

PARTNER PERSPECTIVES

Antifungal Resistance in Vulvovaginal Candidiasis (VVC) Infections, Alternative Treatment Options

By Jessica Shepherd, MD, MBA, FACOG

Antifungal resistance of *Candida* species is an emerging issue in the treatment of fungal infections, which is becoming increasingly prevalent.¹ Although *C albicans* is the most common species isolated in fungal infections, other species are often identified, such as *C glabrata* and *C parapsilosis*.² These 3 species are thought to cause more than 95% of vulvovaginal infections. The non-*albicans* species may also be more resistant than standard treatments, which can lead to recurrent vulvovaginal candidiasis (VCC). This can lead to chronic recurrence of infections and significant impact to these patients.³

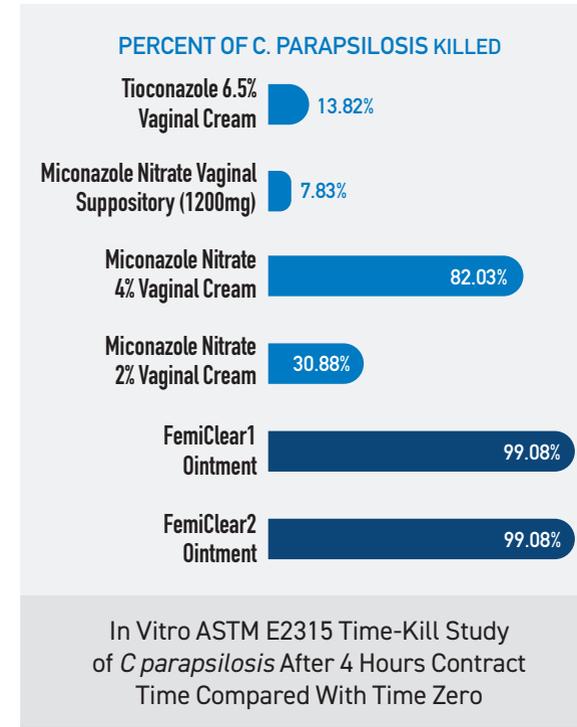
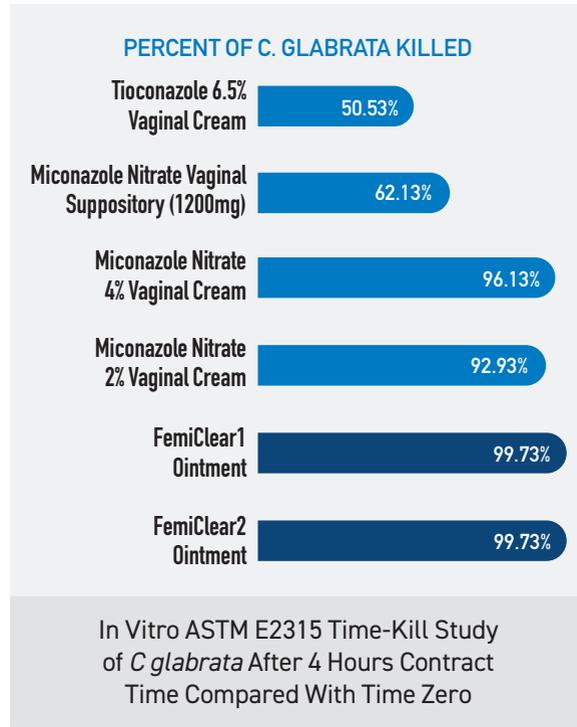
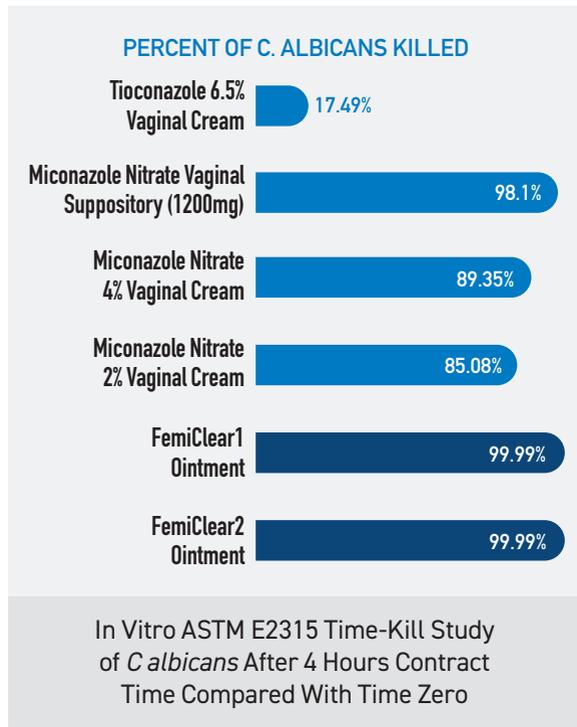
Studies have shown resistance to antifungals in the azole family for non-*albicans* species:

- In vitro studies have shown *C tropicalis* and *C glabrata* are 10 times less sensitive to miconazole than *C albicans*⁴
- In 1 US study, over 4 years, *C glabrata* was isolated in 28% of candidemia cases and *C parapsilosis* was isolated in 15% of candidemia cases⁵
- A separate Italian study over a 5-year period found similar trends: *C glabrata* was isolated in 15% of candidemia cases and *C parapsilosis* was isolated in 23% of candidemia cases⁶



OrganiCare makes highly effective health care products that contain only natural ingredients. Founded in 2016 in Austin, Texas, OrganiCare has quickly become a leader in transforming the natural health care products industry, establishing a new

benchmark in scientific rigor to prove efficacy in all its products, a unique proposition in natural health care. This women-led company offers a range of award-winning products under the CUROXEN and FemiClear brands, which are distributed in many national and regional drug, mass, food, and e-commerce retailers. FemiClear is a line of all-natural and highly effective products that treat yeast infections, vaginal itching and genital herpes symptoms.



In addition, recent studies have demonstrated a shift in the source of many VVC infections from *C albicans* to non-*albicans* species.⁷ The Centers for Disease Control and Prevention (CDC) has stated that doctors should take caution when prescribing antifungal drugs and be aware of resistance patterns and note dose, duration, and indication for every antifungal prescription. Given the increased concern for antifungal resistance of *Candida* from the CDC,⁸ additional treatment options outside of the azole family for simple VVC infections are important in addressing this trend.

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FemiClear 1 Day and FemiClear 2 Day In Vitro Testing

Two new over-the-counter, affordable products that contain only natural ingredients and nothing

from the azole family of drugs were recently studied. These products were developed for VVC infections and evaluated in vitro by an accredited laboratory, according to the ASTM E2315 time-kill method. The test method allows a standardized and controlled method to compare the time-kill kinetics of various products to *Candida* species. The reduction in *Candida* over a fixed time can be attributed to the test sample, and a resulting percent reduction is calculated. The new FemiClear 1 Day and FemiClear 2 Day products were compared with various over-the-counter products that contain standard azole drugs for percent reduction of *C albicans*, *C glabrata*, and *C parapsilosis* in a 4-hour time-kill study. For each *Candida* species, each FemiClear product killed more than the standard azole drug products.

Conclusions

The in vitro laboratory results demonstrated that FemiClear 1 and FemiClear 2 showed the same high level (>99%) of reduction for all 3 *Candida* species: *C albicans*, *C glabrata*, and *C parapsilosis*. These in vitro results may not be indicative of results in humans. For the treatment of simple yeast infections, FemiClear over-the-counter products should be considered, given their broad-spectrum fungicidal activity on several *Candida* species.

FemiClear 1 Day and FemiClear 2 Day showed the same high level (>99%) of reduction for 3 *Candida* species: *C albicans*, *C glabrata*, and *C parapsilosis*.

REFERENCES

- Zhang JY, Liu JH, Liu FD, et al. Vulvovaginal candidiasis: species distribution, fluconazole resistance and drug efflux pump gene overexpression. *Mycoses*. 2014;57(10):584-591. doi:10.1111/myc.12204

- Makanjuola O, Bongomin F, Fayemiwo SA. An update on the roles of non-*albicans Candida* species in vulvovaginitis. *J Fungi*. 2018;4(4):121. doi:10.3390/jof4040121
- Rosati D, Bruno M, Jaeger M, Ten Oever J, Netea MG. Recurrent vulvovaginal candidiasis: an immunological perspective. *Microorganisms*. 2020;8(2):144. doi:10.3390/microorganisms8020144
- Ringdahl EN. Treatment of recurrent vulvovaginal candidiasis. *Am Fam Physician*. 2000;61(11):3306-3317.
- Toda M, Williams SR, Berkow EL, et al. Population-based active surveillance for culture-confirmed candidemia—four Sites, United States, 2012–2016. *MMWR Surveill Summ*. 2019;68(8):1-15. Published correction appears in *MMWR Morb Mortal Wkly Rep*. 2019;68(41):934. doi:10.15585/mmwr.ss6808a1
- Bassetti M, Righi E, Costa A, et al. Epidemiological trends in nosocomial candidemia in intensive care. *BMC Infect Dis*. 2006;6:21. doi:10.1186/1471-2334-6-21
- Richter SS, Galask RP, Messer SA, Hollis RJ, Diekema DJ, Pfaller MA. Antifungal susceptibilities of *Candida* species causing vulvovaginitis and epidemiology of recurrent cases. *J Clin Microbiol*. 2005;43(5):2155-2162. doi:10.1128/JCM.43.5.2155-2162.2005
- Antifungal Resistance in *Candida*. Centers for Disease Control and Prevention. Updated May 18, 2020. <https://www.cdc.gov/fungal/diseases/candidiasis/antifungal-resistant.html>

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Shepherd attended medical school at Ross University and completed her residency at Drexel University-Hahnemann Hospital in Philadelphia, Pennsylvania. She went on to complete a Minimally Invasive Gynecologic Fellowship at the University of Louisville, where she also earned her MBA. She also served as the Director of Minimally Invasive Gynecology at the University of Illinois for 6 years.

Shepherd's passion for women's health—from minority health disparities to reproductive justice issues—has led her to speaking engagements at events ranging from WELL Summit to the 2020 Women's March in New York, New York.

FemiClear is a line of over-the-counter products that are science backed, highly effective, and made with all-natural and organic ingredients to treat yeast infections, vaginal itching and genital herpes symptoms. You can find FemiClear product in CVS, Walgreens, Rite Aid, Walmart and other major retailers across the U.S.

The results described herein are based on testing performed by an independent accredited lab performing an in vitro (non-human/non-animal) time kill study to measure the amount of *C. albicans*, *C. glabrata* and *C. parapsilosis* that was killed. Claims based on clinical and/or in vitro laboratory (non-human/non-animal studies), and traditional homeopathic practice (not accepted clinical medical evidence; not FDA evaluated).

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