PULSE EXPERIENTIAL TEAM ASSIGNMENT

1. Title of your PULSE experiential assignment. *Provide a creative and informative title.*
Navigating the Pathophysiology and Impact of Kidney Stones
2. Please summarize your PULSE experiential assignment (max 300 words). *Provide a non-technical (lay) summary of your PULSE assignment. Prompts to think about: What is the topic? What is the format? Why did you choose this topic and format? The summary for lay audience is a brief and accessible summary of the assignment that is used to explain complex ideas, technical writing and scientific terms to people who do not have prior knowledge of the subject (e.g., high school science level). This summary should include the importance, impact, and content of your assignment to a broader audience.* *[Team 23 is an example of an informative lay summary.]*
Kidney stones, or urolithiasis, are solid pieces of material that form in the kidneys when high levels of certain minerals are present in the urine. This assignment explores how these "stones" develop from tiny crystals into obstructions that can cause significant pain and organ damage. We chose this topic because kidney stones are a common yet complex condition that perfectly illustrates several core pathology concepts: inflammation, obstruction, and infection. Our project is presented as an infographic to make these complex medical processes visually accessible to a high school-level audience. By breaking down the different types of stones, such as calcium oxalate or uric acid, and explaining the "behind-the-scenes" physics of crystal formation, we aim to show how environmental factors (like diet) and physiology (like genetics) collide to cause disease. Most importantly, the infographic highlights the "hidden" dangers, such as hydronephrosis (swelling of the kidney due to urine backup), which can lead to chronic kidney issues if left untreated.
3. Provide up to 6 keywords relevant to your PULSE experiential assignment. *3-6 keywords are ideal.*
Urolithiasis, Nephrolithiasis, Hydronephrosis, Crystal Aggregation, Renal Obstruction.
4. Identify the course topic with which your PULSE assignment most aligns. *Refer to the various topics outlined under ‘Course content and Schedule’ in the syllabus (e.g. Inflammation).*
This assignment most closely aligns with the course topics of Obstruction, Inflammation, and Kidney Damage.
5. What are the learning outcomes? *There should be a minimum of 2 learning outcomes for your assignments. For further information on learning outcomes, the Centre for Teaching and Learning offers information: https://teaching.uwo.ca/curriculum/coursedesign/learning-outcomes.html*

Students will be able to differentiate between the primary types of kidney stones and identify their unique risk factors. Students will be able to explain the pathophysiological sequence from crystal formation to renal obstruction and subsequent hydronephrosis.
6. Why did the team select the chosen topic and the medium? How will the topic and medium of choice help learners?
We chose kidney stones because they clearly demonstrate how physical obstruction leads to secondary pathological changes. The infographic medium helps learners by breaking down technical processes, like the chemical stages of stone growth,into a linear, visual flow that is easier to remember than dense textbook descriptions .
7. Did the team use an artificial intelligence (AI) technology tool? If so, which AI technology tool(s) did the team use? What other technology tools did the team use? Is the technology tool novel? Is the team using this technology tool in a novel fashion? If the team did not use technology tool, why did the team decide against using the technology tool(s)? *Please include details (e.g., for what purpose was the tool used for? Why was the tool the best tool to use for your assignment? Are there alternative tools that were considered?)*
Yes, the team used **Gemini** to refine the lay summary and **Claude** to generate specific icons for the different stone types. These tools were selected to ensure the tone was appropriate for a non-technical audience and to create unique visuals that improve student engagement.
8. How is your PULSE experiential assignment innovative and/or novel? *Describe what about the PULSE assignment is innovative/novel. Is there a particular component or content that is innovative/novel? How is it different from other content that already exists?*
The assignment is innovative because it organizes stone types not just by frequency, but by their specific environmental triggers (e.g., acidic vs. alkaline urine). It uses a "stepped" visual approach to pathophysiology, making the microscopic chemical process of nucleation visible to the reader.
9. If you used an AI tool, please copy and paste the prompt(s)/question(s) used along with the output(s)/answer(s) from the AI tool. *The response here is to allow others to replicate the team's work. If the prompts/outputs are lengthy (over 1 page), please attach it as a separate document and note below [Please see attached document].*
Prompt: "What is the best design and layout for a clinical kidney stone infographic intended for a lay audience?" Output: A 7-section vertical layout including sections for definition, symptoms, causes, pathophysiology, diagnosis, treatment, and complications. The design uses a

professional teal and amber color scheme with clinical icons like CT scanners and kidney diagrams. Prompt: "Summarize the three-step chemical process of kidney stone formation for a high-school science level." Output: 1. Supersaturation: Urine contains more minerals than it can dilute. 2. Nucleation: Minerals stick together to form tiny crystals. 3. Aggregation and Growth: Crystals grow into solid stones that block urine flow. Prompt: "What are the best clinical and lay-audience resources to use for a pathology assignment on urolithiasis?" Output: The team utilized Healthline for simple comparisons of stone types , Mayo Clinic for clinical symptoms and diagnostic standards, and StatPearls for detailed biochemical pathophysiology. Prompt: "Provide ideas for practice questions to include in the infographic footer." Output: Questions focused on identifying the most common stone type (calcium oxalate) and recognizing symptoms like renal colic.
10. If you did not use an AI tool, please attach a copy of the team's notes to the assignment. *The response here is to allow others to observe the 'behind the scenes' team's work.*
11. How did the team ensure the veracity of the information presented in the PULSE assignment? *The response should highlight how the team has ensured that the information presented in the assignment is evidence-based and not spreading misinformation. You should specifically mention which databases (if any) or textbook materials you used, and how you kept track of the sources/references for each claim. If AI provided you with false information, please describe how the team has fact-checked the AI response and the legitimate (scientific) sources you used. A reference document should be provided in the reference section (15. References) below. Please ensure to include in-text citations in your assignment where applicable.*
Evidence-Based Pathophysiology: We utilized StatPearls to verify the microscopic mechanics of stone formation, specifically the three-step chemical sequence of supersaturation, nucleation, and aggregation.

Clinical Accuracy: All clinical information regarding symptoms (like renal colic), diagnostic "gold standards" (non-contrast CT scans), and treatment procedures (like Lithotripsy) was cross-referenced with the Mayo Clinic guidelines to ensure evidence-based accuracy.

Lay-Audience Categorization: To ensure our descriptions were accessible without losing scientific validity, we used Healthline's medically reviewed charts to categorize the four main stone types: Calcium Oxalate, Struvite, Uric Acid, and Cystine, and their specific dietary or genetic triggers.

Fact-Checking Protocol: Every output generated by AI tools was manually compared against these three vetted sources to identify and correct any potential misinformation or technical hallucinations.

12. Write a meaningful team reflection about the PULSE session (max 250 words).

Prompts to help your team write the reflection: Were there any team/individual biases that surfaced when creating content for the assignment? Did the team implement any practices to ensure the content was equitable, diverse, and/or inclusive? How has the PULSE assignment helped with the team's learning? If the team had to estimate, how long did the assignment take? What worked well for your team? What would the team do differently next time? What were the opportunities and challenges with creating the PULSE assignment to help others' learning? Were there any barriers or limitations?

Reflection: Our team, Othman and Hussain, collaborated by dividing the assignment into sections based on our research strengths. The main challenge was selecting a single topic from many interesting pathology concepts, but we ultimately chose kidney stones because of their clear connection to obstruction and inflammation. We worked to ensure the content was inclusive by using "lay" language that avoids overly

complex jargon, making the health risks clear to anyone regardless of their medical background. This project helped our learning by forcing us to simplify the chemical mechanics of supersaturation without losing clinical significance. We estimated that the project took 12 hours. Next time, we would start the visual design phase earlier to allow for more iterations on the pH spectrum graphic.
13. Write the contributions of individual team members using unique initials. *Example: All team members contributed to the design of the prompts used in the technology tool, ChatGPT (GPT-3.5). T.K and T.K2 fact checked the information presented by ChatGPT using published literature on PubMed (PMID 29211319, 32477271). Y.Z finalized and formatted the final infographic and compiled the prompts and outputs. P.E was involved in…*
O.A. led research on stone overview, pathophysiology, and the treatment sections. H.A. led research on clinical presentation, etiology/types, and complications. Both members collaborated on AI prompt design and the final layout in Canva.
14. Other comments (Optional) *Any comments the team would like to let the coordinator and/or TAs know.*

15. References

Please provide a numbered reference list with Nature citation style. [Please feel free to use citation management software (i.e., free citation manager, e.g., Zotero and Mendeley)]

References:
1-Healthline. Types of kidney stones: chart, comparison, and treatment [Internet]. Healthline Media; [cited 2025]. Available from: https://www.healthline.com/health/types-of-kidney-stones-chart Thakore P, Liang TH.
2-Mayo Clinic. Kidney stones [Internet]. Rochester (MN): Mayo Foundation for Medical Education and Research; [cited 2024 May 22]. Available from: https://www.mayo.edu/research/departments-divisions/department-urology/research/kidney-stones
3-Urolithiasis. [Updated 2023 Jun 5]. In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2026 Jan–. NCBI Available from: https://www.ncbi.nlm.nih.gov/books/NBK559101/

16. Annotated Bibliography

1. Thakore, P. & Liang, T. H. Types of kidney stones: chart, comparison, and treatment. Healthline (2025).

This article provides a clear breakdown of the four primary types of kidney stones: calcium oxalate, uric acid, struvite, and cystine. It compares the causes of each stone, such as dietary oxalate intake versus chronic urinary tract infections, and provides a simplified chart of treatment options ranging from home hydration to surgical intervention. Healthline is a reputable consumer health resource that undergoes medical review by professionals to ensure accuracy. While it is written for a general audience, its structured comparison of stone types is highly reliable for categorizing disease etiology. This source was essential for our "Etiology and Types" box in the infographic. We used the data to explain the percentages of stone prevalence (e.g., 80% for calcium stones) and to ensure our descriptions of the different stone types were accessible to our high-school-level lay audience.

2. Mayo Clinic. Kidney stones. Mayo Foundation for Medical Education and Research (2024).

This clinical resource covers the full spectrum of nephrolithiasis, including common symptoms like renal colic and hematuria, diagnostic procedures like CT scans, and various medical treatments. It also offers a deep dive into risk factors such as dehydration, obesity, and digestive diseases that increase mineral absorption. As a world-leading academic medical center, the Mayo Clinic provides highly credible, evidence-based information that is updated regularly to reflect current clinical standards. Its strength lies in bridging the gap between complex pathology and patient-centered care. We utilized this source to draft the "Presentation," "Diagnosis," and "Treatment" sections of our infographic. It ensured that our descriptions of "silent stones" and the "gold standard" of CT imaging were medically accurate and aligned with contemporary urological practices.

3. Thakore, P. & Liang, T. H. Urolithiasis. In StatPearls (StatPearls Publishing, 2026).

This peer-reviewed professional resource provides an in-depth look at the biochemical pathophysiology of urolithiasis. It specifically details the three-step chemical process of stone formation: the initial supersaturation of urine, the nucleation of minerals into tiny crystals, and the eventual aggregation and growth of those crystals into obstructing masses. StatPearls is a highly technical, PubMed-indexed resource used primarily by medical professionals and students. Its peer-reviewed nature makes it the most authoritative source in our bibliography for explaining the microscopic mechanisms of disease. This source was the foundation for our "Pathophysiology" section. It allowed us to accurately describe the sequence of crystal formation and supported the "Complications" section by explaining how a physical blockage leads to hydronephrosis and potential long-term kidney damage.