

## PODCAST CAPSULE SUMMARY

## Evidence-based Emergency Medicine

# Urine pregnancy testing: When does no mean maybe?

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**Funding and support:** By *JACEP Open* policy, all authors are required to disclose any and all commercial, financial, and other relationships in anyway related to the subject of this article as per ICMJE conflict of interest guidelines (see [www.icmje.org](http://www.icmje.org)). The authors have stated that no such relationships exist.

See related article: Kleinschmidt S, Dugas JN, Nelson KP, Feldman JA. False negative point-of-care urine pregnancy tests in an urban academic emergency department: a retrospective cohort study. *JACEP Open*. 2021;2(3):e12427. <https://doi.org/10.1002/emp2.12427>

Qualitative urine pregnancy testing (UPT) is widely used in the emergency department and is thought to be a reliable test with reported sensitivities and negative predictive values as high as ~100%.<sup>1</sup> Despite the heavy reliance on this test for a variety of clinical decisions, a recent paper in *JACEP Open* by Kleinschmidt et al. sheds some light on potential pitfalls associated with UPT and challenges our use of this tool.

**“What can we hang our hat on?”**

Generally, there are 2 potential reasons why a patient could experience a falsely negative UPT. The first and likely most common situation involves a case of early pregnancy when a pregnant patient may not produce enough human chorionic gonadotropin (hCG) to trigger a positive test, a threshold that reportedly ranges from 15 to 100 mIU/mL.<sup>2</sup> The potentially more concerning scenario involves patients who are further along in their pregnancy and experience what has been called the “hook effect” describing a situation where elevated or excessive levels of hCG essentially overwhelm the UPT, resulting in a false negative. In early stages of pregnancy these patients may have a true positive UPT but as pregnancy progresses and levels of hCG increase subsequent UPTs are falsely negative.

Although the theoretical causes of falsely negative UPT are understood, the clinical impact of these issues remains unclear. Griffey et al. reported a false negative UPT rate of 0.34% with the vast majority of patients reporting having previously had a positive pregnancy test. In

this patient population, once cases of early pregnancy with serum hCG levels below the 25 IU/mL threshold for UPT detection were excluded, the actual false negative rate was 0.19%.<sup>3</sup>

In a research abstract that was published in 2015, Woo et al. reported a false negative rate of ~11% including 11 cases of new ectopic pregnancies. Although this reported rate is higher than previously reported, it does not fully depict the potential limitations associated with UPT. In this study only ~9% of patients had both urine and serum testing performed meaning that out of over 12,000 patient encounters a falsely negative UPT was detected in only 137 or ~1% of cases.<sup>4</sup>

Recently in *JACEP Open*, Kleinschmidt et al. found an overall false negative rate of ~1.6% out of over 11,000 patient visits. Interestingly in a subset of patients with “high-risk complaints,” including pain, cramping, pelvic pain/cramping, and vaginal bleeding, the false negative rate was ~3.6%.<sup>5</sup> The authors reported 12 ectopic pregnancies in patients with negative UPT with 83% of cases occurring in the high-risk group. Similarly, the authors reported that ~75% of all “abnormal pregnancies” occurred in this high-risk group.

**“Blood Doesn’t Lie.”**

Although UPT have clear limitations from a resource use standpoint they are inexpensive, widely accessible, and have been associated with decreased ED length of stay when compared to serum testing.<sup>6</sup> Rather than abandoning these tests completely, we should pause and risk stratify patients anytime we are asking ourselves “*could this patient be*

Supervising Editor: Henry Wang, MD, MS

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pregnant?" When used as a simple screening test for example before a radiology study, the reported false positive rate may be acceptable, as an erroneous test result would be unlikely to result in any actual harm. On the other hand, in a situation where a false negative result could result in a missed ectopic pregnancy or other potentially ominous outcome, we need to recalibrate our reliance on UPT. Common sense should be able to help us reasonably identify situations where UPT alone is not adequate. Previous studies have shown that the vast majority of false negative UPT occurred in patients who had previously had a positive pregnancy test. As reported by Kleinschmidt et al., the false negative rate is much higher in patients with a broad range of reported high-risk complaints. UPT may continue to play an important role in the ED, yet if a patient reports a previously positive pregnancy test and/or has symptoms concerning for possible pregnancy complications, UPT alone does not perform well enough to make potentially high-risk clinical decisions. In a clinical situation where it is potentially crucial to determine if a patient is pregnant, clinicians should not rely on a UPT and should have a low threshold to order a serum hCG test.

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**How to cite this article:** DeLaney M, Wood L. Urine pregnancy testing: When does no mean maybe? *JACEP Open.* 2021;2:e12567. <https://doi.org/10.1002/emp2.12567>