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BACKGROUND & OBJECTIVES

The introduction of non-pharmaceutical interventions (NPIs) during the COVID pandemic also coincided with a reduction in the detection of a range of respiratory pathogens. Here, the prevalence of respiratory viruses detected by molecular assays before and during the COVID-19 pandemic on samples collected in primary care (PC) and in a hospital setting from patients presenting with an acute respiratory tract infection (ARI) is reported.

METHODS

Nucleic acids from nasopharyngeal swabs, or combined oropharyngeal and nasal swabs collected in the PC PREPARE (ALIC⁴E, n=3227, January 2016-April 2018) and RECOVER studies (SOS-COVID, n=858, April 2020-June 2021) and in the MERMAIDS-ARI studies (Mermaids ARI, n=1044, February 2016-May 2019) and RECOVER ARI studies, (n=826 (ARI1.0) and n=295 (ARI2.0), March 2020-December 2022), in hospital settings were retrospectively extracted by the NucliSens EasyMag (BioMérieux) and analysed by the Fast-Track Respiratory 21 kit (FTD, Fast-Track Diagnostics) on a LC480 and the Custom TaqMan[®] Array Cards and the Fast Advance Master Mix (ThermoFisher Scientific) by using a Quantstudio 7Flex, respectively. Following organisms were targeted: influenza A and B; influenza A H1 and H3; SARS-CoV-2; hCoV 229E, OC43, NL63 and HKU1; HRV; hMPV; RSV A and B; AdV; hBoV; PIV1-4; hPeV and EV.



RESULTS

Viruses such as influenza A and B and RSV, causing the majority of the ARIs both in primary care and hospital settings before the pandemic, were hardly or not at all detected during the COVID pandemic; prevalence of influenza viruses before the pandemic was 52.1%, 27.1% in PC and 25.8% in hospital settings whereas the prevalence decreased to 0% and 0.1% in hospital settings during the pandemic (p<0.0001). If detected, it was at the end of the enrollment period. Prevalence of SARS-CoV-2 varied between 22.7% and 44.0% in PC and between 48.9% and 81.0% in hospital settings. Seasonal coronaviruses, other respiratory viruses, and viral co-infections were also detected less frequently during the pandemic. Remarkably the prevalence of rhinoviruses increased during the pandemic in PC patients (7.1 and 14.7% versus 15.6 and 12.8%) although prevalence decreased in hospitalized patients (11.0% versus 4.4 and 0.3%).

Enrollment period	Before COVID			During COVID pandemic			
	15/01/16-12/04/18	04/02/16-24/04/19	10/01/16-24/05/19	14/04/20-04/06/21	08/07/20-28/10/21	09/04/20-14/12/22	23/03/20-13/09/21
Pathogen	ALIC ⁴ E (% n=3227)	ARI PC (% n=472)	ARI Hospital (% n=1044)	SOS COVID (% n=858)	ARI1.0 PC (% n=109)	ARI1.0 Hospital (% n=826)	ARI2.0 (% n=295)
Influenza A virus	29.6*	11.9*	18.3*	0*	0*	0.1*	0
Influenza B virus	22.6*	15.3*	7.5*	0*	0*	0*	0
Influenza virus	52.1*	27.1*	25.8*	0*	0*	0.1*	0
SARS-CoV-2	0*	0*	0*	22.7*	44.0*	48.9*	81.0
Coronavirus NL63/229E/OC43/HKU1	9.6*	10.0***	3.2*	3.2* ↓	0*** ↓	0.1* ↓	0
Rhinovirus	7.1*	14.7	11*	15.6* ↑	12.8	4.4* ↓	0.3 ↓
Human metapneumovirus A/B	3.2	1.3	3.4*	3.3	0	0.4* ↓	0
RSV A/B	2.9*	3.6**	3.4*	0*	0**	0.2*	0
Adenovirus	2.8**	0.4	1.1**	0.8** ↓	0	0.1** ↓	0
Bocavirus	1.5	0.6	0.2	0.9	0	0.1	0.3
Parainfluenza virus 1-4	0.7**	1.9	2.3**	0** ↓	0	0.6** ↓	0
Enterovirus	0.5	0.4	0.3	0.6	0	0.2	0.3
Parechovirus	0.2	0.2	0	0	0	0	0
Viral co-detection/co-infection	6.7	3.0	1.2	3.7	0.9	1.3	0.3

*p<0.0001, **p<0,05, ***p<0,001 https://www.medcalc.org/calc/comparison_of_proportions.php

CONCLUSION

Our findings are consistent with several reports about a worldwide reduction in various respiratory viruses circulating except for rhinoviruses during the COVID pandemic and confirm the absence of influenza viruses and RSV. Non-pharmaceutical interventions may have contributed to the decreased circulation of normally-circulating respiratory viruses.

References

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