

Supplementary Table S1. Viral distribution

Viral pathogen	Number of detections (n)	Percentage (%)
Adenovirus	227	33.2
Epstein–Barr virus	151	22.1
Norovirus	79	11.5
Rhinovirus	67	9.8
Cytomegalovirus	54	7.9
Parainfluenza virus	40	5.8
Rotavirus	37	5.4
Coxsackie virus	24	3.5
Coronavirus	4	0.6

Supplementary Table S2. Bacterial pathogen distribution

Bacterial pathogen	Number of detections (n)	Percentage (%)
<i>Streptococcus pneumoniae</i>	677	69.2
<i>Haemophilus influenzae</i>	226	23.1
<i>Staphylococcus aureus</i>	23	2.3
<i>Klebsiella pneumoniae</i>	19	1.9
<i>Acinetobacter baumannii</i>	13	1.3
<i>Escherichia coli</i>	10	1.0
<i>Pseudomonas aeruginosa</i>	4	0.4
Other bacteria	5	0.5

Supplementary Table S3. Category combinations in the multiple co-infection group

Combination type	Number of cases (n)	Percentage (%)
Virus + Bacteria	102	41.1
Bacteria + MP	90	36.3
Virus + MP	45	18.1
Virus + Bacteria + MP	11	4.4

Supplementary Table S4. Most frequent specific pathogen combinations in the multiple co-infection group

Specific Combination	Number of cases (n)	Percentage (%)
RSV + MP + <i>Streptococcus pneumoniae</i>	52	21.0
RSV + Epstein–Barr virus + <i>Streptococcus pneumoniae</i>	27	10.9
RSV + Rhinovirus + <i>Streptococcus pneumoniae</i>	20	8.1
RSV + MP + <i>Haemophilus influenzae</i>	19	7.7
RSV + MP + Adenovirus	15	6.0
RSV + Epstein–Barr virus + MP	10	4.0
RSV + MP + <i>Haemophilus influenzae</i> + <i>Streptococcus pneumoniae</i>	10	4.0
RSV + Adenovirus + <i>Streptococcus pneumoniae</i>	9	3.6
RSV + Norovirus + <i>Streptococcus pneumoniae</i>	6	2.4
RSV + MP + Rotavirus	4	1.6

Supplementary Table S5. Distribution of the total number of detected pathogens in the multiple co-infection group

Total pathogens including RSV	Number of cases (n)	Percentage (%)
3	208	83.9
4	36	14.5
5	3	1.2
6	1	0.4

Note: For Supplementary Tables S1 and S2, numbers represent pathogen detections rather than unique patients because some patients had more than one detected viral or bacterial pathogen. For Supplementary Tables S3–S5, numbers represent patient cases in the multiple co-infection group. Percentages in Supplementary Table S4 were calculated using the total number of patients with multiple co-infections as the denominator (n = 248), and only the most frequent combinations are shown. RSV, respiratory syncytial virus; MP, *Mycoplasma pneumoniae*.