomized controlled trials (RCTs). Exclusion criteria included polysubstance withdrawal, serious medical or psychiatric illness, pregnancy/lactation. Studies were appraised using Centre for Evidence-Based Medicine (CEBM) criteria.

Results: Three studies met eligibility criteria: two systematic reviews and one cross-sectional study. Across 14-17 participants, buprenorphine-naloxone reduced withdrawal symptoms, cravings, and relapse risk. Most patients required lower induction doses (2-6 mg/day) than those used for opioid use disorder (OUD). Symptom relief occurred within 5-28 hours, and no adverse effects reported.

Conclusion: Buprenorphine/naloxone may be effective for withdrawal management and relapse prevention in moderate-to-severe KUD. In the absence of standardized protocols, treatment should be individualized and guided by shared decision-making. Larger, high-quality trials are needed to confirm efficacy and inform clinical guidelines.

21**. Madison Farrington**

Comparing Efficacy of Lidocaine-Prilocaine vs Placebo for Reducing Procedural Pain During IUD Insertion

Background: Despite significant pain for women undergoing IUD insertion, there is no uniform clinical recommendation to reduce procedural pain. Research into alternative pharmacotherapies which reduce procedural pain may improve comfortability with IUD insertion.

Objective: This systematic review examined if cervical application of topical lidocaine-prilocaine is effective in reducing procedural pain of IUD insertion as measured by visual analogue scales (VAS) scores.

Methods: Databases including PubMed and Google Scholar were searched from February through March of 2025. Inclusion criteria included adult women 18 years or older, pain measured using VAS, use of control group, or IUD placement either hormonal or nonhormonal. Exclusion criteria included previous vaginal delivery, contraindications for IUD insertion (pregnancy, active cervical or vaginal infections, fibroids), allergy to local anesthetic, or analgesia within 24 hours of IUD insertion. After implementing the eligibility criteria, three studies were determined to be fit for this review of literature: one meta-analysis and two randomized control trials (RCT) of moderate quality.

Results: All three studies showed a significant reduction in pain when using lidocaine-prilocaine for IUD insertion when compared to placebo.

Conclusion: Based on the research reviewed, similar efficacy was shown between the studies in reduction of pain in women undergoing IUD insertion, lidocaine-prilocaine cream may be a suitable option for pain control.

22**. Nishita Patel**

Feed to Succeed: Formula vs. Donor Milk for Optimal Premature Growth

Background: Pre-term infants have a higher risk for complications that impair growth. Optimal nutrition is critical for increasing birth weight. Studies depict maternal breast milk to be a beneficial source of nutrition in infants. However, in circumstances where breast milk is unavailable, nutrition must be obtained from other sources, typically DBM or formula.

Objective: This research depicts the impact of DBM versus formula feeding on birth weight in pre-term infants or low birth weight infants when the maternal breast milk is insufficient.

Methods: Using PubMed and Cochrane databases, a literature search was conducted from April 1st - 15th, 2025 using MeSH and free text terms. Inclusion criteria included metanalyses, randomized controlled trials, systematic reviews, preterm infants (<37 weeks' gestation), low birth weight infants (<2,500 grams), and studies in English. Exclusion criteria included congenital abnormalities, GI or neurological concerns, and small for gestational age (birthweight <10% of gestational age). Three eligible systematic reviews and metanalyses were appraised using the Center for Evidence-Based Medicine's Critical Appraisal Worksheets.

Results: Based on the limited research in low to moderate quality, formula-fed pre-term infants demonstrated a faster increase in birth weight compared to pre-term infants fed DBM.

Conclusion: In preterm infants born less than 37 weeks' gestation or at a birth weight <2,500 grams, formula feeding showed a rapid increase in birth weight compared to DBM. Before providing a recommendation on DBM versus formula for increasing birth weight, providers should consider additional benefits of each type of nutrition and consult with their obstetrician as there is limited research available.

23. **Nolan Strang**

Assessing Rotator Cuff Retear Rates Post Arthroscopic Repair with Platelet Rich Plasma Injections

Background: Rotator cuff injuries are common causes of shoulder pain seen in orthopedic practice, with surgical intervention being the definitive treatment. A major concern for the surgeon and the patient is postoperative retear rate. Research identifying supplemental treatments options which reduce the retear rate after surgical intervention would be beneficial.

Objective: This systematic review aimed to determine if intraoperative platelet rich plasma injections during arthroscopic rotator cuff repair decreased retear rates compared to no intervention.

Methods: A literature search within PubMed and Trip was conducted from March 9th, 2025 to March 14th, 2025. Search terms included platelet-rich plasma [MeSH term], AND rotator cuff repair [MeSH term], AND Retear [free text]. Publications included patients 18 years of age or older who had confirmed rotator cuff muscle injury with MRI. Studies were excluded if the patients had previous surgery to the affected shoulder, had active infections, or had a psychiatric illness or disorder. Two RCT's and one systematic review and meta-analyses were analyzed through utilizing the Center for Evidence-Based Medicine's Critical Appraisal Worksheet.

Results: Within the selected publications, the study quality ranged from low to moderate. Two studies indicated that the use of PRP injections decreased overall retear rates, though not statistically significant to indicate its effectiveness, while one study demonstrated a statistically significant reduction in retear rates.

Conclusion: Evidence on the use of intraoperative PRP injections during arthroscopic rotator cuff repair remains mixed. Although some studies suggest benefits, the current research is insufficient and inconsistent to recommend its use.

24. **Olivia Kelzer**

Video Versus Direct Laryngoscopy for Successful First Attempt Endotracheal Intubation in Neonates

Background: Intubation is one of the most performed procedures in neonates, however, approximately 50% of neonatal tracheal intubations result in severe oxygen desaturation. Multiple intubation attempts can lead to adverse outcomes due to respiratory and cardiac instability. Thus, increasing first-attempt success rates of neonatal intubation is key to decreasing morbidity and mortality in neonates.

Objective: This systemic review aimed to determine whether video laryngoscopy (VL) or direct laryngoscopy (DL) increases first-attempt success rate with endotracheal intubation of neonates.

Methods: A database search of PubMed and Trip was conducted between March 1, 2025, and May 1, 2025. Inclusion criteria were systemic reviews, meta-analyses, randomized controlled trials (RCTs), and cohort studies that directly compared VL to DL involving neonates (ages birth to one month). Studies with non-human participants were excluded. Additionally, research was published within the past seven years and in English language.

Results: Three studies met the inclusion criteria for this systematic review: a low-to-moderate quality RCT by Tippmann et al., a moderate-quality RCT by Geraghty et al., and a moderate-to-high quality systematic review and meta-analysis by Kuitunen et al. Centre for Evidence Based Medicine's critical appraisal tools were used to assess the quality of each study. Both Geraghty et al. and Kuitenen et al. demonstrated improved first-attempt intubation success rates with VL compared to DL, while Tippmann et al. reported no significant difference in first-attempt success rate between the two.

Conclusion: Results suggest that VL improves first-attempt success rates compared to DL, though this varied across studies.

25. **Pardis Shahamat**

Letrozole vs. Methotrexate in Women Diagnosed with Tubal Ectopic Pregnancy

Background: EP is the leading cause of first-trimester maternal death, requiring prompt intervention. MTX is the standard medical treatment for stable EP, but its use is limited by contraindications and the recommendation to defer the timing of future conception attempts. LTZ poses an alternative by inhibiting the required trophoblastic response to progesterone for maintaining early pregnancy, which might offer benefits to patients who are ineligible for MTX.

Objective: This systematic review aimed to determine the efficacy of LTZ to MTX in the treatment of tubal EP, measured by negative serum beta-hCG.

Methods: A literature search was conducted in PubMed and Google Scholar from February to April 2025 using the search terms ("Pregnancy, Ectopic"[Free text]) AND "Letrozole"[Free text]. Eligible studies included females aged 19-44 diagnosed with tubal EP eligible for medical management, and designed as meta-analyses, systematic reviews, randomized controlled trials (RCT), or prospective cohort studies. Exclusions were hemodynamic instability, need for surgical management, alternative therapies, or serum beta-hCG > 3,000 mIU/mL. An RCT, a meta-analysis and systematic review, and a prospective cohort study were analyzed with the Center for Evidence-Based Medicine's (CEBM) Critical Appraisal Worksheets.

Results: Within the selected publications, LTZ showed comparable success rates to MTX (65-90%) with some studies showing a faster decline in beta-hCG and a more favorable laboratory profile. Study quality ranged from low to high.

Conclusion: Current evidence suggests that LTZ is comparable to MTX in the treatment of stable EP. This option may be beneficial for patients with urgent fertility goals or contraindications to MTX; however, methodological variation, bias, and small sample sizes limit definitive conclusions.

26. **Sidney Ayers**

Hydrocortisone Versus Tacrolimus for Moderate to Severe Atopic Dermatitis in Pediatric Patients

Background: Atopic dermatitis (AD) affects millions of Americans each year; however, there is limited recent research of pharmaceutical options available for the management of AD in pediatric patients. Research into therapies used for AD in pediatric patients may expand options to improve treatment success rates.

Objective: This systematic review assessed the efficacy of tacrolimus versus hydrocortisone in the management of AD in the pediatric population in terms of eczema area and severity index scores (EASI).

Methods: Databases including PubMed, Trip, and Cochrane were searched from January 2025 to February 2025. Inclusion criteria included research published within 10 years, 18-year-olds and younger, outpatient, randomized control trial (RCT), systematic analysis, meta analysis, topical tacrolimus (1% or 0.03%), low-medium potency steroid (hydrocortisone 1%, desonide 0.05%, triamcinolone acetonide 0.1%, or fluticasone 0.05%), baseline and follow-up EASI scores. Exclusion criteria included adult-only participants/no separate pediatric subgroup data, high potency topical steroids (betamethasone dipropionate 0.05%, mometasone furoate 0.1%, clobetasol), and animal studies. After applying the eligibility criteria, three studies met eligibility for inclusion: two moderate-quality RCTs and one high-quality RCT. Each study was evaluated based on randomization methods, blinding, attrition rates, population homogeneity, and risk of bias.

Results: Three studies were deemed appropriate for the systematic review: a moderate quality randomized controlled study (RCT) by Salava et al, a moderate quality RCT by Perälä et al, and a high quality RCT by Mohamed et al. All three studies showed improvement in EASI scores with the use of tacrolimus or hydrocortisone without there being a significant difference in efficacy between the two topicals.

Conclusion: All three studies indicated similar efficacy in improving EASI scores with tacrolimus or hydrocortisone; therefore, both could be suitable for treatment of atopic dermatitis in pediatric patients.

27**. Taylor Evans**

Improving Diagnostic Efficiency: Age-Adjusted vs. Conventional D-dimer Thresholds in Pulmonary Embolism

Background: D-dimer testing is widely used to exclude pulmonary embolism in patients with low or intermediate clinical probability. However, D-dimer levels increase with age, reducing the specificity of a fixed threshold in older adults and leading to unnecessary imaging. An age-adjusted D-dimer threshold has been proposed to improve diagnostic efficiency.

Objective: This study was initiated to review current literature regarding the efficacy of age-adjusted D-dimer threshold compared to conventional D-dimer in ruling out pulmonary embolism in adults greater than 50 years old.

Methods: PubMed and Trip databases were searched from March 2025 to April 2025 for prospective studies and systematic reviews. Inclusion criteria involved adults and elderly 18 years of age and older with suspicion of PE with low to intermediate probability. Case studies, abstracts, and reviews were excluded. A prospective management outcome study, a prospective validation study, and a systematic review and individual patient meta-analysis comprised this review.

Results: Data from the three studies indicated an increase in efficiency when utilizing AADD threshold.

Conclusion: While research is ongoing, the results of this review suggest AADD thresholds improve the efficiency of PE diagnosis in adults greater than 50 years old and may provide benefit if integrated into the clinical decision algorithm for patients with suspected PE and low to intermediate clinical probability.

28**. Tegan Schneider**

Efficacy of Autologous Platelet-Rich Plasma Versus Conventional Wound Care in Healing Adult Diabetic Foot Ulcers

Background: Diabetes mellitus is a prevalent chronic condition in the United States with rising incidence. Diabetic foot ulcers (DFUs) are serious complications associated with significant morbidity and mortality. Conventional wound care (CWC) is the standard treatment for DFUs, but healing is often slow, increasing risks of infection and amputation. Ongoing research to find effective alternative treatments is essential to improve DFU management.

Objective: This systematic review aimed to assess the efficacy of autologous platelet-rich plasma (Au-PRP) versus CWC in the treatment of adults with DFUs.

Methods: A literature search within PubMed and Trip was conducted from March 2025 through April 2025. Search terms included diabetic foot ulcer/diabetic foot [MeSH term], platelet-rich plasma [MeSH term], standard OR conventional wound care. Eligible studies were randomized control trials (RCTs) or systematic reviews with meta-analyses involving adults with chronic DFUs, use of Au-PRP, and comparison to CWC. Studies with mixed ulcer types or publications over five years ago were excluded. Two systematic reviews with meta-analyses and one RCT were analyzed through utilization of the Center for Evidence-Based Medicine's Critical Appraisal Worksheets.

Results: The selected publications encompassed 2,681 adult participants (Au-PRP= 1,426, CWC= 1,255), and publication quality ranged from low to moderate. Across studies, Au-PRP significantly reduced DFU healing duration compared to CWC.

Conclusion: The data suggests that Au-PRP is an efficacious treatment for DFU management. However, the low-to-moderate quality of the included studies limits the validity of results. Further high-quality research is warranted before Au-PRP can be implemented as standard DFU treatment.

29. **Thea Mauck**

Circulating Tumor DNA to Predict Overall Survival in Advanced Ovarian Cancer

Background: Ovarian cancer (OC) is the deadliest gynecologic cancer due to the absence of alarming symptoms and the lack of accurate biomarkers to quantify progression. Research using genetic material to monitor and detect cancer has been revolutionary for lung cancers and prostate cancers. If a similar test was available for ovarian cancer, it would be revolutionary.

Objective: This systematic review (SR) assesses the capability of using circulating tumor DNA (ctDNA) to accurately predict the progression of advanced ovarian cancer in adult women.

Methods: Databases, including PubMed and TRIP were searched from March 2025 to April 2025. Inclusion criteria included using ctDNA with no limitation on assay type and finding overall survival as hazard ratio (HR). Exclusion criteria included research involving other gynecologic malignancies, studies with solely progressive-free survival outcomes, and studies measuring “cfDNA” or “CTCs”. After applying this criteria, three studies were identified as appropriate: one meta-analysis (MA) of low to moderate quality, one SR with MA of moderate to high quality, and one randomized controlled trial (RCT) of moderate quality. Each study was analyzed using the Center for Evidence-Based Medicine’s critical appraisal tools assessing for randomization, blinding, homogenous demographics, method heterogeneity, and bias.

Results: Two articles, the MA and SR with MA, showed decreased overall survival with detection of ctDNA, while the RCT resulted in “no ctDNA” having a better prognosis of overall survival for patients with ovarian cancer. There were similar results throughout all three articles, but heterogeneity between methodologies and population demographics.

Conclusion: Therefore, while ctDNA shows promise as a prognostic tool, further research is required to determine its standardized role in clinical practice.

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