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## Background

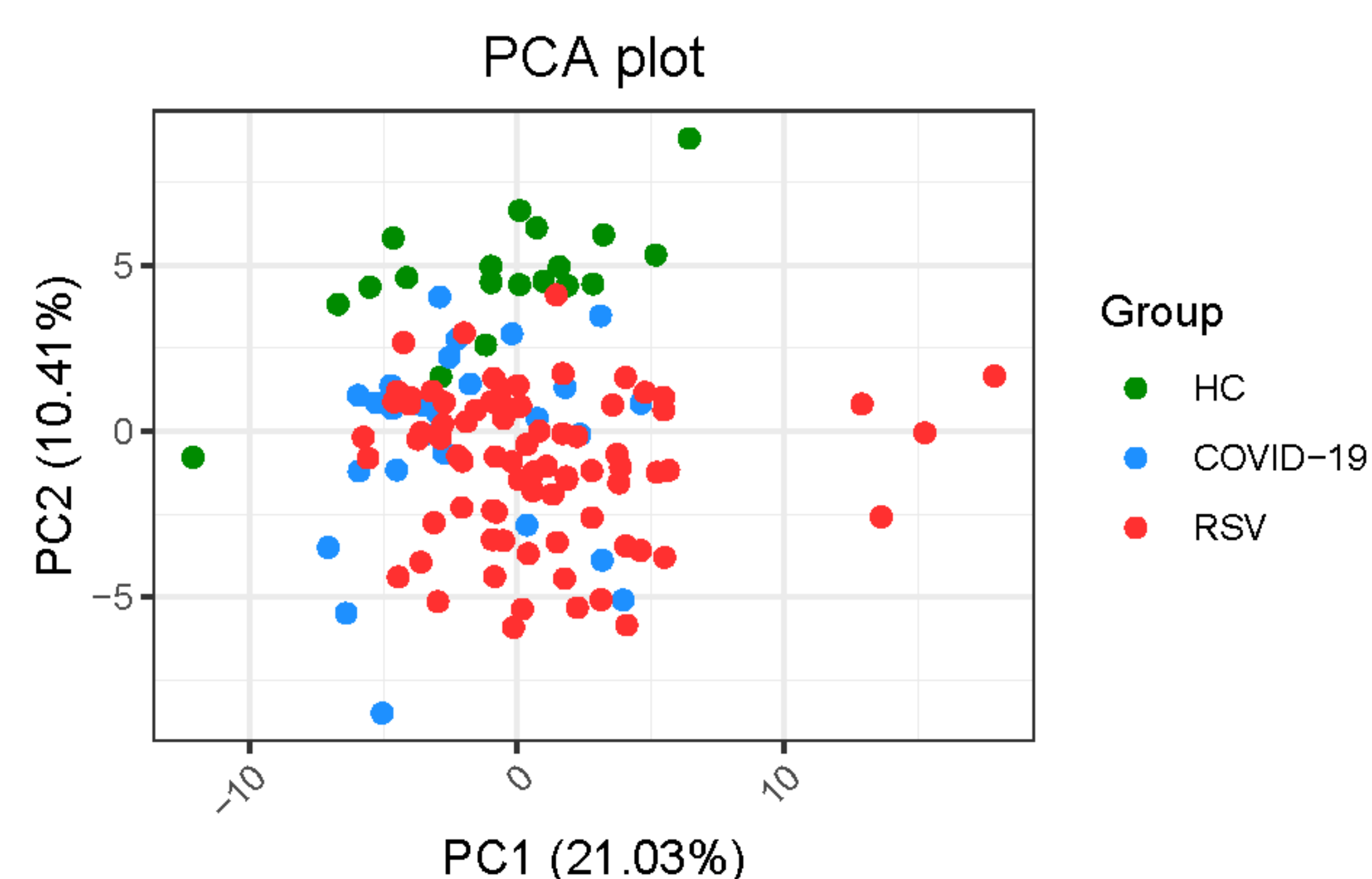
- Cytokines play a major role in the immune response to viral infections, contributing to viral clearance but also mediating immunopathology following infection
- We sought to define and compare the systemic cytokine responses in infants hospitalized with COVID-19 versus RSV infection

## Methods

- Prospective observational study of a convenience cohort of children < 1 year of age hospitalized with PCR confirmed SARS-CoV-2 or RSV infection, and pre-pandemic healthy controls (HC)
- Blood samples were obtained at enrollment and cytokine analysis performed using a 92-cytokine inflammation panel (Olink platform)
- Statistical analyses were performed in R environment

## Results

### Principal Component Analysis

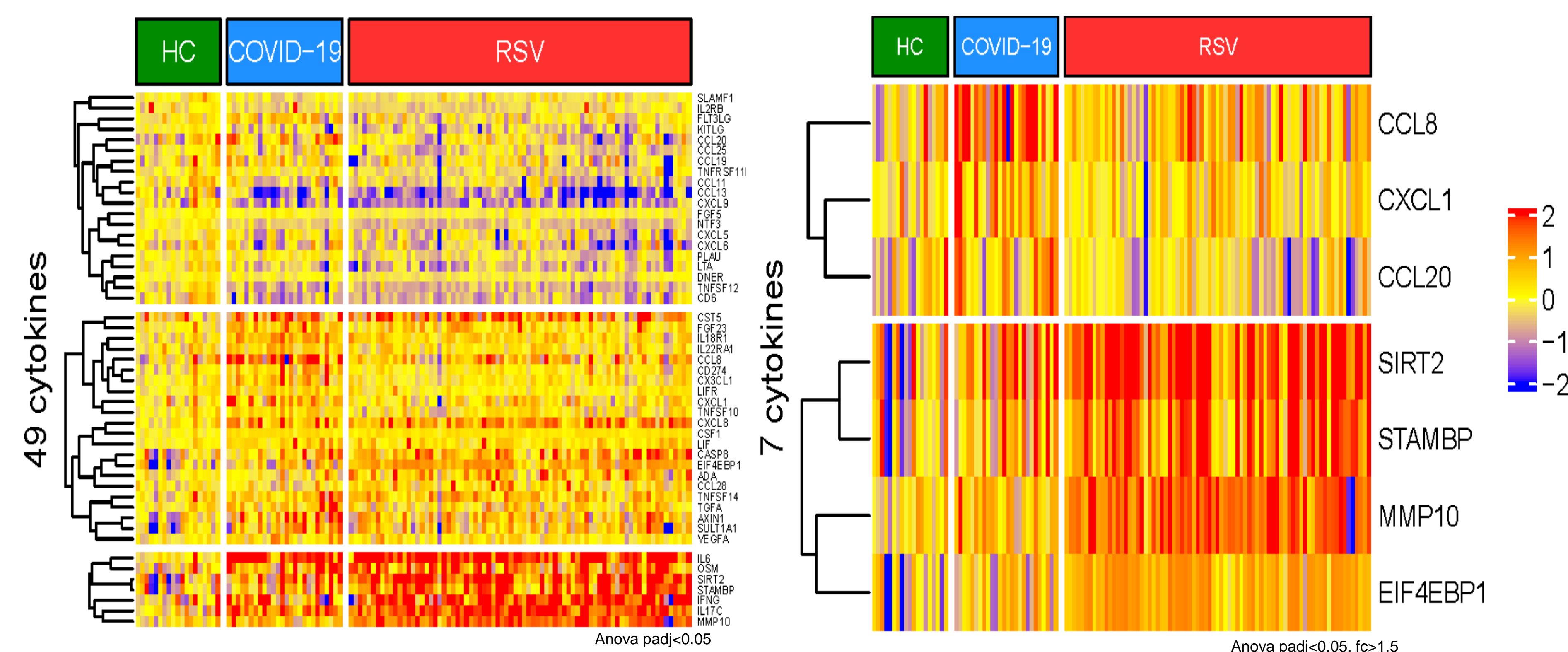


### Demographics and clinical characteristics

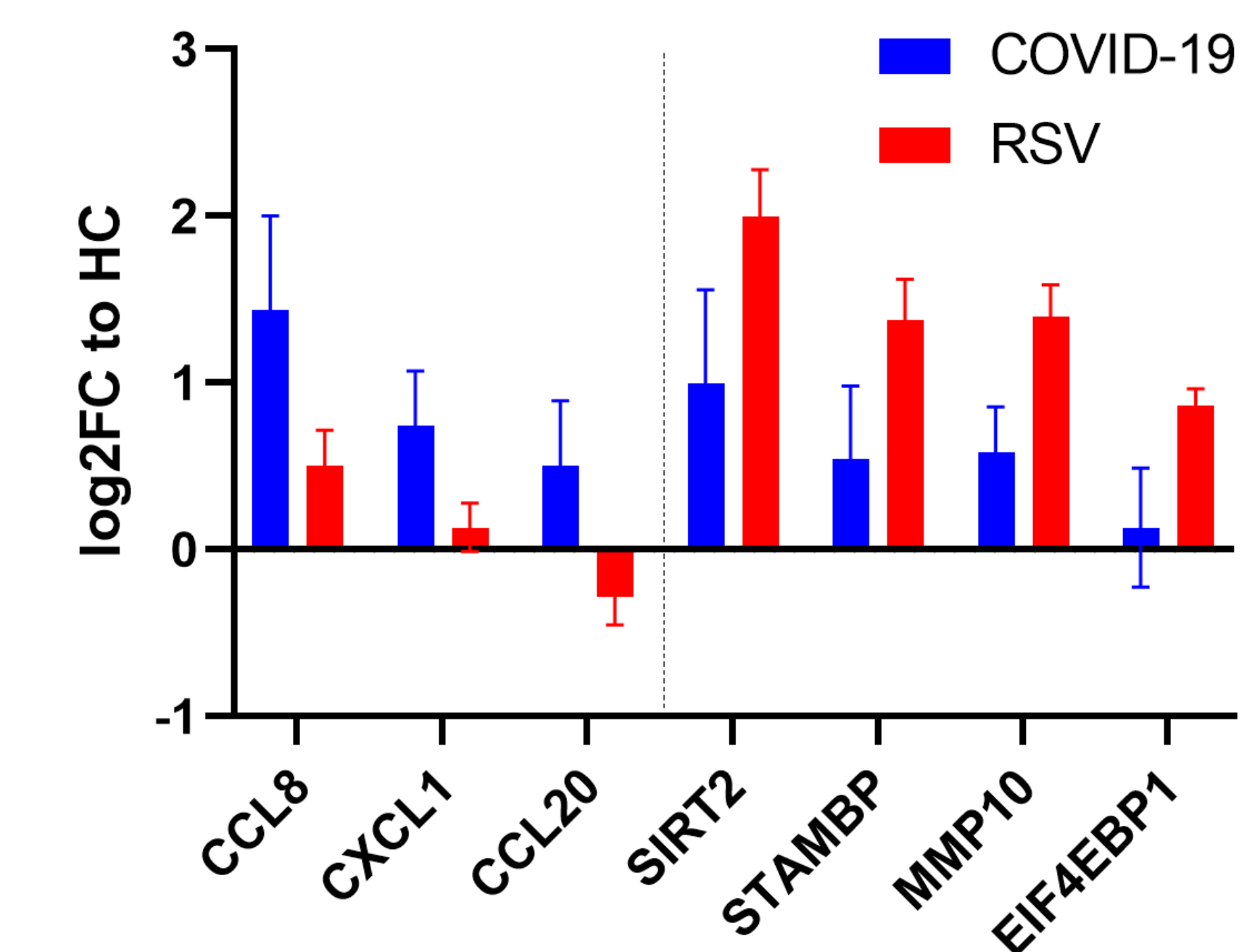
	RSV (n= 77)	COVID-19 (n= 26)	HC (n= 19)	*p value	**p value
Age, months	2.8 [1.2-11.6]	1.95 [0.9-66]	8.70 [7.2-11.9]	<0.001	0.54
Gender, Male	39 (50.6)	12 (46.2)	12 (63)	0.50	0.82
Race					
Asian/Biracial	12 (15.5)	8 (30.7)	3 (15.7)	0.09	0.33
Black	7 (9.2)	8 (30.7)	3 (15.7)		
White	58 (75.3)	10 (38.4)	13 (68.4)		
Comorbidities	6 (7.7)	7 (26.9)	NA	ND	<b>0.01</b>
Viral coinfection	18 (23)	2 (7)	NA	ND	0.09
Lymphocyte %	58 [46-86.5]	46.8 [27.6-65.2]	NA	ND	0.06
LOS, days	2.5 [1.2-3.8]	1.8 [1.6-3.5]	NA	ND	0.99
PICU admission	24 (31)	4 (15)	NA	ND	0.13
Oxygen requirement	38 (49)	4 (19)	NA	ND	<b>0.002</b>
Mechanical ventilation	3 (3.8)	2 (7.6)	NA	ND	0.59

\*Comparisons among RSV, COVID-19 and HC; \*\*Comparisons between RSV and COVID-19; HC: healthy control; LOS: length of stay; PICU: pediatric intensive care unit; Continuous variables displayed as medians [with 25%-75% interquartile ranges]. Mann-Whitney and Kruskal-Wallis tests were used to determine differences between two and three groups, respectively; Categorical data expressed as numbers (and percentages) and analyzed by Fisher's exact test or Chi square test.

### Serum cytokine concentrations in HC, COVID-19 and RSV



### Differences in serum cytokine concentrations between COVID-19 and RSV



## Conclusions

- Although infants with COVID-19 had more frequent comorbidities, those with RSV infection had worse disease severity as defined by increased oxygen requirement
- Analysis of systemic cytokine profiles identified a number of shared but also distinct cytokine responses in infants with COVID-19 and RSV infection
- Among the distinct cytokines, chemoattractant predominate in COVID-19 patients, such as CCL8 and CXCL1, while patients with RSV infection had higher concentrations of immunoregulatory cytokines, including SIRT2 and MMP10
- This suggests important differences in the immunopathogenesis of these two viral infections that warrant further studies

## Acknowledgements

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