

# Letters

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## RESEARCH LETTER

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### **Rates of Co-infection Between SARS-CoV-2 and Other Respiratory Pathogens**

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新冠肺炎讀書分享報告  
感染科

# Introduction

- Early reports from China suggested that co-infection with other respiratory pathogens was rare
- Patients positive for other pathogens might be assumed unlikely to have SARS-CoV-2
- We report on co-infection rates between SARS-CoV-2 and other respiratory pathogens in northern California

# Methods

- From March 3 through 25, 2020, we performed real-time reverse transcriptase-polymerase chain reaction tests for SARS-CoV-2 and other respiratory pathogens on nasopharyngeal swabs of symptomatic patients
- Laboratory of Stanford Health Care tested specimens from multiple sites in northern California
- We included specimens from sites that tested for a panel of non-SARS-CoV-2 respiratory pathogens simultaneously
  - Influenza A/B, respiratory syncytial virus, non-SARS-CoV-2 Coronaviridae, adenovirus, parainfluenza 1-4, human metapneumovirus, rhinovirus/enterovirus, *Chlamydia pneumoniae*, *Mycoplasma pneumoniae*

# Results

- **1217 specimens, from 1206 patients**
  - **116 specimens** (116/1217; 9.5%) were positive for SARS-CoV-2
  - **318 specimens** (318/1217; 26.1%) were positive for 1 or more non-SARS-CoV-2 pathogens
- Of the 116 specimens positive for SARS-CoV-2, **24 (20.7%)** were positive for 1 or more additional pathogens
- Most common co-infections were rhinovirus/enterovirus (6.9%), respiratory syncytial virus (5.2%), and non-SARS-CoV-2 Coronaviridae (4.3%)

Table 1. Patient Characteristics and Sites of Specimen Collection, by SARS-CoV-2 and Non-SARS-CoV-2 Pathogen Status

Characteristic	SARS-CoV-2 status, No. (%)			
	Negative (n = 1101)		Positive (n = 116)	
	Positive for other respiratory pathogen	Negative for other respiratory pathogen	Positive for other respiratory pathogen	Negative for other respiratory pathogen
No. of samples	294 (26.7%) <sup>1</sup>	807	24 (20.7%) <sup>1</sup>	92
No. of patients <sup>a</sup>	292 (292/1091; 26.8%) <sup>2</sup>	800	23 (23/115; 20.3%) <sup>2</sup>	92
Age, mean (range), y <sup>b</sup>	48.8 (7-82)	43.8 (1-100)	50.8 (9-88)	43.3 (1-98)
Female, No./total (%) <sup>b</sup>	161/292 (55.1)	443/800 (55.4)	12/23 (52.2)	52/92 (56.5)
Site of specimen collection, No./total (%) <sup>c</sup>				
Outpatient clinic	115/294 (39.1)	347/807 (43.0)	11/24 (45.8)	39/92 (42.4)
Emergency department				
Discharged	122/294 (41.5)	301/807 (37.3)	12/24 (50.0)	38/92 (41.3)
Admitted <sup>d</sup>	28/294 (9.5)	109/807 (13.5)	1/24 (4.2)	15/92 (16.3)
Inpatient	29/294 (9.9)	50/807 (6.2)	0/24	0/92

<sup>1</sup> 95% confidence interval, -2.3% ~ 14.3%

<sup>2</sup> 95% confidence interval, -1.5% ~ 15.0%

Table 2. Proportions of Specimens Positive for Non-SARS-CoV-2 Respiratory Pathogens and Mean Patient Ages for Each Subgroup, by SARS-CoV-2 Result<sup>a,b</sup>

Pathogen	SARS-CoV-2 status			
	Negative (n = 1101)		Positive (n = 116)	
	Proportion positive for other respiratory pathogen, No. (%) <sup>b</sup>	Mean age of positive patients, y	Proportion positive for other respiratory pathogen, No. (%) <sup>b</sup>	Mean age of positive patients, y
Influenza				
A	29/1101 (2.6)	45.9	1/116 (0.9)	74.0
B	8/1101 (0.7)	21.6	0/116 (0)	
RSV	32/1101 (2.9)	26.0	6/116 (5.2)	52.3
Parainfluenza				
1	1/1101 (0.1)	71.0	1/116 (0.9)	43.0
2	0/1101 (0)		0/116 (0)	
3	2/1101 (0.2)	40.0	1/116 (0.9)	45.0
4	5/1101 (0.5)	26.6	1/116 (0.9)	36.0
Metapneumovirus	47/1101 (4.3)	41.1	2/116 (1.7)	67.0
Rhinovirus/enterovirus	133/1101 (12.1)	32.6	8/116 (6.9)	42.1
Adenovirus	10/1101 (0.9)	14.1	0/116 (0)	
Other Coronaviridae	39/1101 (3.5)	42.2	5/116 (4.3)	40.8
<i>Chlamydia pneumoniae</i>	0/1060 (0)		0/116 (0)	
<i>Mycoplasma pneumoniae</i>	6/1101 (0.5)	14.8	0/116 (0)	

# Results

Variables		
<b>Positive for SARS-CoV-2 and other pathogens specimens</b> / total specimens <b>positive</b> for non-SARS-CoV-2 pathogens (%)	24/318 (7.5)	95% CI, -1.0% ~ 6.4%
<b>Positive for SARS-CoV-2 but negative for other pathogens specimens</b> / total specimens <b>negative</b> for non-SARS-CoV-2 pathogens (%)	92/899 (10.2)	

- Results were not substantially changed by restricting the analysis to 1 specimen per patient
- Patients with co-infections did not differ significantly in age (mean, 46.9 years) from those infected with SARS-CoV-2 only (mean, 51.1 years) (4.2-year difference [95% CI, -4.8 to 13.2])

# Comment

- **Higher rates of co-infection** between SARS-CoV-2 and other respiratory pathogens than previously reported
- The presence of a non-SARS-CoV-2 pathogen may not provide reassurance that a patient does not also have SARS-CoV-2.
- Routine testing for non-SARS-CoV-2 respiratory pathogens during the COVID-19 pandemic is unlikely to provide clinical benefit unless a positive result would change disease management (e.g., neuraminidase inhibitors for influenza in appropriate patients)
- The study is limited to a single region, sample size, restriction to multiply tested specimens, and spatiotemporal variation in viral epidemiology