Supplementary Materials

		Amsel's Criteria	
		BV(+)	BV(-)
Nugent Score	BV (+)	18	8
	BV (-)	1	22

Supplemental Table 1. BV Diagnosis Agreement between Amsel and Nugent scores

Data is shown for 49 women where a definitive BV diagnosis using Nugent Score could be made. Not included are 8 cases diagnosed as indeterminate by Nugent of whom 3 were positive and 5 were negative by Amsel's criteria.

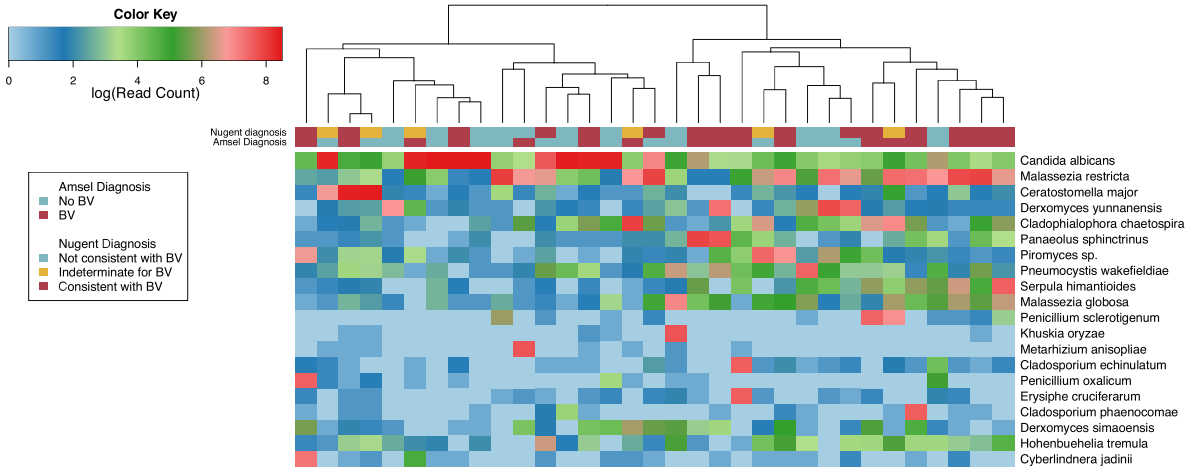
Supplemental Table 2. Cytokines Identified to be Significantly Associated with *molBV*

Cytokine	Odds Ratio	Categorical trend p-val	Categorical trend q-val	Citing Literature	Cytokine Description
IL-1B	1.73 [1.56-1.92]	2.98E-22	9.54E-21	Positive Nonpregnant women [1-9] Pregnant [10-14] Pregnant black women [15] Undergoing IVF treatment [16]	Inflammation/cell proliferation, differentiation, apoptosis
IL-1A	1.52 [1.36-1.69]	3.43E-13	9.95E-12	Positive Nonpregnant women [8] Pregnant [17] Twin pregnancies [18]	Acute phase protein/infection response
SEGFR	1.64 [1.48-1.81]	2.85E-19	8.83E-18		Cell migration/ adhesion/proliferation/mutations of receptor in cancer
STNFRI	1.5 [1.34-1.68]	2.93E-12	7.61E-11		Inflammatory marker of chronic disease
SIL-6R	1.51 [1.35-1.68]	8.69E-13	2.35E-11		Trans-signaling of IL-6 via gp130
IL-15	1.36 [1.22-1.52]	7.33E-08	1.83E-06		Regulates T cell and NK cell activation and proliferation
TNF-A	1.58 [1.42-1.77]	2.67E-15	8.00E-14	Positive Nonpregnant women [1,19] Pregnant [10]	Acute phase protein/infection response
SVEGFR1	1.32 [1.18-1.48]	2.31E-06	5.31E-05		Inhibits lymphangiogenesis
SILRII	1.31 [1.17-1.46]	5.62E-06	1.24E-04		
IP-10	0.76 [0.68-0.85]	1.83E-06	4.38E-05	Negative Nonpregnant women [8] Pregnant white women [15] No Association Nonpregnant women [20]	Anti-tumor chemoattractant
IL-10	1.55 [1.38-1.74]	4.63E-13	1.30E-11	Positive Nonpregnant women [21]	Immunosuppressive & anti-inflammatory cytokine
SCD40L	1.27 [1.14-1.43]	2.67E-05	5.61E-04		Induces pro-inflammatory tumoridical cytokines/B cell activation
IL-2	1.28 [1.14-1.43]	3.39E-05	6.77E-04	Positive Nonpregnant women [21]	White blood cell regulator

*** Data for only the significantly associated immune markers is shown (after adjustment for multiple testing, q<0.05, 15/32 tested markers). The full list of analyzed markers included: EGF, EOTAXIN, GRO, G_CSF, IFNA_2, IFN_G, IL_10, IL_15, IL_1A, IL_1B, IL_1RA, IL_2, IL_6, IL_7, IL_8, IP_10, MCP_1, MIP_1B, SCD40L, SEGFR, SGP130, SILRII, SIL_4R, SIL_6R, STNFRI, STNFRII, SVEGFR1, SVEGFR2, SVEGFR3, TGFA, TNF_A and VEGF.**

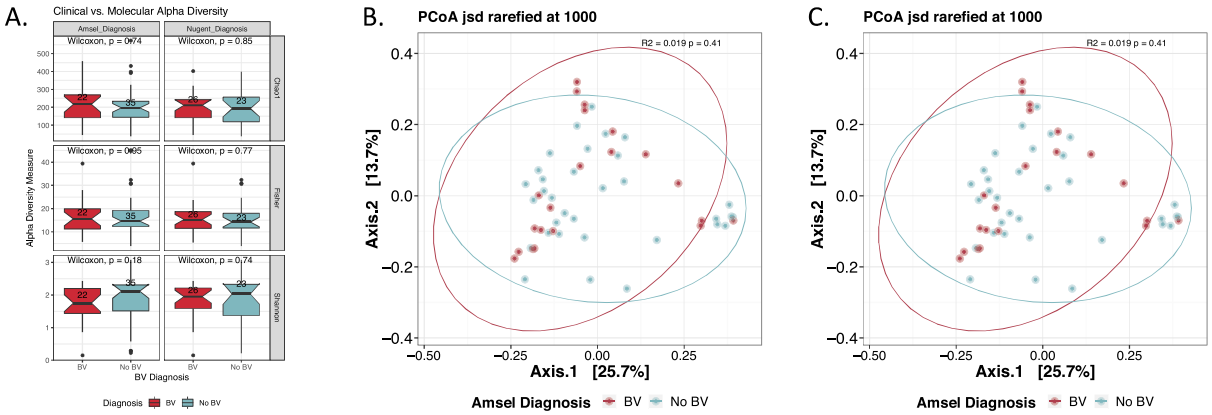
Supplemental Table 3. Beta Coefficients and Intercepts For Microbial Reference Frames Used to Calculate *molBV*

Reference Frame	beta	intercept
log(Lactobacillus/Prevotella)	-1.0305	7.2775
log(Lactobacillus/Gardnerella)	-1.0012	6.7448
log(Lactobacillus/Megasphaera)	-1.6761	24.9232
log(Lactobacillus/Parvimonas)	-0.8007	10.2133
log(Lactobacillus/Clostridium)	-1.2528	10.0125
log(Lactobacillus/Porphyromonas)	-0.8971	10.8979
log(Lactobacillus/Adlercreutzia)	-1.0922	9.9193
log(Lactobacillus/Dialister)	-1.1281	9.6347
log(Lactobacillus/Atopobium)	-1.2970	9.8496
log(Lactobacillus/Sneathia)	-0.9494	8.3180



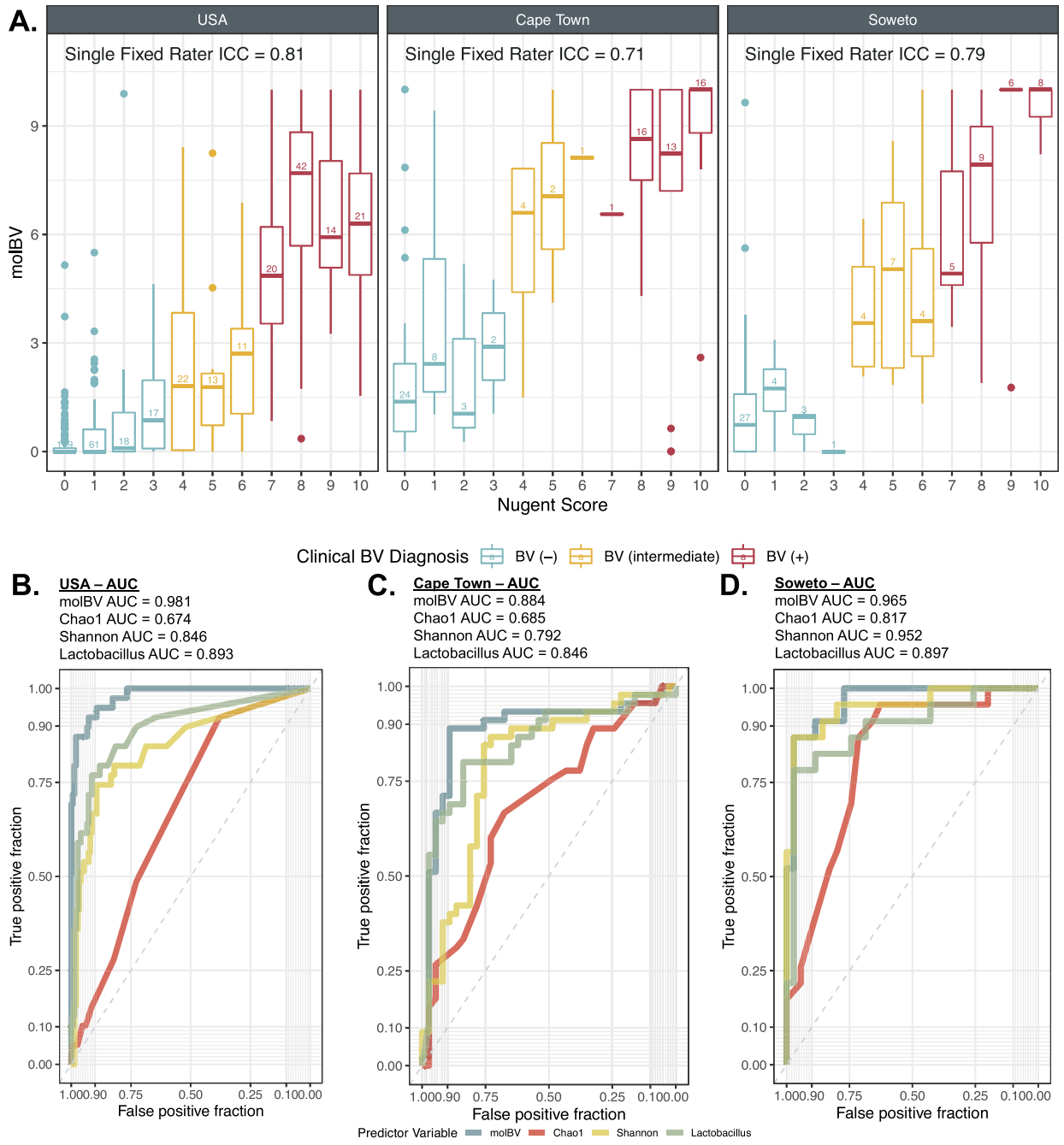
Supplemental Figure 1. Heatmap Showing Clustering of the Cervicovaginal Microbiome Based on the Top 20 Fungal Species.

Heatmap shows the top 20 fungal species. The two rows directly below the dendrogram show the sample case status based on Nugent and Amsel criteria in the first and second row, respectively.



Supplemental Figure 2. Alpha and Beta diversity Analysis of BV using Fungal NGS Data

Panel A shows the alpha diversity differences of the Chao1, Fisher and Shannon diversity indices for both BV diagnosed by Amsel or Nugent criteria (significance is shown in the figure). Panel B shows beta diversity analysis using PCoA and Jensen Shannon Diversity index for the Amsel BV diagnosis (not significant). Panel C shows beta diversity analysis using PCoA and Jensen Shannon Diversity index for the Nugent BV diagnosis (not significant).



Supplemental Figure 3. Benchmarking molecular diagnosis of BV vs. Clinical BV diagnosis

A. The calculated molecular BV score (*molBV*) is shown on the y-axis vs. the clinical Nugent score (x-axis) for each of the three tested cohorts (USA, Cape Town and Soweto). ICC was used to assess the consistency between *molBV* and the Nugent Score and is shown in each of the cohort panels. B., C. and D. show the AUC analyses the effectiveness of diagnosing BV using molBV and three measured of the CVM (Chao1/Shannon alpha diversity and Lactobacillus abundance) within the USA, Cape Town and Soweto cohorts respectively. In panels B-D each

line shown the AUC analyses for each components. Specific AUC values are provided above each cohort's figure.