

## Supplementary Information

Table S1: Specimen types analysed in the cohort

Specimen	Severe case	Very severe case	Total (%)
Nasopharyngeal swab	15	14	29(41)
Lung aspirate	4	3	7(10)
Blood	0	11	11(15)
Induced sputum	0	12	12(17)
Combined nasopharyngeal and oropharyngeal swab	0	12	12(17)
Total	19	52	71 (100)

Table S2: Serotypes and sequence types of *S. pneumoniae* and *H. influenzae* high-quality MAGs

Specie	MAG	Serotype	ST	Participant	Specimen
<i>Streptococcus pneumoniae</i>	MAG4	19A	10676	3	LA
	MAG6	19A	847	4	NP-OP
	MAG9	Possible non capsular	Unassigned	6	NPS
	MAG11	Possible non capsular	3081	7	LA
	MAG14	6A/6B	5549	10	Blood
	MAG16	19A	847	11	LA
	MAG20	6E	Unassigned	17	Blood
	MAG23	19A	847	20	Blood
	MAG27	19F	925	30	Blood
	MAG32	19A	Unassigned	30	NPS
MAG34	Possible non capsular	3334	34	NPS	
<i>Haemophilus influenzae</i>	MAG7	Nontypeable <i>H. influenzae</i>	2442	5	IS
	MAG10	Nontypeable <i>H. influenzae</i>	503	6	LA
	MAG13	Nontypeable <i>H. influenzae</i>	Unassigned	7	LA
	MAG15	Nontypeable <i>H. influenzae</i>	Unassigned	10	NP-OP
	MAG17	Nontypeable <i>H. influenzae</i>	Unassigned	11	LA
	MAG18	Nontypeable <i>H. influenzae</i>	165	13	LA
	MAG19	Nontypeable <i>H. influenzae</i>	481	15	Blood
	MAG24	Nontypeable <i>H. influenzae</i>	2442	21	Blood
	MAG29	Nontypeable <i>H. influenzae</i>	Unassigned	30	Blood
	MAG31	Nontypeable <i>H. influenzae</i>	Unassigned	30	NPS

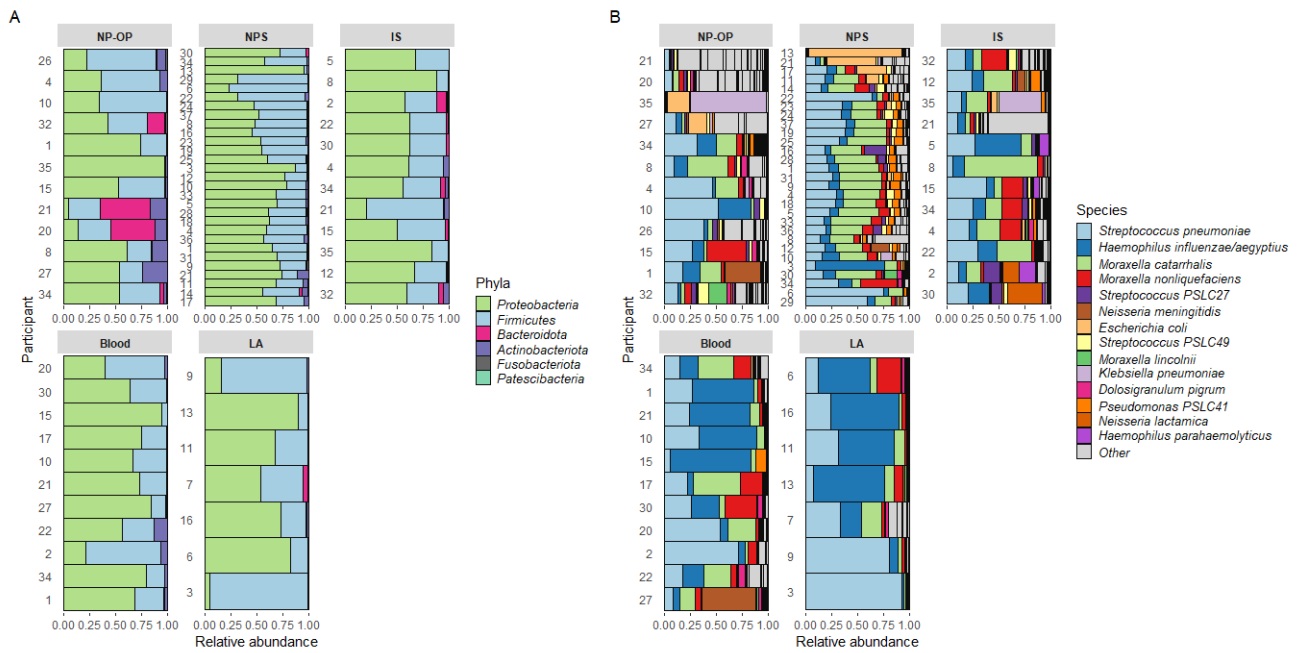


Figure S1: Barplots of the relative abundances of bacteria DNA at the phylum (A) and species (B) level in individual samples. The bars which represent individual samples are arranged on the Y axis based on similarity in profiles.

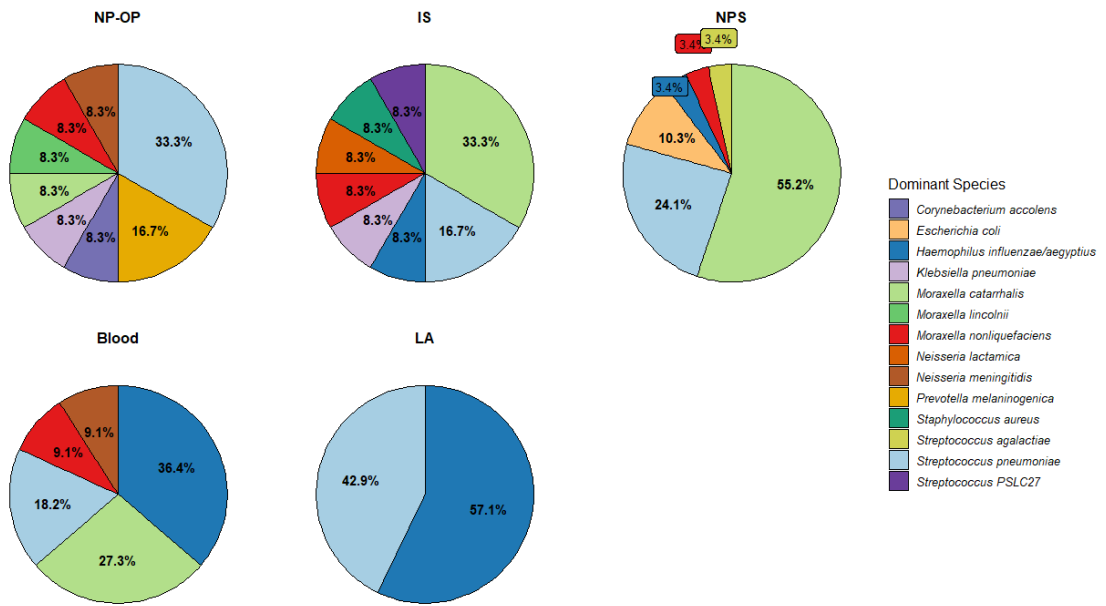


Figure S2: Distribution of dominant bacterial species across specimen type. A species was defined as dominant if it had the highest relative abundance in a sample. Each sector in the pie represents the percentage of the number of samples in which that species was dominant relative to the number of samples analysed for that specimen type.

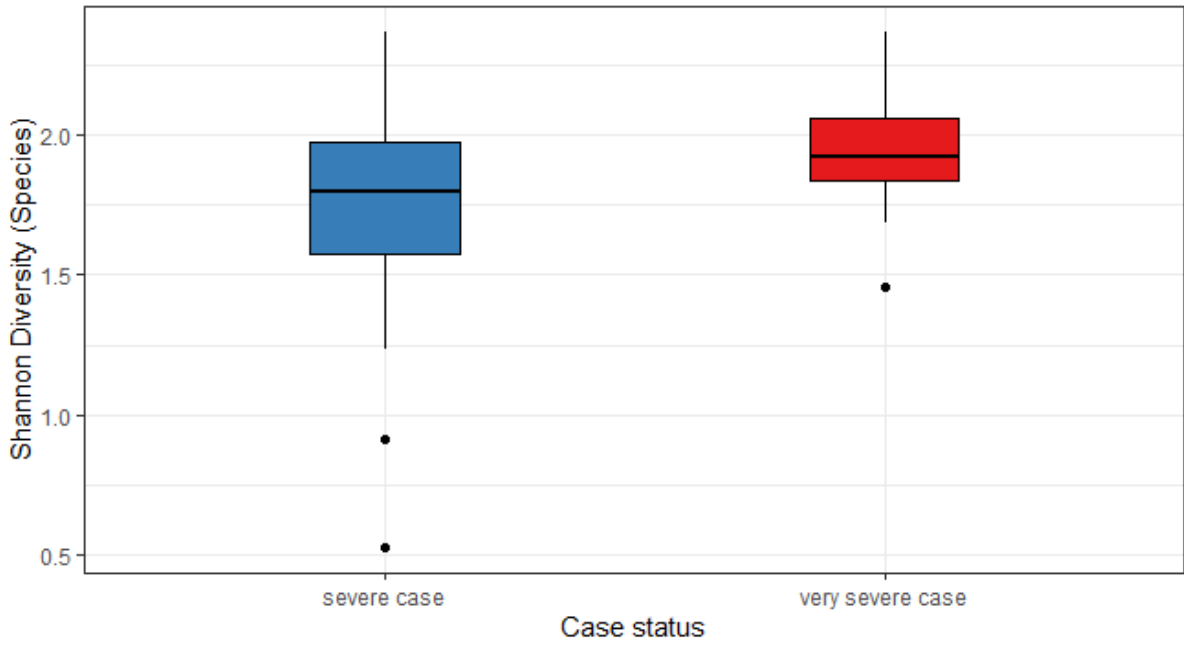


Figure S3: Shannon diversity of the nasopharynx microbial community by case type. Median Shannon diversity values are represented by horizontal lines within each boxplot while the upper and lower ranges of each boxplot represent the 75% and 25% quartiles.

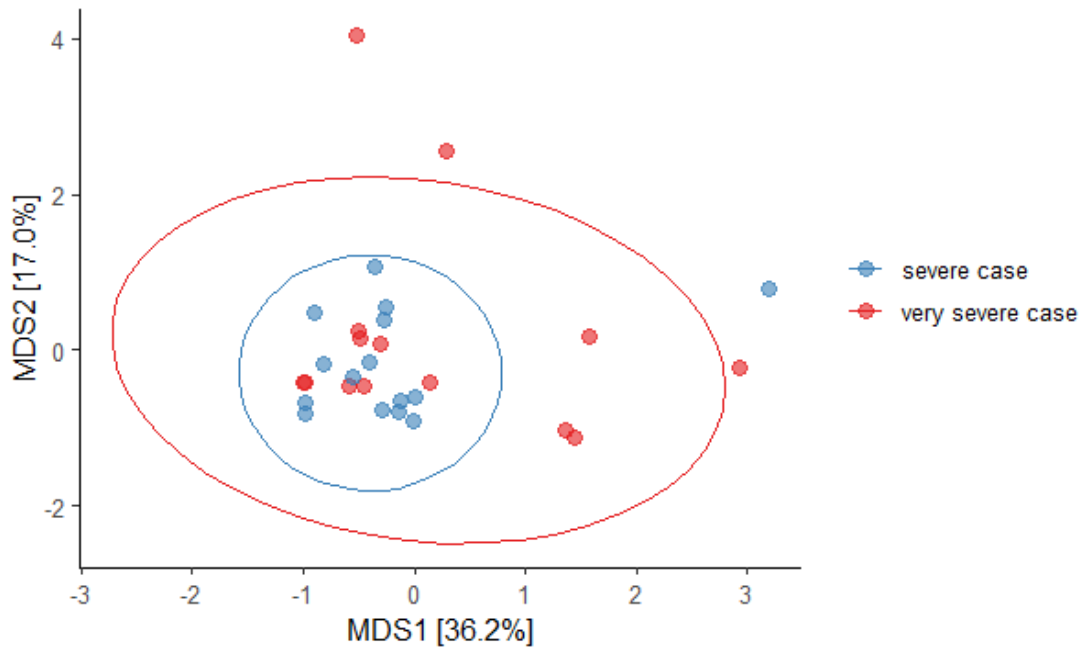


Figure S4: Principal Coordinates Analysis (PCoA) plot based on Aitchison distance of severe cases and very severe cases.

Table S3: Accession numbers of the samples used in this paper

Accession	Sample name	Specimen	Bioproject accession
SAMN28592158	G00009_1C	Blood	PRJNA727021
SAMN28592134	G00009_30	Nasopharyngeal swab	PRJNA727021
SAMN28592087	G00009_3B	Nasopharyngeal and Oropharyngeal Swabs	PRJNA727021
SAMN28592159	G00014_1C	Blood	PRJNA727021
SAMN28592099	G00014_4A	Induced Sputum	PRJNA727021
SAMN28592112	G00088_30	Nasopharyngeal swab	PRJNA727021
SAMN28592150	G00088_90	Lung aspirate	PRJNA727021
SAMN28592135	G00145_30	Nasopharyngeal swab	PRJNA727021
SAMN28592085	G00145_36	Nasopharyngeal and Oropharyngeal Swabs	PRJNA727021
SAMN28592100	G00145_4A	Induced Sputum	PRJNA727021
SAMN28592136	G00182_30	Nasopharyngeal swab	PRJNA727021
SAMN28592101	G00182_4A	Induced Sputum	PRJNA727021
SAMN28592113	G00186_30	Nasopharyngeal swab	PRJNA727021
SAMN28592151	G00186_90	Lung aspirate	PRJNA727021
SAMN28592152	G00196_90	Lung aspirate	PRJNA727021
SAMN28592137	G00215_30	Nasopharyngeal swab	PRJNA727021
SAMN28592083	G00215_3B	Nasopharyngeal and Oropharyngeal Swabs	PRJNA727021
SAMN28592102	G00215_4A	Induced Sputum	PRJNA727021
SAMN28592116	G00248_30	Nasopharyngeal swab	PRJNA727021
SAMN28592153	G00248_90	Lung aspirate	PRJNA727021
SAMN28592163	G00253_18	Blood	PRJNA727021
SAMN28592138	G00253_30	Nasopharyngeal swab	PRJNA727021
SAMN28592082	G00253_3B	Nasopharyngeal and Oropharyngeal Swabs	PRJNA727021
SAMN28592117	G00266_30	Nasopharyngeal swab	PRJNA727021
SAMN28592154	G00266_90	Lung aspirate	PRJNA727021
SAMN28592139	G00268_30	Nasopharyngeal swab	PRJNA727021
SAMN28592103	G00268_4A	Induced Sputum	PRJNA727021
SAMN28592118	G00278_30	Nasopharyngeal swab	PRJNA727021
SAMN28592155	G00278_90	Lung aspirate	PRJNA727021
SAMN28592120	G00318_30	Nasopharyngeal swab	PRJNA727021
SAMN28592165	G00342_1C	Blood	PRJNA727021
SAMN28592080	G00342_3B	Nasopharyngeal and Oropharyngeal Swabs	PRJNA727021
SAMN28592104	G00342_4A	Induced Sputum	PRJNA727021
SAMN28592121	G00353_30	Nasopharyngeal swab	PRJNA727021
SAMN28592157	G00353_90	Lung aspirate	PRJNA727021
SAMN28592166	G00411_17	Blood	PRJNA727021
SAMN28592141	G00411_30	Nasopharyngeal swab	PRJNA727021
SAMN28592122	G00423_30	Nasopharyngeal swab	PRJNA727021
SAMN28592123	G00467_30	Nasopharyngeal swab	PRJNA727021
SAMN28592167	G00479_1C	Blood	PRJNA727021
SAMN28592089	G00479_3B	Nasopharyngeal and Oropharyngeal Swabs	PRJNA727021
SAMN28592168	G00509_1C	Blood	PRJNA727021
SAMN28592143	G00509_30	Nasopharyngeal swab	PRJNA727021
SAMN28592090	G00509_3B	Nasopharyngeal and Oropharyngeal Swabs	PRJNA727021

SAMN28592106	G00509_4A	Induced Sputum	PRJNA727021
SAMN28592169	G00605_1C	Blood	PRJNA727021
SAMN28592144	G00605_30	Nasopharyngeal swab	PRJNA727021
SAMN28592107	G00605_4A	Induced Sputum	PRJNA727021
SAMN28592124	G00633_30	Nasopharyngeal swab	PRJNA727021
SAMN28592125	G00652_30	Nasopharyngeal swab	PRJNA727021
SAMN28592126	G00660_30	Nasopharyngeal swab	PRJNA727021
SAMN28592092	G00667_3B	Nasopharyngeal and Oropharyngeal Swabs	PRJNA727021
SAMN28592171	G00680_1C	Blood	PRJNA727021
SAMN28592093	G00680_3B	Nasopharyngeal and Oropharyngeal Swabs	PRJNA727021
SAMN28592127	G00749_30	Nasopharyngeal swab	PRJNA727021
SAMN28592128	G00774_30	Nasopharyngeal swab	PRJNA727021
SAMN28592172	G00789_17	Blood	PRJNA727021
SAMN28592147	G00789_30	Nasopharyngeal swab	PRJNA727021
SAMN28592108	G00789_4A	Induced Sputum	PRJNA727021
SAMN28592129	G00866_30	Nasopharyngeal swab	PRJNA727021
SAMN28592095	G00973_3B	Nasopharyngeal and Oropharyngeal Swabs	PRJNA727021
SAMN28592109	G00973_4A	Induced Sputum	PRJNA727021
SAMN28592131	G01021_30	Nasopharyngeal swab	PRJNA727021
SAMN28592174	G01032_18	Blood	PRJNA727021
SAMN28592149	G01032_30	Nasopharyngeal swab	PRJNA727021
SAMN28592096	G01032_36	Nasopharyngeal and Oropharyngeal Swabs	PRJNA727021
SAMN28592110	G01032_4A	Induced Sputum	PRJNA727021
SAMN28592097	G01038_37	Nasopharyngeal and Oropharyngeal Swabs	PRJNA727021
SAMN28592111	G01038_4A	Induced Sputum	PRJNA727021
SAMN28592132	G01175_30	Nasopharyngeal swab	PRJNA727021
SAMN28592133	G01180_30	Nasopharyngeal swab	PRJNA727021