

Modeling the Impact of Antibiotic Exposure on Human Microbiota

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Supplementary Materials:

Figure S1

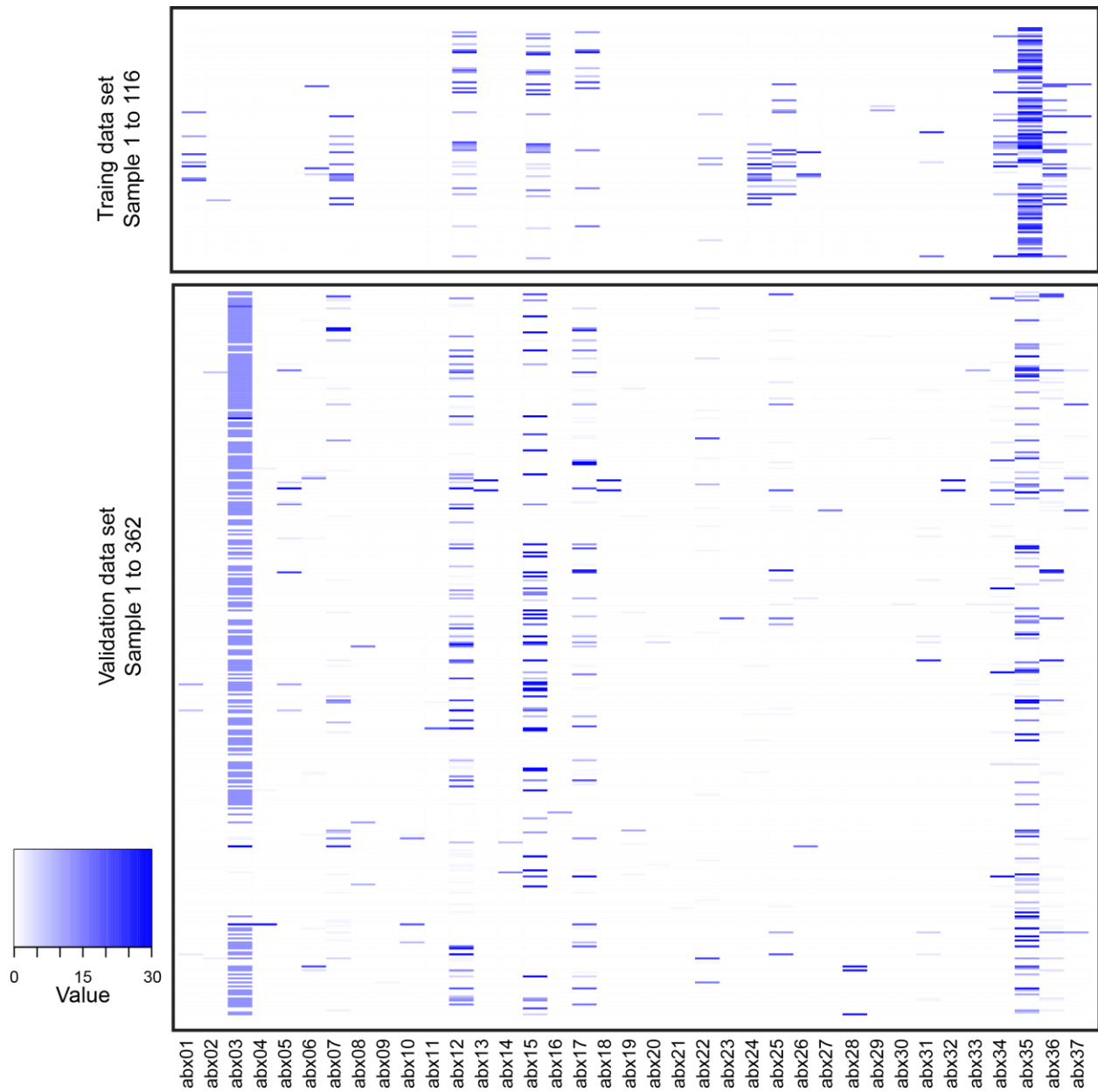


Figure S1. Antibiotic exposure associated with sputum samples in the training (A; n=116) and validation (B; n=362) data sets. In the heat maps, each row represents a sputum sample and each column represents a different antibiotic. A total of 16 antibiotics were associated with samples in the training set and 37 antibiotics were applied in the validation data set. The color intensity of individual cells represents the number of days (1-30) that the antibiotic was applied during the 30 days prior to sample collection.

Figure S2

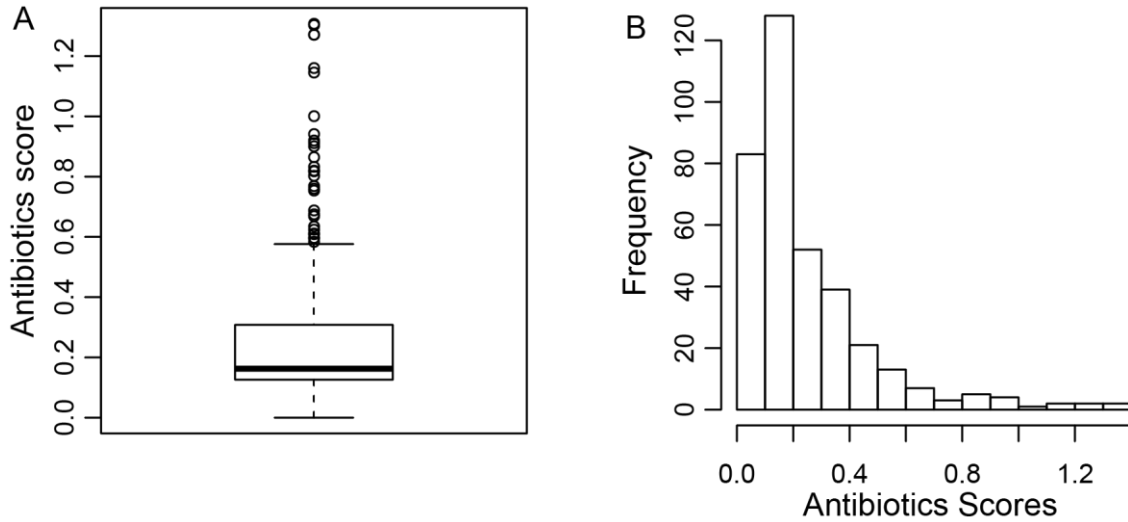


Figure S2. Distribution and frequency of antibiotics weighting scores used in the validation data set. Panel A shows the distribution of the antibiotics weighting scores in the validation data set used in the multivariate model. Top and bottom boundaries of the box indicate 75th and 25th quartile values, respectively, and black lines inside the box represent the 50th quartile (median) value. Ends of the whiskers mark the lowest and highest antibiotic weighting scores within 1.5 times the interquartile range. Panel B shows the frequency of the antibiotics weighting scores.

Table S1. Daily weight values for *wcB* corresponding to Figure 1B and Equation 2.

Days to sampling	i used in Equation 2	Equal Weights	Increasing Weights		
			Linear	Concave	Convex
30	1	0.0333	0.0022	0.0000	0.0001
29	2	0.0333	0.0043	0.0093	0.0004
28	3	0.0333	0.0065	0.0147	0.0010
27	4	0.0333	0.0086	0.0186	0.0017
26	5	0.0333	0.0108	0.0216	0.0026
25	6	0.0333	0.0129	0.0240	0.0038
24	7	0.0333	0.0151	0.0261	0.0052
23	8	0.0333	0.0172	0.0279	0.0068
22	9	0.0333	0.0194	0.0294	0.0086
21	10	0.0333	0.0215	0.0308	0.0106
20	11	0.0333	0.0237	0.0321	0.0128
19	12	0.0333	0.0258	0.0333	0.0152
18	13	0.0333	0.0280	0.0344	0.0179
17	14	0.0333	0.0301	0.0353	0.0207
16	15	0.0333	0.0323	0.0363	0.0238
15	16	0.0333	0.0344	0.0371	0.0271
14	17	0.0333	0.0366	0.0379	0.0306
13	18	0.0333	0.0387	0.0387	0.0343
12	19	0.0333	0.0409	0.0394	0.0382
11	20	0.0333	0.0430	0.0401	0.0423
10	21	0.0333	0.0452	0.0408	0.0466
9	22	0.0333	0.0473	0.0414	0.0512
8	23	0.0333	0.0495	0.0420	0.0559
7	24	0.0333	0.0516	0.0426	0.0609
6	25	0.0333	0.0538	0.0431	0.0661
5	26	0.0333	0.0559	0.0436	0.0715
4	27	0.0333	0.0581	0.0441	0.0771
3	28	0.0333	0.0602	0.0446	0.0829
2	29	0.0333	0.0624	0.0451	0.0889
1	30	0.0333	0.0645	0.0456	0.0952

Table S2. Linear mixed model results for four *wcB* profiles (equal weights, and linear, concave or convex increasing weights) and the two modeling cohorts (training and validation). AIC values can be appropriately compared across models fit to the same cohort.

<i>wcB</i> weights	Training Set					Validation Set					Bootstrap Averages	
	AIC	AIC Rank	Coefficients			AIC	AIC Rank	Coefficients			AIC Rank	% Rank #1
			Antibiotics	Age	FEV ₁			Antibiotics	Age	FEV ₁		
Equal	469.79	4	-0.49	-0.01	0.03	1673.23	4	-0.45	-0.03	0.04	3.44	16%
Linear	467.91	2	-0.50	-0.01	0.03	1671.80	2	-0.46	-0.03	0.04	2.05	9%
Concave	468.64	3	-0.50	-0.01	0.03	1672.59	3	-0.45	-0.03	0.04	2.90	<1%
Convex	467.67	1	-0.48	-0.01	0.03	1671.23	1	-0.45	-0.02	0.04	1.62	75%

Table S3. Characteristics and models for the individual antibiotics in the combined data set

Antibiotics Names	Route	Class	AIC	AIC Rank	Coefficient	Coefficient Rank	Summed Rank	WCC
Levofloxacin	IV	Quinolone	2139.20	2	-32.532	1	3	0.5
Amoxicillin/Clavulanate	oral	Beta-lactam	2141.49	7	-12.816	3	10	0.5
Imipenem	IV	Beta-lactam	2141.44	6	-12.509	4	10	0.5
Nafcillin	IV	Beta-lactam	2141.49	8	-12.876	2	10	0.5
Colistin	IV	Polypeptide	2140.71	3	-2.0398	9	12	0.5
Meropenem	IV	Beta-lactam	2140.95	4	-1.7425	11	15	0.5
Cefepime	IV	Beta-lactam	2143.45	11	-3.8783	5	16	0.5
Tobramycin	IV	Aminoglycoside	2141.01	5	-1.6468	12	17	0.5
Ciprofloxacin	IV	Quinolone	2143.67	12	-2.7239	6	18	0.5
Minocycline	IV	Tetracycline	2144.26	14	-2.2355	8	22	0.5
Cefuroxime	oral	Beta-lactam	2144.79	16	-2.4559	7	23	0.5
Ciprofloxacin	oral	Quinolone	2143.21	10	-1.1239	20	30	0.5
Minocycline	oral	Tetracycline	2145.24	20	-1.7971	10	30	0.33
Chloramphenicol	IV	Other	2144.00	13	-1.1332	19	32	0.33
Linezolid	oral	Oxazolidonone	2145.08	18	-1.594	14	32	0.33
Levofloxacin	oral	Quinolone	2145.61	24	-1.639	13	37	0.33
Cephalexin	oral	Beta-lactam	2133.45	1	64.179	37	38	0.33
Vancomycin	IV	Glycopeptide	2145.69	25	-1.4934	15	40	0.33
sulfamethoxazole/trimethoprim	IV	Sulfonamide	2145.21	19	-0.9431	22	41	0.33
Ceftazidime	IV	Beta-lactam	2145.75	26	-1.225	17	43	0.33
Piperacillin/Tazobactam	IV	Beta-lactam	2145.84	27	-1.4511	16	43	0.33
Moxifloxacin	oral	Quinolone	2144.66	15	-0.1825	28	43	0.33
Gentamicin	IV	Aminoglycoside	2142.05	9	9.27658	36	45	0.33
Amikacin	IV	Aminoglycoside	2146.20	31	-1.1528	18	49	0.33
Doxycycline	oral	Tetracycline	2145.84	28	-0.9521	21	49	0.33
Clindamycin	oral	Lincosamide	2144.83	17	2.43332	35	52	0.17
Aztreonam	inhaled	Beta-lactam	2146.04	30	-0.6754	23	53	0.17

Rifabutin	oral	Other	2145.39	21	1.76664	32	53	0.17
Ethambutol	oral	Other	2145.39	22	1.76664	33	55	0.17
Linezolid	IV	Oxazolidonone	2145.97	29	-0.3367	27	56	0.17
Azithromycin	oral	Macrolide	2146.78	33	-0.5216	24	57	0.17
Clarithromycin	oral	Macrolide	2145.39	23	1.76664	34	57	0.17
Tobramycin	inhaled	Aminoglycoside	2146.96	34	-0.5138	25	59	0.17
sulfamethoxazole/trimethoprim	oral	Sulfonamide	2148.06	36	-0.4302	26	62	0.17
Metronidazole	oral	Other	2146.44	32	0.69447	31	63	0.17
Aztreonam	IV	Beta-lactam	2147.42	35	0.05573	29	64	0.17
Colistin	inhaled	Polypeptide	2149.07	37	0.20011	30	67	0.17

