

**Cervical intraepithelial neoplasia disease progression is associated with increased vaginal microbiome diversity.**

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**Supplementary Tables**

**Supplementary Table 1.** Rates of each class-based structure according to disease severity and HPV status/genotype – class level

	<b>Normal (&gt;97% Bacilli) n/N (%)</b>	<b>Transient (85-97% Bacilli) n/N (%)</b>	<b>Atypical (&lt;85% Bacilli) n/N (%)</b>	<b>TOTAL n/N (%)</b>
<b>DISEASE SEVERITY (A)</b>				
<b>Normal</b>	16/20 (80)	2/20 (10)	2/20 (10)	20/20 (100)
<b>LSIL</b>	40/52 (77)	4/52 (8)	8/52 (15)	52/52 (100)
<b>HSIL</b>	67/92 (73)	4/92 (4)	21/92 (23)	92/92 (100)
<b>Cancer</b>	3/5 (60)	0/5 (0)	2/5 (40)	5/5 (100)
<b>Total</b>	126/169 (75)	10/169 (6)	33/169 (19)	169/169 (100)
<b>P value<sup>1</sup></b>	0.33	0.21	0.07	-
<b>Q value<sup>1</sup></b>	0.33	0.33	0.20	-
<b>DISEASE SEVERITY (B) (ASCUS/LSIL separate)<sup>2</sup></b>				
<b>Normal</b>	16/20 (80)	2/20 (10)	2/20 (10)	20/20 (100)
<b>ASCUS</b>	20/26 (77)	2/26 (8)	4/26 (15)	26/26 (100)
<b>LSIL</b>	20/26 (77)	2/26 (8)	4/26 (15)	26/26 (100)
<b>HSIL</b>	67/92 (73)	4/92 (4)	21/92 (23)	92/92 (100)
<b>Cancer</b>	3/5 (60)	0/5 (0)	2/5 (40)	5/5 (100)
<b>Total</b>	126/169 (75)	10/169 (6)	33/169 (19)	169/169 (100)
<b>P value<sup>1</sup></b>	0.36	0.23	0.08	-
<b>Q value<sup>1</sup></b>	0.36	0.36	0.25	-
<b>HPV STATUS</b>				
<b>Negative</b>	17/24 (71)	3/24 (13)	4/24 (17)	24/24 (100)

<b>Positive</b>	70/94 (74)	3/94 (3)	21/94 (22)	93/93 (100)
<b>Total</b>	87/118 (74)	6/118 (5)	25/118 (21)	117/117 (100)
<b>P value<sup>3</sup></b>	0.80	0.10	0.78	-
<b>Q value<sup>3</sup></b>	1.00	1.00	1.00	-
<b>HPV GENOTYPE</b>				
<b>HPV-16</b>	22/31 (71)	2/31 (6)	7/31 (23)	31/31 (100)
<b>HPV-18</b>	4/5 (80)	0/5 (0)	1/5 (20)	5/5 (100)
<b>Other HR-HPV subtype</b>	21/26 (81)	1/26 (4)	4/26 (15)	26/26 (100)
<b>Total</b>	47/62 (76)	3/62 (5)	12/62 (19)	62/62 (100)
<b>P value<sup>3</sup></b>	0.81	1.00	0.89	-
<b>Q value<sup>3</sup></b>	1.00	1.00	1.00	-
<b>DISEASE SEVERITY and HPV STATUS</b>				
<b>Normal/LSIL, HPV neg</b>	16/20 (80)	2/20 (10)	2/20 (10)	20/20 (100)
<b>Normal/LSIL, HPV pos</b>	27/34 (79)	1/34 (3)	6/34 (18)	34/34 (100)
<b>HSIL, HPV pos</b>	42/58 (72)	1/58 (2)	15/58 (26)	58/58 (100)
<b>Cancer</b>	3/5 (60)	0/5 (0)	2/5 (40)	5/5 (100)
<b>Total</b>	88/117 (75)	4/117 (3)	25/117 (22)	117/117 (100)
<b>P value<sup>1</sup></b>	0.29	0.10	0.06	-
<b>Q value<sup>1</sup></b>	0.29	0.20	0.19	-

ASCUS: atypical squamous cells of undetermined significance; HPV: Human Papilloma Virus; HPV neg: HPV negative; HPV pos: HPV positive; HR-HPV: High-risk Human Papilloma Virus; HSIL: High-grade Squamous intraepithelial lesion; LSIL: Low-grade squamous intraepithelial lesion

<sup>1</sup>P-value & Q-value calculated using linear regression. <sup>2</sup>ASCUS and LSIL are split in two separate groups <sup>3</sup>P-value calculated using Fishers exact test, Q-value calculated using Benjamini-Hochberg false discovery rate (FDR) method.

**Supplementary Table 2.** Regression analysis of each class-based structure according to disease severity

Subgroups	Effect	Standard error	t-value	p-value	q-value
<b>DISEASE SEVERITY (A)</b>					
Normal	-0.04	0.05	-0.99	0.33	0.33
Intermediate	-0.03	0.02	-1.26	0.21	0.33
Atypical	0.08	0.04	1.84	0.07	0.20
<b>DISEASE SEVERITY (B) (ASCUS/LSIL separate)<sup>1</sup></b>					
Normal	-0.03	0.03	-0.92	0.36	0.36
Intermediate	-0.02	0.02	-1.21	0.23	0.36
Atypical	0.05	0.03	1.74	0.08	0.25
<b>DISEASE SEVERITY and HPV STATUS</b>					
Normal	-0.05	0.05	-1.07	0.29	0.29
Intermediate	-0.03	0.02	-1.65	0.10	0.20
Atypical	0.09	0.05	1.87	0.06	0.19

<sup>1</sup>ASCUS and LSIL are split in two separate groups

**Supplementary Table 3.** Regression analysis of each species-based structure according to disease severity

Subgroups	Effect	Standard error	t-value	p-value	q-value
<b>DISEASE SEVERITY (A)</b>					
CST I	-0.05	0.05	-1.05	0.30	0.47
CST II	0.03	0.02	1.58	0.12	0.46
CST III	-0.04	0.05	-0.88	0.38	0.47
CST IV	0.08	0.04	1.87	0.06	0.32
CST V	-0.02	0.02	-0.73	0.47	0.47
<b>DISEASE SEVERITY (B) (ASCUS/LSIL separate)<sup>1</sup></b>					
CST I	-0.06	0.03	-1.67	0.10	0.33
CST II	0.02	0.01	1.60	0.11	0.33
CST III	-0.01	0.03	-0.46	0.65	0.87
CST IV	0.05	0.03	1.87	0.06	0.32
CST V	0.00	0.01	-0.17	0.87	0.87
<b>DISEASE SEVERITY and HPV STATUS</b>					
CST I	-0.10	0.06	-1.74	0.08	0.34
CST II	0.03	0.02	2.01	0.05	0.24
CST III	-0.02	0.05	-0.40	0.69	0.69
CST IV	0.07	0.05	1.43	0.15	0.46
CST V	0.01	0.02	0.57	0.57	0.69

CST: Community state type. <sup>1</sup>ASCUS and LSIL are split in two separate groups

**Supplementary Table 4.** Richness and Diversity indices for the study population.

	<b>Class Microbiome Status</b>	<b>CST Status</b>	<b>Disease severity (A)</b>	<b>Number of sequences</b>	<b>Species observed</b>	<b>Inverse Simpson</b>	<b>InvSimpson _lci</b>	<b>InvSimpson _hci</b>	<b>Non- parametric Shannon</b>	<b>Coverage</b>
A003	A	4	HSIL	183	12	3.517744	3.097309	4.070248	1.609652	0.983607
A005	N	1	HSIL	183	2	1.068116	1.016053	1.125803	0.144552	1
A006	A	4	HSIL	183	11	4.882146	4.087711	6.059862	1.900957	0.989071
A007	N	5	LSIL	183	1	1	1	1	0	1
A008	N	1	HSIL	183	2	1.01105	0.990009	1.033004	0.055747	0.994536
A009	A	4	HSIL	183	12	5.764278	4.976013	6.849297	1.993397	0.989071
A010	N	3	HSIL	183	4	1.080662	1.023147	1.145029	0.235495	0.989071
A011	N	1	HSIL	183	1	1	1	1	0	1
A013	N	1	LSIL	183	3	1.155896	1.074211	1.251027	0.301669	1
A014	A	4	LSIL	183	22	5.21874	4.167965	6.977929	2.322218	0.961749
A015	N	3	HSIL	183	1	1	1	1	0	1
A017	N	1	LSIL	183	1	1	1	1	0	1
A019	N	3	LSIL	183	1	1	1	1	0	1
A020	A	4	LSIL	183	14	1.585245	1.387612	1.848525	1.102464	0.972678
A021	I	3	NORMAL	183	4	1.602483	1.419498	1.839625	0.727045	0.994536
A022	N	1	NORMAL	183	4	1.548252	1.374855	1.7717	0.694882	1
A024	N	3	NORMAL	183	3	1.104384	1.039173	1.178326	0.234141	0.994536
A026	N	3	LSIL	183	2	1.01105	0.990009	1.033004	0.055747	0.994536
A027	N	4	LSIL	183	3	2.074106	1.997367	2.156977	0.767902	1
A028	N	1	HSIL	183	1	1	1	1	0	1
A029	N	1	HSIL	183	1	1	1	1	0	1

A030	A	4	HSIL	183	11	5.629817	5.030579	6.391123	1.912851	0.989071
A031	N	3	HSIL	183	3	1.092287	1.031066	1.161236	0.217097	0.994536
A032	N	1	HSIL	183	1	1	1	1	0	1
A033	N	3	HSIL	183	3	1.080732	1.023122	1.145217	0.193399	1
A034	I	3	HSIL	183	7	1.398589	1.253024	1.582421	0.704096	0.983607
A035	N	1	HSIL	183	1	1	1	1	0	1
A036	N	3	HSIL	183	1	1	1	1	0	1
A037	N	1	HSIL	183	1	1	1	1	0	1
A038	I	3	HSIL	183	9	1.640043	1.441274	1.902409	0.937286	0.983607
A040	N	1	HSIL	183	2	1.01105	0.990009	1.033004	0.055747	0.994536
A041	N	1	HSIL	183	4	2.073332	1.888526	2.29823	0.863966	0.994536
A042	N	1	HSIL	183	3	1.341361	1.221425	1.487416	0.461393	0.994536
A043	N	3	LSIL	183	3	1.313432	1.198452	1.452815	0.44142	0.994536
A044	N	1	HSIL	183	2	1.022221	0.992476	1.053804	0.067856	1
A045	N	1	HSIL	183	1	1	1	1	0	1
A046	A	4	HSIL	183	13	5.046364	4.268994	6.169878	1.974823	0.989071
A050	A	4	LSIL	183	10	3.794258	3.265046	4.528209	1.626232	0.978142
M001	N	1	HSIL	183	2	1.044927	1.002691	1.090878	0.106675	1
M002	N	3	HSIL	183	5	1.080942	1.023038	1.145796	0.271052	0.983607
M003	N	1	HSIL	183	2	1.352473	1.23242	1.49844	0.427887	1
M004	A	4	HSIL	183	10	3.640796	3.299043	4.061536	1.533157	0.978142
M005	N	3	LSIL	183	3	1.281592	1.166926	1.421248	0.448706	1
M006	N	1	HSIL	183	2	1.01105	0.990009	1.033004	0.055747	0.994536
M009	N	1	LSIL	183	3	1.068459	1.015878	1.126779	0.180856	0.994536
M010	N	3	HSIL	183	2	1.068116	1.016053	1.125803	0.144552	1
M011	A	4	LSIL	183	9	4.074627	3.462428	4.949813	1.679591	0.989071
M012	A	4	HSIL	183	13	7.265707	6.327307	8.530924	2.176772	0.989071
M013	N	3	HSIL	183	2	1.664801	1.517589	1.84364	0.586439	1
M014	N	3	LSIL	183	2	1.033513	0.997027	1.072772	0.08709	1
M015	N	2	LSIL	183	3	1.340066	1.212968	1.496917	0.496449	1

M016	N	1	HSIL	183	1	1	1	1	0	1
M017	N	3	LSIL	183	2	1.380502	1.256105	1.532247	0.446137	1
M018	A	4	LSIL	183	6	3.66	3.195216	4.283019	1.465748	0.994536
M019	N	3	LSIL	183	2	1.165605	1.083625	1.261004	0.270144	1
M020	N	3	HSIL	183	2	1.270155	1.164793	1.396473	0.36736	1
M021	N	1	HSIL	183	2	1.01105	0.990009	1.033004	0.055747	0.994536
M023	A	4	HSIL	183	9	3.574372	2.985317	4.453033	1.626865	1
M024	N	1	HSIL	183	1	1	1	1	0	1
M025	A	4	HSIL	183	10	4.178921	3.556557	5.065301	1.724467	0.994536
M027	N	1	LSIL	183	6	1.336839	1.212055	1.490265	0.580437	0.983607
M028	N	3	HSIL	183	3	1.105116	1.039007	1.18021	0.23109	1
M029	N	1	HSIL	183	2	1.056461	1.009096	1.108493	0.12593	1
M030	N	1	HSIL	183	1	1	1	1	0	1
M031	N	3	HSIL	183	3	1.179474	1.093162	1.280585	0.323981	0.994536
M032	N	1	HSIL	183	5	1.131318	1.05596	1.218258	0.334028	0.994536
M033	N	1	HSIL	183	8	2.852518	2.501651	3.317863	1.314771	0.978142
M034	A	4	HSIL	183	9	2.848127	2.368636	3.571022	1.517152	1
M035	N	1	LSIL	183	4	2.059486	1.881004	2.275389	0.853145	0.994536
M036	N	3	HSIL	183	1	1	1	1	0	1
M038	A	4	HSIL	183	2	1.989368	1.932152	2.050076	0.687748	1
M039	A	4	HSIL	183	7	2.219808	1.939111	2.595525	1.115111	0.989071
M040	N	3	HSIL	183	3	1.068665	1.015776	1.127363	0.174287	1
M041	N	1	HSIL	183	2	1.01105	0.990009	1.033004	0.055747	0.994536
M042	A	4	NORMAL	183	11	1.339312	1.204444	1.508191	0.787372	0.972678
M043	A	4	HSIL	183	1	1	1	1	0	1
M045	N	4	HSIL	183	7	1.647344	1.460551	1.888922	0.835043	0.983607
M046	N	1	LSIL	183	5	2.891648	2.685593	3.13195	1.154027	0.994536
M047	N	3	NORMAL	183	3	1.117801	1.047375	1.198381	0.251092	1
M048	A	4	HSIL	183	3	1.068459	1.015878	1.126779	0.180856	0.994536
M049	N	3	HSIL	183	12	5.050955	4.344906	6.030995	1.906986	0.989071

M050	N	5	LSIL	183	4	1.033706	0.996808	1.07344	0.166376	0.983607
M051	N	1	LSIL	183	2	1.033513	0.997027	1.072772	0.08709	1
M052	N	1	LSIL	183	2	1.338558	1.220785	1.481482	0.41842	1
M054	I	4	HSIL	183	13	2.991915	2.657803	3.422109	1.510216	0.978142
M055	N	5	CANCER	183	12	2.617985	2.193909	3.245289	1.509116	0.989071
M057	N	1	HSIL	183	4	1.105557	1.038906	1.181346	0.260908	1
M058	N	1	NORMAL	183	3	1.033642	0.996881	1.073217	0.123279	0.994536
M059	N	1	HSIL	183	1	1	1	1	0	1
M060	N	3	HSIL	183	2	1.103798	1.039314	1.176813	0.196109	1
M061	N	4	LSIL	183	3	1.033642	0.996881	1.073217	0.123279	0.994536
M062	A	4	HSIL	183	3	1.909967	1.724849	2.139596	0.770555	1
M063	N	1	HSIL	183	13	5.794363	4.939729	7.00659	2.042392	0.983607
M064	A	4	HSIL	183	3	1.068459	1.015878	1.126779	0.180856	0.994536
M065	N	3	HSIL	183	13	5.720715	4.991201	6.699983	1.998711	0.972678
M066	N	1	HSIL	183	2	1.01105	0.990009	1.033004	0.055747	0.994536
M067	N	3	HSIL	183	3	1.578334	1.42611	1.766938	0.597045	1
M068	N	1	LSIL	183	3	1.258635	1.154336	1.383654	0.398258	0.994536
M069	I	4	LSIL	183	1	1	1	1	0	1
M070	N	1	HSIL	183	7	1.256451	1.145423	1.391313	0.551692	0.994536
M071	A	4	HSIL	183	2	1.033513	0.997027	1.072772	0.08709	1
M072	N	3	HSIL	183	8	4.481432	3.903394	5.260426	1.686752	0.994536
M073	A	4	HSIL	183	2	1.01105	0.990009	1.033004	0.055747	0.994536
M074	N	3	LSIL	183	17	8.048816	6.954904	9.551069	2.351875	0.978142
M075	N	3	HSIL	183	3	1.056729	1.008921	1.109295	0.161754	0.994536
M076	N	1	NORMAL	183	1	1	1	1	0	1
M077	N	1	LSIL	183	1	1	1	1	0	1
M078	N	3	HSIL	183	6	1.330537	1.202388	1.489261	0.600545	0.989071
M079	N	1	HSIL	183	2	1.033513	0.997027	1.072772	0.08709	1
M080	N	1	HSIL	183	1	1	1	1	0	1
M081	N	4	HSIL	183	1	1	1	1	0	1



M082	N	1	HSIL	183	3	1.947492	1.836052	2.073333	0.719621	0.994536
M083	N	2	HSIL	183	3	1.25267	1.144884	1.382861	0.420251	1
M084	A	4	HSIL	183	1	1	1	1	0	1
M085	N	5	LSIL	183	5	3.711388	3.443495	4.024481	1.370046	0.994536
M086	N	3	NORMAL	183	2	1.022221	0.992476	1.053804	0.067856	1
M087	A	4	LSIL	183	3	1.205429	1.11284	1.314823	0.350183	0.994536
M088	I	5	LSIL	183	4	1.461815	1.312673	1.649192	0.609267	0.994536
M089	A	4	LSIL	183	4	1.419451	1.283331	1.587873	0.555176	0.994536
M090	N	1	LSIL	183	6	1.268897	1.156058	1.406146	0.528551	0.994536
M091	N	2	HSIL	183	2	1.022221	0.992476	1.053804	0.067856	1
M093	N	3	HSIL	183	2	1.01105	0.990009	1.033004	0.055747	0.994536
M094	N	1	HSIL	183	1	1	1	1	0	1
M095	A	4	HSIL	183	2	1.022221	0.992476	1.053804	0.067856	1
M096	N	1	LSIL	183	10	1.480925	1.310713	1.701943	0.886108	0.989071
M097	N	1	HSIL	183	2	1.068116	1.016053	1.125803	0.144552	1
M100	N	1	HSIL	183	1	1	1	1	0	1
M101	I	3	LSIL	183	2	1.01105	0.990009	1.033004	0.055747	0.994536
M102	N	3	LSIL	183	2	1.217058	1.122814	1.328571	0.321466	1
M103	N	2	HSIL	183	1	1	1	1	0	1
M104	N	5	LSIL	183	1	1	1	1	0	1
M132	N	1	CANCER	183	3	2.192049	1.93465	2.528453	0.923912	1
M133	N	3	LSIL	183	1	1	1	1	0	1
M136	N	5	LSIL	183	2	1.297266	1.186741	1.430492	0.388562	1
M138	N	1	NORMAL	183	4	1.06887	1.015673	1.127949	0.209686	0.994536
M140	N	1	NORMAL	183	2	1.165605	1.083625	1.261004	0.270144	1
M141	N	3	NORMAL	183	3	1.033642	0.996881	1.073217	0.123279	0.994536
M142	N	1	NORMAL	183	3	1.49946	1.357499	1.67458	0.555182	0.994536
M143	N	3	NORMAL	183	4	1.056931	1.008791	1.109895	0.197294	0.989071
M145	N	3	NORMAL	183	1	1	1	1	0	1
M152	N	1	LSIL	183	2	1.068116	1.016053	1.125803	0.144552	1

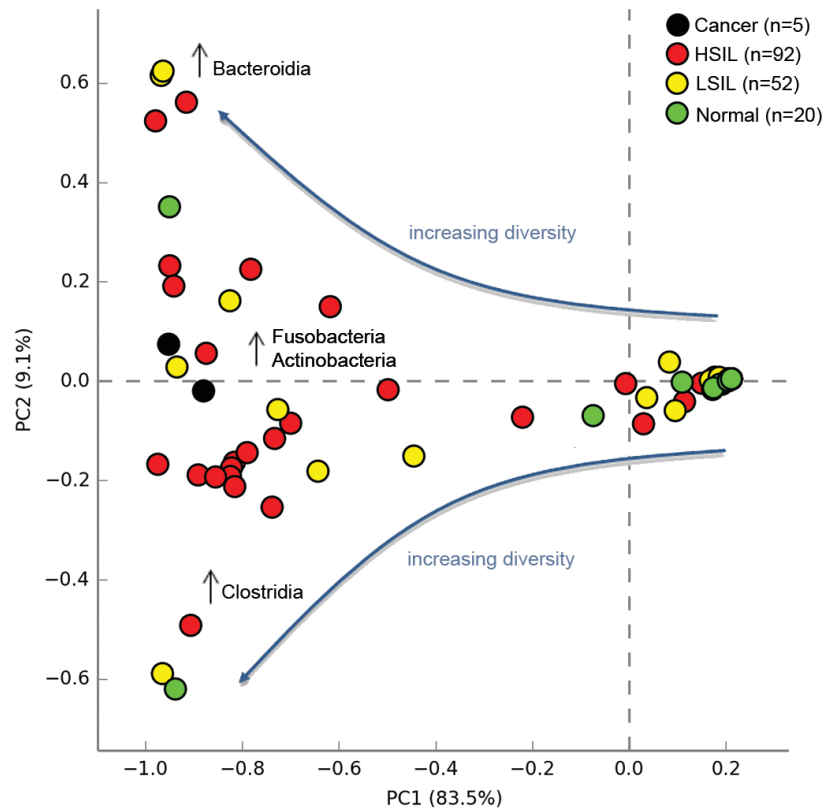
M153	N	1	NORMAL	183	2	1.01105	0.990009	1.033004	0.055747	0.994536
M154	A	4	NORMAL	183	7	2.209207	1.908653	2.622107	1.127411	1
M156	N	1	LSIL	183	2	1.678561	1.531484	1.856887	0.59171	1
M157	N	1	HSIL	183	6	1.703457	1.524084	1.930686	0.787029	0.989071
M158	N	1	NORMAL	183	2	1.091785	1.031222	1.159906	0.179617	1
M159	N	1	LSIL	183	3	2.020505	1.876927	2.187869	0.775368	1
M160	N	1	LSIL	183	1	1	1	1	0	1
M162	N	1	LSIL	183	2	1.091785	1.031222	1.159906	0.179617	1
M163	N	1	LSIL	183	2	1.01105	0.990009	1.033004	0.055747	0.994536
M164	N	1	LSIL	183	4	2.138839	1.947998	2.371133	0.893032	0.994536
M166	N	3	NORMAL	183	4	1.35832	1.233834	1.510745	0.513787	0.989071
M168	N	3	LSIL	183	3	1.261878	1.154863	1.390751	0.406843	1
M169	N	1	LSIL	183	2	1.01105	0.990009	1.033004	0.055747	0.994536
M170	A	4	LSIL	183	10	1.214661	1.113675	1.335787	0.618425	0.967213
M174	A	4	CANCER	183	7	4.976987	4.590058	5.435157	1.676453	0.994536
M175	N	3	HSIL	183	6	1.158228	1.074144	1.256594	0.400836	0.994536
M176	A	4	CANCER	183	16	6.218447	5.25611	7.612147	2.175393	0.983607
M177	A	4	HSIL	183	16	7.056356	6.129191	8.314021	2.230323	0.972678
M178	I	1	NORMAL	183	7	2.935484	2.548075	3.461818	1.331454	0.989071
M180	N	1	LSIL	183	3	1.033642	0.996881	1.073217	0.123279	0.994536
M181	N	2	CANCER	183	1	1	1	1	0	1
M182	N	1	HSIL	183	2	1.566162	1.421882	1.74303	0.545215	1
M183	N	3	HSIL	183	2	1.091785	1.031222	1.159906	0.179617	1
M185	N	1	NORMAL	183	3	1.068459	1.015878	1.126779	0.180856	0.994536
M186	N	3	HSIL	183	2	1.044927	1.002691	1.090878	0.106675	1
M187	N	4	HSIL	183	3	1.818609	1.66626	2.00162	0.688203	1
M188	N	1	LSIL	183	1	1	1	1	0	1
M189	N	3	HSIL	183	1	1	1	1	0	1

A: Abnormal; CST: Community state type; CST I = *Lactobacillus crispatus*-dominant; CST II = *Lactobacillus gasseri*-dominant; CST III = *Lactobacillus iners*-dominant, CST IV = high-diversity, *Lactobacillus spp*-deplete; CST V = *Lactobacillus jensenii*-dominant; HSIL: High-grade squamous intraepithelial lesion; I:

*Intermediate; InvSimpson\_hci: Inverse Simpson higher confidence interval; InvSimpson\_lci: Inverse Simpson lower confidence interval; LSIL: Low-grade squamous intraepithelial lesion; N: Normal*

## Supplementary Figures

Supplementary Figure 1. Bacterial class diversity in study cohort and controls



KEY - Cancer: Black; High-grade squamous intra-epithelial lesions (HSIL): Red; Low-grade squamous intra-epithelial lesions (LSIL): Yellow; Normal: Green.

**Supplementary Figure 2. Vaginal microbiome composition according to disease and HPV status** Hierarchical clustering analysis (HCA) using centroid clustering.

**DISEASE SEVERITY I** - Normal: Green; Low-grade squamous intra-epithelial lesions (LSIL): Yellow; High-grade squamous intra-epithelial lesions (HSIL): Red;

Cancer: Black

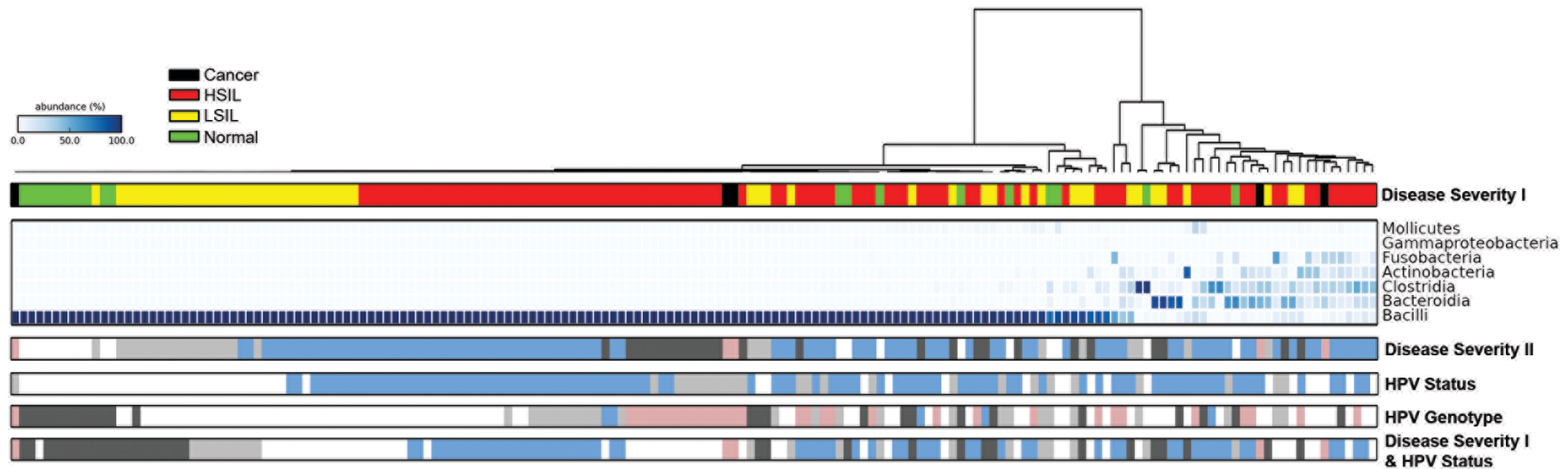
**DISEASE SEVERITY II** - Normal: white; ASCUS: light grey; LSIL: dark grey; HSIL: blue; Cancer: pink

**HPV STATUS** - HPV negative: light grey; HPV positive: blue; Unknown: white

**HPV GENOTYPE** - HPV negative: light grey; HPV16: pink; HPV18: blue; Other HR-HPV: dark grey; Unknown: white

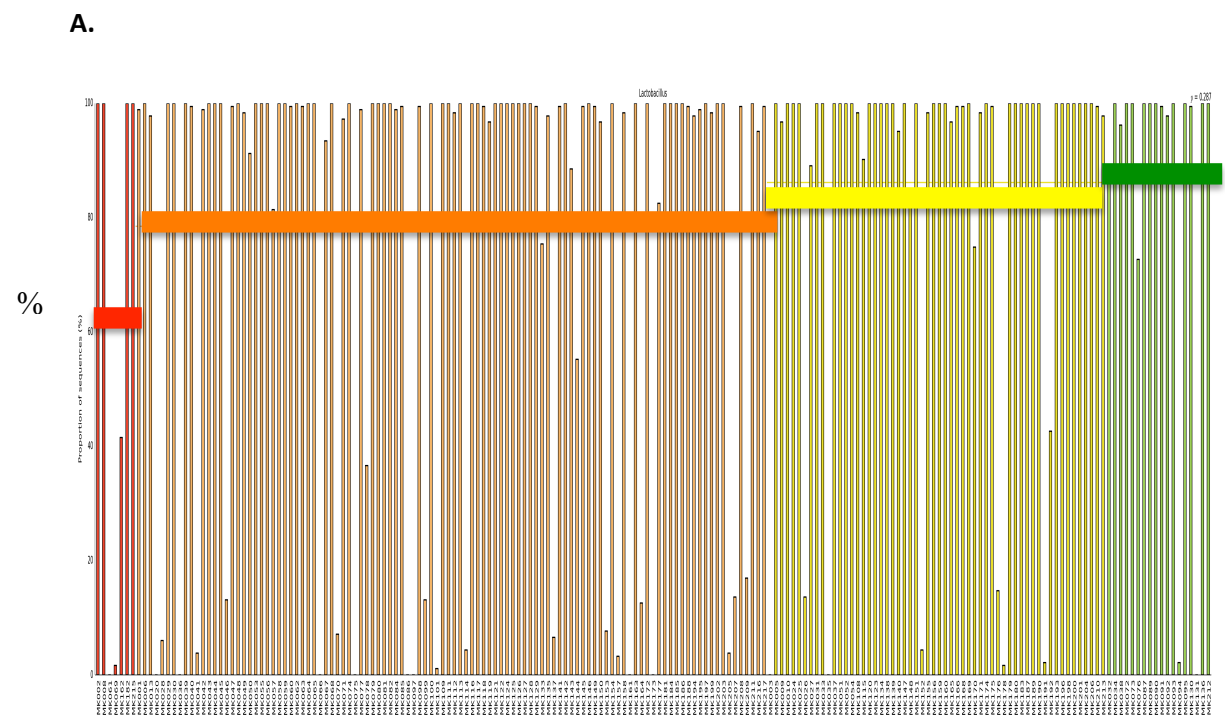
**DISEASE SEVERITY I & HPV STATUS** - LSIL/Normal HPV negative: light grey; LSIL/Normal HPV positive: dark grey; HSIL/HPV positive: blue; Cancer: pink;

unknown/other: white

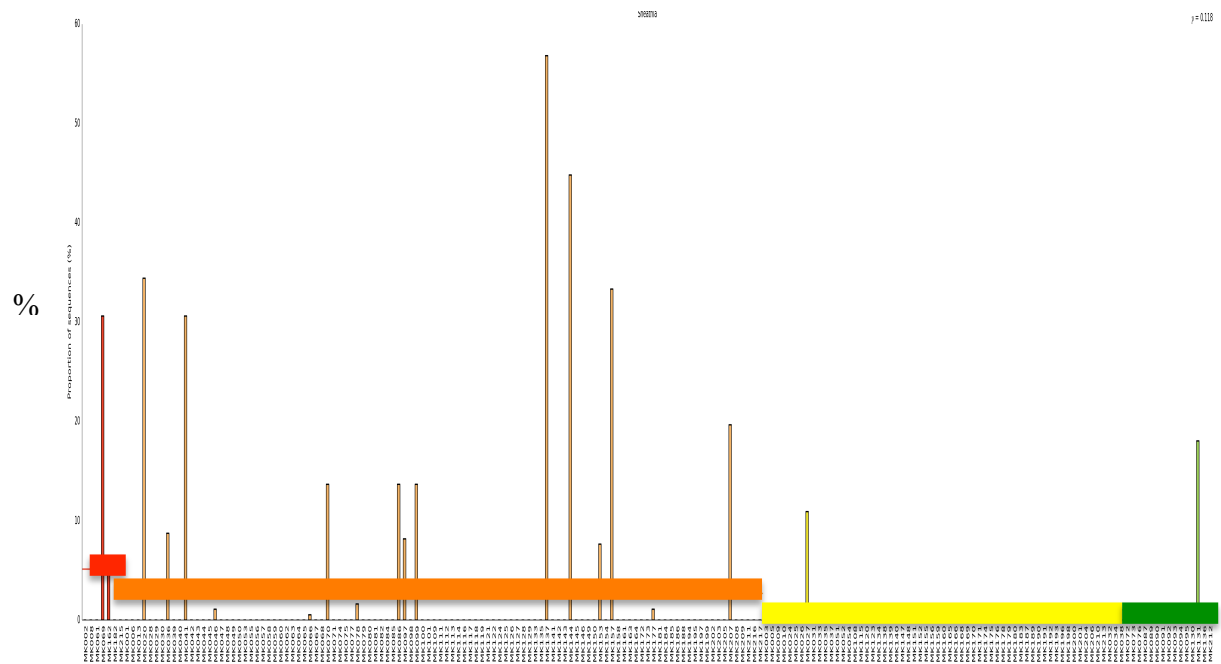


KEY - ASCUS: atypical squamous cells of undetermined significance; CST: community state type; HPV: Human Papillomavirus; HR-HPV: high-risk HPV; HSIL: High-grade squamous intra-epithelial lesion; ICC: invasive cervical cancer; LSIL: Low-grade squamous intra-epithelial lesion

**Supplementary Figure 3.** Mean proportion of *Lactobacillus* spp. (A) content and *Sneathia* spp. (B) content according to disease severity (normal vs LSIL vs HSIL vs ICC)



**B.**



KEY: Normal: Green; Low-grade squamous intra-epithelial lesions (LSIL): Yellow; High-grade squamous intra-epithelial lesions (HSIL): Orange; Invasive Cervical Cancer (ICC): Red

