

GSM & SEXUAL WELLNESS SERIES — GUIDE 02

The Vaginal Microbiome

What Changes at Menopause and How to Restore It

Your vaginal microbiome is a living ecosystem that depends on estrogen to stay balanced. When estrogen declines, the protective bacteria that kept you healthy for decades start to disappear — and the consequences extend far beyond what most women are ever told.

By Dr. Cyrus, MD | February 2026 | 14 min read

Your Vaginal Microbiome: A Primer

90%+

Lactobacillus dominance in a healthy vaginal microbiome

3.5–4.5

Healthy vaginal pH — more acidic than lemon juice

5

Community State Types (CSTs) — your microbiome 'fingerprint'

The vaginal microbiome is unlike any other microbial community in your body. While your gut thrives on diversity — hundreds of species working together — your vagina is the opposite. A healthy vaginal microbiome is dominated by a single genus: *Lactobacillus*.

These bacteria ferment glycogen (a sugar stored in vaginal cells) into lactic acid, which keeps your vaginal pH in the protective range of 3.5 to 4.5. This acidic environment acts as a natural defense shield — preventing colonization by harmful bacteria, yeast, and even sexually transmitted pathogens.

Scientists have classified the vaginal microbiome into five Community State Types (CSTs), each defined by the dominant bacterial species. Four of these are *Lactobacillus*-dominant and associated with vaginal health. The fifth — CST IV — lacks *Lactobacillus* and is associated with infections, inflammation, and disease.

The Five Community State Types

CST I

L. crispatus

Most protective. Stable acid environment. Lowest BV & UTI risk.

CST II

L. gasseri

Protective. Less studied but associated with good vaginal health.

CST III

L. iners

Variable. Can shift to dysbiosis. Less lactic acid production.

CST V

L. jensenii

Protective. Less common. Associated with healthy microbiome.

CST IV

Mixed anaerobes

Dysbiotic. *Gardnerella*, *Prevotella*. Linked to BV, infections, inflammation.

CST I (L. crispatus-dominant) is considered the gold standard. Women with CST I microbiomes have the lowest rates of bacterial vaginosis, UTIs, and vaginal inflammation. This is the profile that estrogen therapy helps restore.

What Menopause Does to Your Microbiome

Here's the chain reaction that nobody explains: When estrogen drops at menopause, everything downstream collapses.

Premenopausal

Lactobacillus-Dominant

- **pH 3.5-4.5**
Acidic, protective
- **90%+ Lactobacillus**
Produces lactic acid
- **High glycogen**
Estrogen-driven fuel
- **Low diversity**
Healthy = less diverse
- **Strong barrier**
Thick epithelium
- **Pathogen-resistant**
Natural defense

Postmenopausal

Lactobacillus-Depleted

- **pH 5.0-7.0+**
Alkaline, vulnerable
- **Low Lactobacillus**
Cannot maintain acidity
- **Low glycogen**
Estrogen gone = no fuel
- **High diversity**
The 'menopause paradox'
- **Thin barrier**
Atrophic epithelium
- **Pathogen-prone**
UTIs, BV, infections

Scientists call this the "menopause paradox" — as your vaginal microbiome becomes more diverse, it actually becomes less healthy. In almost every other body site, microbial diversity is a sign of health. In the vagina, it's the opposite. Diversity means Lactobacillus has lost its dominance and opportunistic pathogens have moved in.

The mechanism is straightforward: estrogen drives glycogen accumulation in vaginal epithelial cells. Glycogen is the fuel Lactobacillus needs to produce lactic acid. No estrogen → no glycogen → no Lactobacillus → no lactic acid → rising pH → pathogen colonization → symptoms and infections.

Circulating estrogen drops from over 120 pg/mL to less than 10 pg/mL at menopause. The vaginal epithelium thins from multiple layers to just basal and parabasal cells, and the protective mucus layer disappears.

Unlike hot flashes, which often improve on their own over time, microbiome changes are progressive and do not reverse without treatment. The tissue damage worsens the longer it goes unaddressed.

The Gut–Vagina Connection: Your Estrobolome

60+

Bacterial genera in the gut that can metabolize estrogen

2–Way

Estrogen shapes your gut microbiome and your gut shapes estrogen levels

2011

Year the 'estrobolome' was first defined in scientific literature

The connection between your gut and your vaginal microbiome is one of the most exciting areas of women's health research. Inside your intestines lives a specialized collection of bacteria called the estrobolome — bacteria that produce enzymes (particularly beta-glucuronidase) capable of reactivating estrogen.

Here's how it works: Your liver deactivates estrogen by conjugating it — essentially tagging it for excretion. This deactivated estrogen gets excreted in bile into your intestines. But your estrobolome bacteria can undo this tagging, freeing the estrogen to be reabsorbed back into circulation. This process — enterohepatic circulation — is a significant source of circulating estrogen, especially after menopause when ovarian production has ceased.

1**Liver**

Estrogen conjugated (deactivated) in liver, excreted in bile

2**Gut Bacteria**

Estrobolome enzymes (beta-glucuronidase) reactivate estrogen

3**Bloodstream**

Free estrogen reabsorbed into circulation

4**Vaginal Tissue**

Estrogen drives glycoogen + Lactobacillus = healthy microbiome

This means your gut health directly affects your vaginal health. A healthy, diverse gut microbiome supports estrogen recycling, which supports vaginal Lactobacillus, which maintains vaginal acidity. Gut dysbiosis disrupts this cycle, potentially compounding the estrogen loss of menopause.

After menopause, when ovarian estrogen production ceases, the estrobolome may become a more influential regulator of circulating estrogen levels — making gut health even more important for vaginal health.

The Evidence: Restoring Your Microbiome Works

Lactobacillus Restored

Vaginal estradiol tablets increased Lactobacillus and Bifidobacterium vs placebo and moisturizer after 12 weeks. Lactic acid metabolites also increased.

pH Normalized

Estrogen therapy reduces vaginal pH from 5.0-7.0+ back toward the protective 3.5-4.5 range, re-creating the acidic environment that inhibits pathogens.

UTIs Reduced 52%

Postmenopausal women using vaginal estrogen had 51.9% fewer UTIs (2025 retrospective). 1993 NEJM trial: 95% UTI-free at 8 months vs 30% placebo.

Synbiotic Breakthrough

2025 RCT: multi-strain *L. crispatus* vaginal synbiotic achieved 90% conversion to optimal CST I microbiome vs 11% placebo. Reduced Gardnerella and Candida.

Vaginal Estrogen: The Gold Standard

Multiple clinical studies have now confirmed that vaginal estrogen therapy restores Lactobacillus dominance in postmenopausal women. In one study of women with atrophic vaginitis, Lactobacillus abundance increased from 11.2% to 71.0% after low-dose estrogen therapy, with corresponding decreases in pathogenic bacteria like Gardnerella, Atopobium, and Prevotella. The results closely resembled healthy postmenopausal microbiomes.

Probiotics: Emerging Evidence

The probiotic landscape is evolving rapidly. The most promising approach uses vaginal administration of *L. crispatus* — the species most associated with optimal vaginal health. A 2025 randomized controlled trial of a multi-strain vaginal synbiotic achieved 90% conversion to the optimal CST I microbiome versus just 11% with placebo, while also reducing Gardnerella and Candida colonization.

Oral probiotics show more modest results. The most studied strains — *L. rhamnosus* GR-1 and *L. reuteri* RC-14 — can produce temporary increases in vaginal Lactobacillus, though vaginal delivery appears to be more effective for direct colonization. The combination of vaginal estrogen plus probiotics is now being studied as a dual-mechanism approach.

*Not all probiotics are equal. General "women's health" probiotics may contain gut-adapted species that never reach the vagina. Look for products specifically containing *L. crispatus*, *L. rhamnosus* GR-1, or *L. reuteri* RC-14 — and understand that vaginal delivery is more direct than oral.*

Your Microbiome Restoration Plan

Restoring your vaginal microbiome is a step-up process. Start with lifestyle foundations, add targeted support, and escalate to prescription therapy based on symptoms and severity.

Step 1: Lifestyle

Foundations

Avoid douching, scented products, harsh soaps. Stay hydrated. High-fiber diet supports gut estrobolome. Quit smoking (depletes Lactobacillus). Use pH-balanced cleansers only.

Step 2: Moisturizers + Probiotics

Support

Vaginal moisturizers 2-3x/week (Replens, Hyalo GYN). Vaginal probiotics with *L. crispatus* (most evidence). Oral probiotics (*L. rhamnosus* GR-1, *L. reuteri* RC-14). Prebiotic fiber for estrobolome.

Step 3: Vaginal Estrogen

Restore

Gold standard for microbiome restoration. Cream (Estrace 0.5-1g, 2-3x/week), tablet (Vagifem 10mcg), or ring (Estring, 3 months). Restores glycogen, Lactobacillus, pH. Minimal systemic absorption.

Step 4: Combination

Optimize

Vaginal estrogen + probiotics (dual mechanism). Add systemic HRT if needed. Ultra-low estriol + *L. acidophilus* (Gynoflor-type). Address gut microbiome simultaneously. Pelvic floor PT if indicated.

What to Look for in a Probiotic

1

Strain specificity matters

Look for *L. crispatus* (CST I species), *L. rhamnosus* GR-1, or *L. reuteri* RC-14. Generic 'Lactobacillus acidophilus' is a gut species and may not effectively colonize the vagina.

2

Delivery method matters

Vaginal probiotics colonize directly in 2-3 days. Oral probiotics take ~7 days to potentially reach the vagina and evidence for vaginal colonization via oral route is still limited. Vaginal delivery is more direct.

3

Combination may be best

The most promising research combines vaginal estrogen (restores the environment) with vaginal probiotics (introduces beneficial bacteria). Estrogen creates the conditions; probiotics provide the colonizers.

Protecting Your Microbiome Every Day

What Harms Your Vaginal Microbiome

1

Douching and scented products

Douching disrupts vaginal pH and washes away protective Lactobacillus. Scented soaps, sprays, and wipes contain chemicals that kill beneficial bacteria. Use only water or pH-balanced, fragrance-free cleansers externally.

2

Smoking

Clinical studies show smokers have significantly lower Lactobacillus levels and higher BV risk. Smoking also worsens menopausal symptoms including hot flashes. Quitting benefits your microbiome directly.

3

Unnecessary antibiotics

Antibiotics don't discriminate — they kill Lactobacillus along with pathogens. Recurrent antibiotic use for UTIs creates a vicious cycle of dysbiosis. Vaginal estrogen addresses the root cause; antibiotics only treat symptoms.

What Supports Your Vaginal Microbiome

1

High-fiber diet for your estrobolome

Fiber feeds beneficial gut bacteria that metabolize estrogen. Aim for 25-30g daily from vegetables, legumes, whole grains. Fermented foods (kimchi, sauerkraut, yogurt) support microbial diversity.

2

Vaginal moisturizers between treatments

Replens, Hyalo GYN, or similar pH-balanced moisturizers 2-3x/week maintain hydration and support the vaginal environment between estrogen applications.

3

Regular sexual activity (if comfortable)

Blood flow to vaginal tissue helps maintain health. Use silicone or water-based lubricants as needed. If penetration is painful, treat the underlying GSM first — don't push through pain.

Talking to Your Provider

Most providers have not been trained on the vaginal microbiome. You may need to be your own advocate. Here are scripts that work:

1**If you have recurrent UTIs**

"I've been reading that vaginal estrogen can prevent recurrent UTIs by restoring Lactobacillus and lowering vaginal pH. The AUA gives it a Grade A recommendation. Can we try this before another course of antibiotics?"

2**If you have vaginal dryness or discomfort**

"I'm experiencing dryness, irritation, and discomfort. I know these are GSM symptoms related to estrogen loss. Can we discuss local vaginal estrogen? I'd like to address the root cause, not just manage symptoms."

3**If your provider is hesitant about estrogen**

"I understand the concerns, but local vaginal estrogen has minimal systemic absorption — blood estrogen stays within postmenopausal range. The AUA/SUFU 2025 guidelines even support it for breast cancer survivors. Can we discuss my specific risk profile?"

4**If you want to try probiotics**

"I'm interested in vaginal probiotics with *L. crispatus* to support my microbiome. Can we combine this with vaginal estrogen for a dual approach? There's a 2025 trial showing 90% conversion to a healthy microbiome."

Red flag: If your provider repeatedly prescribes antibiotics for UTIs without discussing vaginal estrogen, or dismisses vaginal symptoms as 'just aging,' consider seeking a menopause specialist. The evidence strongly supports treating the cause, not just the symptoms.

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Your Microbiome Deserves Better Than 'Just Aging'

The science is clear: vaginal microbiome changes at menopause are treatable. Vaginal estrogen, targeted probiotics, and lifestyle changes can restore the protective Lactobacillus environment your body needs. You don't have to accept recurring infections, dryness, or discomfort as your new normal.

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