



A living review examining the impact of COVID-19 pandemic on Influenza and Respiratory Syncytial Virus activity

Week 16.08.2021 to 22.08.2021

Contributing authors: Durga Kulkarni, Thulani Ashcroft, Bohee Lee, Madhurima Nundy, Karen Hartnup, Evropi Theodoratou, Ruth McQuillan, Ting Shi and Emilie McSwiggan for the USHER Network for COVID-19 Evidence Reviews (UNCOVER)

Corresponding authors: Evropi Theodoratou (e.theodoratou@ed.ac.uk), Ruth McQuillan (ruth.mcquillan@ed.ac.uk)

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Purpose of the review

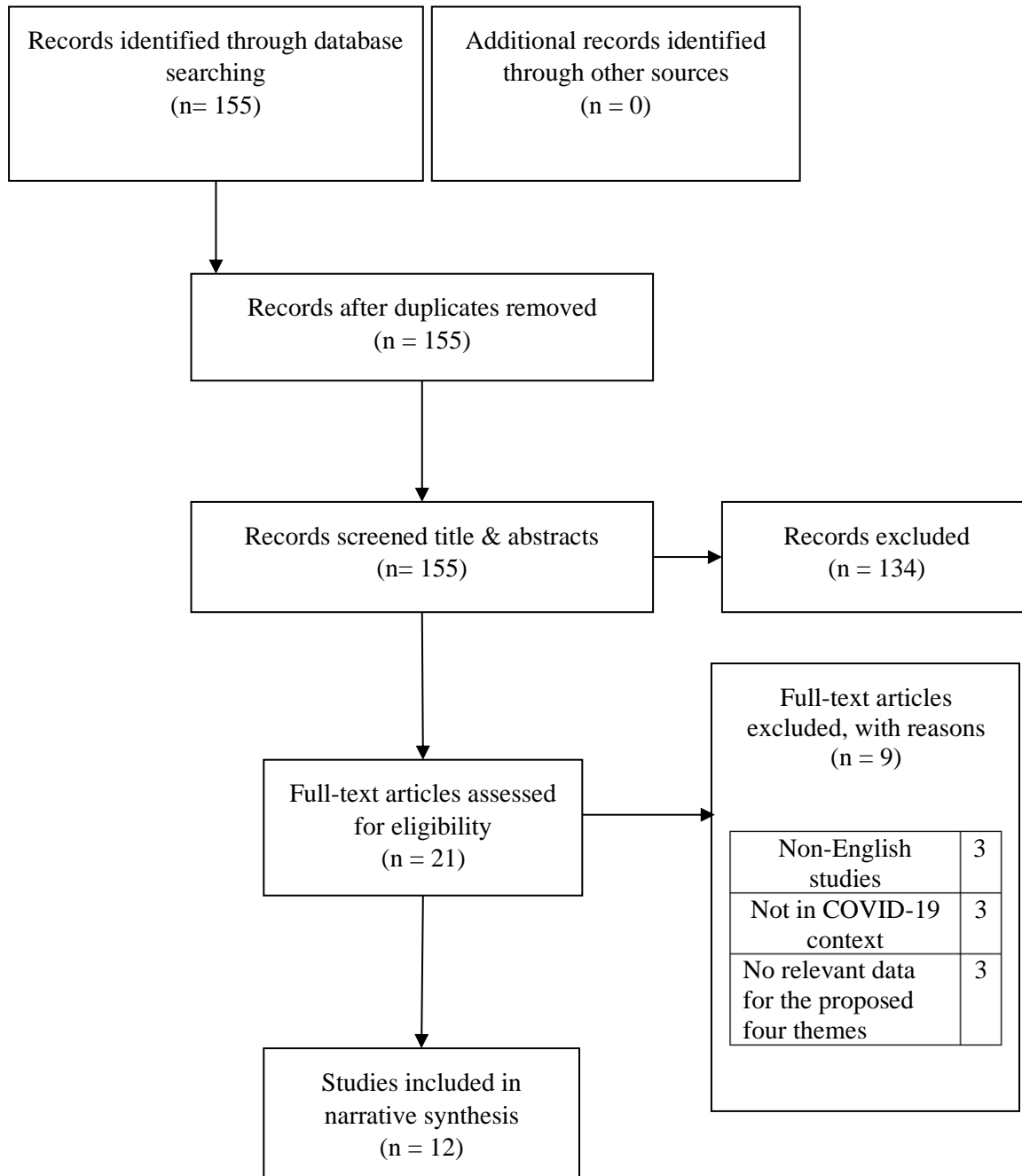
The aim of this review was to examine the impact of a novel virus, SARS-CoV-2, on the activity of Influenza virus and Respiratory Syncytial Virus (RSV) in the human population. Understanding their co-existence will help inform clinical guidelines and public policy to protect public health and prevent health services from becoming overwhelmed.

Methods

This rapid review was guided by the Preferred Reporting Items for Systematic Review and Meta-Analysis (PRISMA-2020) protocols statement (Page et al., 2021) and a study protocol was developed (see appendices). We designed a search strategy by developing a search string that included terms related to influenza and RSV (shown in appendices). The COVID-19 literature database was searched on 29th August 2021 for studies published between 16th August 2021 and 22nd August 2021, and results were imported to Covidence (COVIDENCE, 2021) after deduplication in EndNote. Within Covidence we then performed a further deduplication. Two reviewers from the review team performed independent screening of the titles and abstracts of all the records followed by independent screening of full-texts of the studies selected for full-text review. Disagreements at any stage were reconciled by discussion within

team members. A single reviewer performed data extraction for each included study. Figure 1 illustrates the flow of study selection at each stage.

Figure 1: PRISMA flow chart



Data extracted were study type and methods, country and WHO region, sources of data, period of data collection, and study findings. Four themes were used to synthesise the available literature on influenza virus and RSV:

- 1) The seasonality and circulating strains of influenza virus and RSV.
- 2) The epidemiology and surveillance activity of influenza virus and RSV. This includes disruptions to and adaptations for end-to-end integrated influenza/RSV and COVID-19 surveillance, change in surveillance standards (type of specimens processed, sampling strategy, testing algorithms, data reporting) and lessons from sentinel surveillance for SARS-CoV-2.
- 3) Effect of COVID-19 related public health measures and availability of COVID-19 vaccines on influenza and RSV activity.
- 4) The health systems, the reallocation of health resources such as poor availability of flu vaccines due to prioritization of health resources for COVID.

We were unable to conduct a formal quality assessment of individual studies, owing to time constraints. However, we commented on the general quality of evidence available for each theme.

Summary of findings

A total of 12 studies were included in this rapid review. Table 1 summarises the study characteristics and findings of each study by themes, with Table 2 providing quality assessment of the included studies.

Epidemiology/ surveillance

Three of the six studies on surveillance examined influenza alone or influenza and RSV rates within the general population (Kim et al., 2021a; Kim et al., 2021b; Tang and Chin 2021) and one reported an influenza positivity rate only in children (Khazanachi et al., 2021). Influenza rates were found to be lower in the early pandemic period compared to pre-pandemic levels in Malaysia (Tang and Chin, 2021) and Republic of Korea (Kim et al., 2021a). Lower rates of RSV were also found in Republic of Korea in the early pandemic period. Similarly, a multi-centre study, with data from seven countries in the Southern Hemisphere (Kim et al., 2021b),

found lower levels of influenza activity in 2020 compared to the previous ten years. The pediatric (≤ 18 years) study in the USA initially had high influenza positivity in early 2020, which then trended down to historical low levels during March 2020 and May 2021. After this time period, positivity began to climb reaching 35% positivity rates in July 2021. Another two studies focused on the coinfection of SARS-CoV-2 and influenza or other respiratory pathogens. One literature review (McIntosh et al., 2021) reported coinfection with influenza ranged from 0.3-0.54%, a higher proportion of coinfection (influenza or RSV coinfection at 3%) was found in a study from New York. The remaining study was a small household study (n= 1112) in Barcelona (Brotons et al., 2021) which tested an adult and a child in a house (regardless of household size) where there had been a positive case of COVID-19. No adults had coinfection and only two children had influenza, and one had RSV coinfection.

Public health measures and COVID-19 vaccinations

With regards to studies on public health measures, four studies were included in the review (Dong et al., 2021, Kataoka et al., 2021, Park et al., 2021, Ujiie et al., 2021). All these studies were reported from the Western Pacific Region (WPR) of the World Health Organisation (WHO) regions with two studies from Japan (Kataoka et al., 2021, Ujiie et al., 2021), one from China (Dong et al., 2021) and one from Korea (Park et al., 2021). They demonstrated that public health measures imposed to control the spread of COVID-19 infection in 2020 seemed to be associated with a decrease in both, influenza (Dong et al., 2021, Park et al., 2021) and RSV (Kataoka, et al., 2021, Ujiie et al., 2021) cases. Conversely, the relaxation of COVID protective public health measures and re-opening of schools coincided with a sharp rise in RSV infections in the paediatric population (Ujiie et al., 2021).

Seasonality and Health Systems

Two studies reported on seasonality and health systems. Boender et al., 2021 examined case definitions used in emergency departments in Germany for influenza like illness (ILI) and RSV, reporting seasonality for both in 2018, 2019 and 2020 with a steeper fall in March 2020 compared to previous years. Menezes et al. (2021) undertook a survey of influenza vaccination which suggested vaccination rates were adequate in Brazil despite COVID-19 preventive measures.

Table 1: Summary table of study characteristics and main findings

Themes	Study	Study type	Country (WHO region)	Data sources	Time period for data collection	Main findings
Seasonality	Boender et al., 2021	Ecological	Germany (EUR)	Hospital emergency departments (8)	March 2017 to March 2020	<ul style="list-style-type: none"> • A typical seasonality in 2018, 2019 and 2020 with a steeper fall in case numbers in March 2020 for both RSV and ILI was observed. • The same pattern was seen for probable and confirmed cases combined and separated.
Epidemiology/surveillance	Kim et al., 2021a	Ecological	Republic of Korea (WPR)	Respiratory virus national surveillance system	Weekly detection between 2016 to 2019 compared to 2020	<ul style="list-style-type: none"> • Weekly detection rates of influenzae virus and RSV (confirmed by PCR) in 2020 was significantly reduced compared to rates in 2016-2019. Annual rate 4.50 in 2020 % vs 11.46% in 2016-2019 for influenza ($p < 0.05$) and 1.45% in 2020 vs 3.73% in 2016-2019 for RSV ($p < 0.05$). • During the COVID-19 pandemic, enveloped viruses (like influenza virus, RSV) were rarely detected in patients with influenza like illness.

Themes	Study	Study type	Country (WHO region)	Data sources	Time period for data collection	Main findings
Epidemiology/ surveillance	Kim et al., 2021b	Ecological	Argentina (AMR), Australia (WPR), Bolivia (AMR), Chile (AMR), Madagascar (AFR), Paraguay (AMR), and South Africa (AFR)	Country-level influenza surveillance records extracted from the FluNet database	2010 to 2020	<ul style="list-style-type: none"> • The average influenza-positive proportions (IPPs) decreased significantly in 2020 compared with the preceding 10 years ($p < 0.01$ in each country). • All seven countries had $< 10\%$ IPP in 2020. • The fall in IPP ranged from 3.1 % (Argentina) to 31.1 % (Madagascar). Argentina, Australia and Chile had no weeks with an IPP $\geq 10\%$ in 2020, and Bolivia had the most weeks ($n = 9$) with an IPP $\geq 10\%$ in 2020. • Peaks in influenza activity were observed at the beginning of the year in some countries and the temporal declines varied between countries: after the implementation of public health measures, the IPP of Australia decreased immediately, while the IPPs of Argentina and South Africa increased. The IPP started to decline before NPI implementation in Bolivia, Chile, Madagascar and Paraguay. • However, none of the countries registered influenza surges after the incidence of COVID-19 increased. • The IPPs in the Southern hemisphere were significantly lower, and seasonal peaks were not observed in 2020 compared with 2010–2019.
	Tang and Chin, 2021	Ecological	Malaysia (WPR)	John Hopkins University for COVID-19 cases and FluNet for Influenza	3 rd Dec 2018 to 2 nd Feb 2020 versus 3 rd Feb 2020 to 4 th April 2021	<ul style="list-style-type: none"> • Subtypes of influenza A and B recorded. • A negative correlation was observed with weekly new cases of Influenza A and B. • The time trends over the first period showed no seasonality in Influenza subtypes (consistent with usual findings in Malaysia) but a sharp drop of cases in week 14 of 2020.

Themes	Study	Study type	Country (WHO region)	Data sources	Time period for data collection	Main findings
Epidemiology/ surveillance	Khazanchi et al., 2021	Cross-sectional	Minnesota, USA (AMR)	Electronic health records across 8 health systems	1 st Jan 2017 to 30 th July 2021	<ul style="list-style-type: none"> • Study in children (≤ 18 years) with pre-defined viral symptom who had influenza test or diagnostic code. • Influenza testing and positivity in early 2020 surpassed historical trends peaking by week 8 then declining steeply with the greatest slope in week 11-14. • Influenza positivity remained low and below historical averages from March 2020 to May 2021 (week 10 to week 20 ranged from 0.0-3.5%) but trended up since then eclipsing historical levels by mid-June (week 23) reaching ~35% at the end of the study period (week 30).
	Brotans et al., 2021	Cross-sectional	Barcelona, Spain (EUR)	Intra-household study on 1 st adult with SARS-CoV-2 RT-PCR positive had a multiplex viral swab	April 2020 to June 2020 respiratory panel after a 15-day minimum time lag.	<ul style="list-style-type: none"> • Nasopharyngeal SARS-CoV-2 RNA can be detectable for a prolonged time in the post-acute infection phase, even in the absence of antibody response assessed either by lateral flow assay tests (LFA) or enzyme-linked immunosorbent assay (ELISA). • Prolonged nasopharyngeal SARS-CoV-2 RNA persistence beyond the acute infection phase was frequent in adults quarantined at home during the first epidemic wave, but it was not associated with influenza or RSV coinfection.
	McIntosh et al., 2021	Review	Not applicable	Ovid Medline and PubMed	1 st Jan 2020 to 31 st Dec 2020	<ul style="list-style-type: none"> • Literature search for evidence on Sars CoV2 coinfection with Streptococcal pneumonia or influenza and effects of vaccines against influenzae or pneumonia on Sars CoV2. • Their review coinfection rates of Sars CoV2 and Influenzae in Turkey reported as 0.54%, and 0.3% in the UK and coinfection with Sars CoV2 and Influenzae or RSV was 3% in New York. • The UK study found higher mortality rate in those with coinfection (OR 5.92; 95% CI: 3.32-10.91).

Themes	Study	Study type	Country (WHO region)	Data sources	Time period for data collection	Main findings
Public health measures and COVID-19 vaccinations	Ujiie et al., 2021	Ecological	Japan (WPR)	Tokyo Metropolitan Infectious Diseases Surveillance Centre	From 2017 until the the epidemiological week 28 of 2021 (12 th July 2020 to 18 th July 2020).	<ul style="list-style-type: none"> • Years 2017 to 2019 reported RSV outbreaks during summer and autumn. • No outbreaks were reported in 2020. • The largest annual increase in cases since 2003 was reported in 2021. • The cumulative number of cases through week 28 of 2021 was 10,327, rising from a total of 570 in 2020. • <i>Public health measures:</i> Japan observed temporary school closures and restriction of children's group activities in 2020. In 2021, schools and kindergartens re-opened and aggressive viral testing possibly undertaken in schools to rule out COVID-19 infection in symptomatic children.
	Kataoka et al., 2021	Ecological	Japan (WPR)	Japan's National Epidemiological Surveillance Program	2015 to 2020-between week 1 and week 30 of every year	<ul style="list-style-type: none"> • Highest occurrence of RSV cases in 2015-2016 were in early January (week1/week 2) whereas the highest number of cases in 2017,2018 and 2019 were recorded in late July (week 30). • Lowest number of weekly cases were recorded from the middle of March 2020 (week 12) until the end of study period. • The annual number of reported cases for RSV reduced to 12,274 in 2020 as compared to 26,770 to 40,410 in the period between 2015-2019. • There was no significant week to week difference in case numbers in 2020 • No significant reduction in number of cases was observed in the same period for limitation of social activities. • <i>Public health measures:</i> Policies of school closures and adopting preventive behaviours significantly reduced number of cases in 2020.

Themes	Study	Study type	Country (WHO region)	Data sources	Time period for data collection	Main findings
Public health measures and COVID-19 vaccinations	Park et al., 2021	Ecological study	Korea (WPR)	National surveillance from the KCDC.	January 2016 to April 2020	<ul style="list-style-type: none"> • The 2019 to 2020 influenza epidemic ended within 3 weeks, from the epidemic peak to the epidemic end, with a 1.8- to 2.5-fold faster decline than in previous seasons. • During the COVID-19 pandemic, the positive rate, 26.5%, was significantly lower than those in previous years (47.7% to 69.9%). • Hospital-based surveillance reported a decline in hospitalised patients with acute viral respiratory illnesses confirmed by laboratory data. • <i>Public health measures:</i> Prior to implementing the social distancing measures, the seasonal respiratory virus was possibly controlled following strong adherence to personal preventive measures (mask wearing, coughing etiquette, and correct hand washing etiquette). After voluntary social distancing was implemented, the positivity rate continued to decrease and remained low.

Themes	Study	Study type	Country (WHO region)	Data sources	Time period for data collection	Main findings
Public health measures and COVID-19 vaccinations	Dong et al., 2021	Ecological study	China (WPR)	35 hospitals from the Respiratory Pathogens Surveillance System (RPSS)	Pre COVID-19 pandemic (1 st February 2015 to 31 st January 2020), and during the COVID-19 pandemic (1 st February 2020–31 st January 2021)	<ul style="list-style-type: none"> • A total of 41,630 acute respiratory tract infections (ARTIs) were reported in of which 37,490 (25,658 adults and 11,832 children) occurred before the COVID-19 epidemic, and 4140 (3379 adults and 761 children) occurred during the COVID-19 epidemic. • Influenza was the most common pathogen in the pre-pandemic study period (26.27% of all ARTI cases) and ranked 4th (13.08% of all ARTI cases) among other respiratory pathogens during the pandemic period. • 6.11% cases of ARTI were attributable to RSV in the pre-pandemic period which increased to 10.76% in the pandemic study period. • COVID-19 had a relatively smaller effect on the positive rate of RSV compared to other pathogens. • <i>Public health measures:</i> Overall reduction in total number of ARTI cases was possibly due to different levels of public health measures instituted and reduction in inpatient and outpatient hospital visits.

Themes	Study	Study type	Country (WHO region)	Data sources	Time period for data collection	Main findings
Health systems	Menezes et al., 2021	Population based study (survey)	Brazil (AMR)	Part of EPICOVID-19 study included 25 census tracts in 133 sentinel cities and 10 random households	27 th August 2020 to 30 th August 2020	<ul style="list-style-type: none"> • Self-reported influenza vaccination coverage was 82.3% in 2020 (95% CI 80.1%- 84.2%) in adults aged 60 years or older. • Over 97% of respondents reported being vaccinated in the public health system. • The Ministry of Health extended the free vaccine programme to other populations. • This rate of vaccine coverage was considered adequate in view of COVID-19 preventive measures. • <i>Significance to health systems:</i> The increase in influenza vaccine coverage may be the result of an intensive national influenza vaccination campaign. However, COVID-related lockdowns and the need for social isolation may have depressed influenza vaccination rates somewhat.
Abbreviation: AFR= Region of Africa AMR= Region of the Americas EUR= European region WPR= Western Pacific region						

Table 2: Quality of evidence of included studies

Theme	Number of studies	Quality of evidence*	Comments
Seasonality	(N = 1) Boender et al., 2021	Low	Ecological study (N = 1): Boender et al., 2021 Most cases were probable rather than confirmed. Cases were recorded per attendance and not linked to person, multiple visits by same person could have occurred.
Epidemiology / Surveillance	(N = 6) Kim et al., 2021a; Kim et al., 2021b; Tang and Chin, 2021; Khazanchi et al., 2021; Brotons et al., 2021; McIntosh et al., 2021	Moderate	Ecological studies (N = 3) 1. Kim et al., 2021a: This was moderate quality ecological study with a large sample size using national surveillance system. 2. Kim et al., 2021b: The study does not consider the difference in NPI stringency or public compliance and only covers 7 countries in the Southern hemisphere. 3. Tang and Chin, 2021: This is an ecological study which does not use national data but platforms from John Hopkins University for COVID-19 and GIRS for Influenzas cases and as such would be regarded as low quality. Cross-sectional studies (N = 2) 1. Khazanchi et al., 2021: This study may have underestimated true prevalence rates as it included patients seeking care at participating health systems, it did not examine other pathogen-specific outcomes for other respiratory viruses. 2. Brotons et al., 2021: This study did not evaluate both the direction of transmission between first-reported adult cases and children and the timing of SARS-CoV-2 and RV/EV infection in adults and children.

Theme	Number of studies	Quality of evidence*	Comments
			<p>Review (N = 1)</p> <p>1. McIntosh et al., 2021: This was not a systematic review with only single reviewer, limited information on methodology and only one database searched.</p>
<p>Public Health measures and COVID-19 vaccine availability</p>	<p>(N = 4) Ujiie et al., 2021; Kataoka et al., 2021; Park et al., 2021; Dong et al., 2021</p>	<p>Low to moderate</p>	<p>Ecological studies (N = 4): Ujiie et al., 2021; Kataoka et al., 2021; Park et al., 2021; Dong et al., 2021</p> <ol style="list-style-type: none"> 1. Exposure to public health measures was not measured similarly. 2. Data on public health measures were collected from other sources and did not explore the compliance of the population to these measures. 3. These studies were ecological in nature and evaluated the influence of public health measures or public compliance to public health measures on influenza or RSV infections. The findings, therefore, do not reflect the association between individual compliance to public health measures and influenza and RSV infections. 4. Confounding factors like climatic effects, viral interference, seasonality of influenza and RSV, and depleted surveillance capacity due to COVID-19 were not adjusted for. 5. Data used in all the studies was from the surveillance database and thus valid, reliable, and representative of the respective populations. 6. Causality cannot be established

Theme	Number of studies	Quality of evidence*	Comments
Health systems	(N = 1) Menezes et al., 2021	Low	<p>Population based study (N = 1): Menezes et al., 2021</p> <ol style="list-style-type: none"> 1. This study was based on a large sample size, but the sample is not representative of the wider Brazilian population, which is 14.2 % rural. It is not even representative of the Brazilian urban population since the human development index of the sentinel cities is higher than in the non-included cities. 2. The sentinel cities are the largest in each region and as such, likely to have larger and better resourced health systems. 3. Data based on self-reported vaccination status and may be subject to recall bias.

*Quality appraisal tool not used

Limitations of the review

We identified a few limitations in this review. There might be some levels of risk of bias because data were extracted and quality assessment of the studies were conducted by a single reviewer. The twelve included studies were reported from different countries and regions of the world and at variable time points. The number of COVID-19 cases, the seasons, prevailing epidemiology of RSV and influenza, and the COVID protective public health measures imposed by every country were variable at their respective data collection periods. Hence, this heterogeneity across studies does not allow this review to generalise the findings to other settings or populations. Further, this should not be considered a comprehensive literature review of the effect of the ongoing COVID-19 pandemic on influenza and RSV activity since our literature search was restricted to 16.08.2021 to 22.08.2021. In addition, the rapid turnaround of this review did not allow us to reflect on the relevance of our findings in the context of broader literature. However, this review was undertaken as a rapid review, in essence, to provide a quick summary of the available literature for the week between 16.08.2021 and 22.08.2021. We aim to update this review and summarise the existing literature weekly.

Conclusions

There were limited studies focussing on seasonality of influenza and RSV in the context of COVID-19 pandemic. As for the rates of these infections, several studies demonstrated a fall in their rates in early 2020. Public health measures against COVID-19 like school closures, social distancing, and mask wearing seemed to be associated with the fall in the infection rates of influenza and RSV. There were limited evidence concerning the effect of the ongoing pandemic on flu vaccination rates. Heterogeneity across available studies does not allow further generalisation of findings.

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Appendices

Appendix 1- Study protocol

Review title

A living review examining the impact of the COVID-19 pandemic on influenza and respiratory syncytial virus (RSV) activity in the human population

Rationale

Since its emergence in December 2019, Severe Acute Respiratory Syndrome Coronavirus 2 (SARS-CoV-2) has heavily impacted influenza and respiratory syncytial virus (RSV) activity. Non-pharmaceutical interventions (NPIs) implemented to prevent SARS-CoV-2 transmission might have affected transmission dynamics of influenza and other respiratory viruses due to commonality in modes of transmission. Also, widespread lockdowns and restriction of movement may have increased virus–virus interactions. Moreover, there might have been a reduction in healthcare seeking behavior for respiratory viruses among the general population. Furthermore, lifting restrictions might result in a surge of cases or alteration of seasonality.

Research Questions

How has the COVID-19 pandemic affected influenza and RSV activity in the human population in terms of-

- a) The seasonality and circulating strains of the influenza virus and RSV
- b) The epidemiology of the influenza virus and RSV
- c) The surveillance activity of the influenza virus and RSV (disruptions, adaptations for end-to-end integrated influenza/RSV and COVID-19 surveillance, change in surveillance standards – type of specimens processed, sampling strategy, testing algorithms, data reporting, lessons from sentinel surveillance for SARS-CoV-2)
- d) Effect of COVID-19 related public health measures on influenza and RSV activity
- e) The health systems (reallocation of health resources- poor availability of flu vaccines due to prioritization of health resources for COVID)
- f) The impact of availability of COVID-19 vaccines on influenza and RSV activity

Methods

Eligibility criteria

Inclusion

- **Population**- Individuals of all age groups
- **Exposure** - RSV or Influenza in the context of the COVID-19 pandemic
- **Diagnosis**- RSV or influenza infections diagnosed with standard, valid laboratory based, or laboratory confirmed tests (for example, reverse transcriptase-polymerase chain reaction (RT-PCR), antigen testing, viral culture, serology, immunofluorescence assays, influenza nucleic acid amplification etc.) or ICD-9 or ICD-10 codes
- **Comparator**- Studies comparing different time points (pre-pandemic vs post pandemic) or studies comparing different health systems or epidemiological features by regions /countries.

- **Outcome-** Reporting data on at least one of our research questions
- No geographical restrictions
- **Language-** Studies published in English language
- **Publication type**
 - Academic literature published in peer-reviewed journals
 - Pre-prints
- **Study design**
 - Observational studies
 - Modelling studies
 - Publication date: 1st December 2019 onwards

Exclusions

- Studies that focus on clinical features or immunology
- Interventional studies such as drug or vaccine trials
- Environmental studies (transmission dynamics in different environments)
- Studies not reporting data for the pandemic period and only reporting data for the period before 31st December 2019 (pre-COVID-19 pandemic)
- Studies published in languages other than English

Search strategy

Database searches will be conducted in the WHO COVID-19 database to identify studies investigating influenza or RSV related activity during the COVID-19 pandemic period to-date.

Searches will be conducted weekly using a pre-designed search strategy for weekly updates.

Search terms- We will include two main strings comprising influenza and RSV, and COVID related terms.

(Influenza OR RSV) AND COVID

We will not apply any language restrictions for searches. However, considering time constraints, translations may not be possible for every non-English paper.

Study selection and data extraction

This study will follow the Preferred Reporting Items for Systematic Reviews and Meta-Analysis (PRISMA) 2020 checklist. Studies retrieved from searches will be imported into Covidence after deduplication in Endnote. Studies retrieved will be screened for eligibility using pre-defined inclusion/ exclusion criteria independently by pairs of reviewers for both title and abstract screening as well as full-text screening. Any disagreement will be resolved by mutual discussion, however, if unresolved a third reviewer will assess the final decision. Information from included studies will be extracted into a pre-piloted excel extraction sheet and the following variables will be extracted: the name of the author, publication year, study site, setting, WHO region, aims and objectives, study design and methods, sample description/population, outcome measures, main finding, method of assessment of quality and quality score.

The risk of bias and quality of individual studies will be assessed using JBI critical appraisal tools appropriate for each type of study included in the review. Two reviewers will independently assess the risk of bias and quality of included studies.

Data synthesis

We will synthesise the available data narratively. However, if comparable data emerge, we will consider undertaking a meta-analysis to report pooled estimates (for example, odds ratios or incidence rates).

Appendix 2- Search strategy

The search covers the week 16/08/2021 - 22/08/2021 inc.

("respiratory virus" OR "respiratory viruses" OR "acute respiratory infection" OR "acute respiratory infections" OR "respiratory tract infection" OR "respiratory tract infections" OR "respiratory tract disease" OR "respiratory tract diseases" OR "respiratory distress syndrome" OR influenza OR influenza OR flu OR grippe OR ili OR rsv OR "Respiratory Syncytial Virus" OR "Respiratory Syncytial Viruses" OR alphainfluenzavirus) AND (entry_date:20210816 OR entry_date:20210817 OR entry_date:20210818 OR entry_date:20210819 OR entry_date:20210820 OR entry_date:20210821 OR entry_date:20210822)