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Supplementary material

Supplement to: Hon KL, Leung KKY, Hui WF, et al. Waltzing with SARS-CoV-2 for Asia? Hong Kong Med J 2024;30:179-80. https://doi.org/10.12809/hkmj219890.

Supplementary Table. Comparison of the four common childhood respiratory viruses[1-12]

	Influenza	COVID-19	Respiratory syncytial virus	Rhinovirus
Epidemiology	➢ Five pandemics in the last 140 years, with the 1918 pandemic being the most severe ➢ Estimated >50 to 100 million deaths ➢ <1 million deaths in the 2009 swine flu pandemic ➢ Pandemics occur irregularly ➢ Aerosol transmission ➢ R_0 = 1-2 ➢ Three to four waves of increasing lethality ➢ Mortality was greater at the beginning of a wave	➢ Repeated zoonoses (eg, SARS, MERS, and now COVID-19) and annual circulation of seasonal coronaviruses ➢ Between 2000 and 2022: >774 million cases confirmed, with >7 million deaths reported ➢ Global death-to-case ratio: 2.1% ➢ Aerosol and airborne transmission ➢ R_0 = 2-3 ➢ In waves with containment and mitigation stages	➢ Most common cause of respiratory hospitalisation in infants ➢ An important pathogen in all age groups ➢ Infection rates higher during the cold winter months ➢ Bronchiolitis in infants, common colds in adults, and more serious respiratory illnesses, such as pneumonia in the elderly and immunocompromised individuals[1] ➢ Outbreaks spread by contaminated air droplets	➢ High global prevalence[2] ➢ Infants, the elderly, and immunocompromised individuals most affected[3] ➢ Transmission via respiratory aerosols and fomites
Biology of organisms	➢ Envoloped single-stranded RNA virus ➢ *Orthomyxoviridae* family ➢ Majority influenza A,	➢ Enveloped single-stranded RNA virus ➢ *Coronaviridae* family ➢ SARS-CoV-2 ➢ Possible association	➢ Single-stranded negative-sense RNA virus ➢ *Pneumoviridae* family ➢ No genetic	➢ Single-stranded positive-sense RNA genomes ➢ *Picornaviridae* family

	➢	eg, H1N1, H2N2, H3N2, and H5N1 Associated with antigenic shift		with antigenic drift		reassortment and antigenic shifts[1]	
New strains/variants	➢	Zoonotic transmission (eg, pigs, chickens, and ducks)	➢	New variants: B.1.1.7, P.1, B.1.351, B.1.427, and B.1.429	➢	Antigenic subtypes A and B	➢ Three species (A, B, and C)
Pathophysiology of clincal presentation	➢	Haemagglutinin protein of the influenza virus binds to the sialosaccharides of respiratory epithelial cells Viral replication within the neucleus	➢	Spike protein of the SARS-CoV-2 virus binds to the angiotensin-converting enzyme 2 receptor of olfactory and respiratory epithelial cells Viral replication in the cytoplasm		N/A	N/A
Diagnosis	➢	RT-PCR test to detect influenza RNA from upper respiratory tract samples, eg, nasopharyngeal swab, nasopharyngeal aspirate	➢	RT-PCR test to detect SARS-CoV-2 RNA from upper respiratory tract samples, eg, nasopharyngeal swab, nasopharyngeal aspirate, and deep throat saliva Serologic test to identify previous or late infections	➢	Antigen, molecular testing Viral culture	➢ RT-PCR test
Variable	➢	~5%	➢	Overall 2% to 3%	➢	At least one RSV	➢ Not usually associated

mortality	➢	Lower mortality than RSV in children[4]	➢	Low mortality; children may be asymptomatic or silent carriers		infection by the age of 2 years ➢ Reinfection is common ➢ More serious infections in 15% to 50% of cases in children, 25% of cases in adults ➢ High mortality in infants and the elderly[4,5] ➢ 80% mortaliIity in immunocompromised individuals	➢	with mortality ➢ Infants, the elderly, and immunocompromised individuals are most affected
Prevention strategies	➢	Culling and vaccinating livestock ➢ Vaccinating poultry workers against common strains ➢ Limiting travel in pandemic areas ➢ Strategies to slow down a pandemic include public response measures, social distancing, respiratory hygiene, handwashing hygiene, masks, and risk	➢	Staying at home, universial mask wearing, avoiding crowded places, social distancing, ventilating indoor spaces, thorough hand washing, practising respiratory hygiene, and avoiding touching the eyes, nose, or mouth with unwashed hands ➢ Vigilant contact tracing	➢	Thorough hand washing, avoiding close contact ➢ Palivizumab in high-risk infants[5,6]	➢	Droplet precautions ➢ Thorough hand washing ➢ Surgical mask and gloves

		communication	➢	Travel restrictions and quarantine measures ➢ Regular testing					
Antiviral drugs	➢	Oseltamivir and zanamivir ➢ Adamantanes (amantadine and rimantadine)	➢	No specific effective antiviral treatment or cure (no good evidence for lopinavir, ritonavir, or remdesivir) ➢ At risk groups with mild to moderate symptoms can take nirmatrelvir/ritonavir ➢ Glucocorticoid (dexamethasone) effective for severe cases	➢	Ribavirin controversial[7]	➢	Pleconaril is not currently available	
Vaccines	➢	Several ➢ Variable efficacies and side-effects ➢ Vaccine hesistancy	➢	>13 vaccines ➢ Variable efficacies and side-effects ➢ Vaccine hesistancy	➢	No vaccine yet[7]	➢	No vaccine yet	

Abbreviations: COVID-19 = coronavirus disease 2019; MERS = Middle East respiratory syndrome; N/A = not available; RT-PCR = reverse transcriptase–polymerase chain reaction; R_0 = reproduction number; SARS = severe acute respiratory syndrome; SARS-CoV-2 = severe acute respiratory syndrome coronavirus 2

References

1. Coultas JA, Smyth R, Openshaw PJ. Respiratory syncytial virus (RSV): a scourge from infancy to old age. Thorax 2019;74:986-93.
2. Ljubin-Sternak S, Meštrović T, Lukšić I, Mijač M, Vraneš J. Seasonal coronaviruses and other neglected respiratory viruses: a global perspective and a local snapshot. Front Public Health 2021;9:691163.
3. Jacobs SE, Lamson DM, St George K, Walsh TJ. Human rhinoviruses. Clin Microbiol Rev 2013;26:135-62.

4. Fleming DM, Pannell RS, Cross KW. Mortality in children from influenza and respiratory syncytial virus. J Epidemiol Community Health 2005;59:586-90.
5. Chan PK, Tam WW, Lee TC, et al. Hospitalization incidence, mortality, and seasonality of common respiratory viruses over a period of 15 years in a developed subtropical city. Medicine (Baltimore) 2015;94:e2024.
6. American Academy of Pediatrics Committee on Infectious Diseases and Committee on Fetus and Newborn. Revised indications for the use of palivizumab and respiratory syncytial virus immune globulin intravenous for the prevention of respiratory syncytial virus infections. Pediatrics 2003;112(6 Pt 1):1442-6.
7. Battles MB, McLellan JS. Respiratory syncytial virus entry and how to block it. Nat Rev Microbiol 2019;17:233-45.
8. Hon KL, Leung KK, Hui WF, Ng DK. Applying lessons from influenza pandemics to the COVID-19 pandemic. Pediatr Pulmonol 2021;56:3071-4.
9. El-Nakeep S. To vaccinate or not to vaccinate; that is the question! (new insights into COVID-19 vaccination). Curr Mol Med 2022;22:567-71.
10. World Health Organization. Coronavirus disease (COVID-19): similarities and differences between COVID-19 and influenza. January 2024. Available from: https://www.who.int/news-room/questions-and-answers/item/coronavirus-disease-covid-19-similarities-and-differences-with-influenza. Accessed 10 Apr 2024.
11. Flerlage T, Boyd DF, Meliopoulos V, Thomas PG, Schultz-Cherry S. Influenza virus and SARS-CoV-2: pathogenesis and host responses in the respiratory tract. Nat Rev Microbiol 2021;19:425-41.
12. Manoha C, Espinosa S, Aho SL, Huet F, Pothier P. Epidemiological and clinical features of hMPV, RSV and RVs infections in young children. J Clin Virol 2007;38:221-6.