PRISMA Checklist: Risk factors associated with infective acute upper respiratory illnesses in athletes: A systematic review (Supplementary information not included in paper)

Online Supplementary File:

Section and Topic	Item #	Checklist item	Location where item is reported
TITLE			
Title	1	Identify the report as a systematic review.	1
ABSTRACT			
Abstract	2	See the PRISMA 2020 for Abstract's checklist.	3, see below for abstract checklist
INTRODUCTION			
Rationale	3	Describe the rationale for the review in the context of existing knowledge.	4
Objectives	4	Provide an explicit statement of the objective(s) or question(s) the review addresses.	4
METHODS			
Eligibility criteria	5	Specify the inclusion and exclusion criteria for the review and how studies were grouped for the syntheses.	5
Information sources	6	Specify all databases, registers, websites, organisations, reference lists and other sources searched or consulted to identify studies. Specify the date when each source was last searched or consulted.	5
Search strategy	7	Present the full search strategies for all databases, registers and websites, including any filters and limits used.	5-6, Online supplementary S1 for generic, below for full string for each database
Selection process	8	Specify the methods used to decide whether a study met the inclusion criteria of the review, including how many reviewers screened each record and each report retrieved, whether they worked independently, and if applicable, details of automation tools used in the process.	5-6
Data collection process	9	Specify the methods used to collect data from reports, including how many reviewers collected data from each report, whether they worked independently, any processes for obtaining or confirming data from study investigators, and if applicable, details of automation tools used in the process.	5-7
Data items	10a	List and define all outcomes for which data were sought. Specify whether all results that were compatible with each outcome domain in each study were sought (e.g. for all measures, time points, analyses), and if not, the methods used to decide which results to collect.	6-7, see below for further details
	10b	List and define all other variables for which data were sought (e.g. participant and intervention characteristics, funding sources). Describe any assumptions made about any missing or unclear information.	6-7, further details below
Study risk of bias assessment	11	Specify the methods used to assess risk of bias in the included studies, including details of the tool(s) used, how many reviewers assessed each study and whether they worked independently, and if applicable, details of automation tools used in the process.	7-8
Synthesis methods	13a	Describe the processes used to decide which studies were eligible for each synthesis (e.g. tabulating the study intervention characteristics and comparing against the planned groups for each synthesis (item #5)).	6-8 (no sub-group analysis was performed)
	13b	Describe any methods required to prepare the data for presentation or synthesis, such as handling of missing summary statistics, or data conversions.	5-8, see below for further information
	13c	Describe any methods used to tabulate or visually display results of individual studies and syntheses.	5-8
	13d	Describe any methods used to synthesize results and provide a rationale for the choice(s). If meta-analysis was performed, describe the	6-8 (no meta-

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Section and Topic	Item #	Checklist item	Location where item is reported
		model(s), method(s) to identify the presence and extent of statistical heterogeneity, and software package(s) used.	analysis was performed)
	13e	Describe any methods used to explore possible causes of heterogeneity among study results (e.g. subgroup analysis, meta-regression).	-
	13f	Describe any sensitivity analyses conducted to assess robustness of the synthesized results.	(no subgroup analysis was performed)
Reporting bias assessment	14	Describe any methods used to assess risk of bias due to missing results in a synthesis (arising from reporting biases).	7-8, see below for further details
Certainty assessment	15	Describe any methods used to assess certainty (or confidence) in the body of evidence for an outcome.	7-8
RESULTS			
Study selection	16a	Describe the results of the search and selection process, from the number of records identified in the search to the number of studies included in the review, ideally using a flow diagram.	8, Figure 1
	16b	Cite studies that might appear to meet the inclusion criteria, but which were excluded, and explain why they were excluded.	See below for details.
Study characteristics	17	Cite each included study and present its characteristics.	8-9, Table 2, Tables 3a-3c, & online supplementary S3.
Risk of bias in studies	18	Present assessments of risk of bias for each included study.	37, Online supplementary S4
Results of individual studies	19	For all outcomes, present, for each study: (a) summary statistics for each group (where appropriate) and (b) an effect estimate and its precision (e.g. confidence/credible interval), ideally using structured tables or plots.	Table 2, Tables 3a-c, online supplementary S4
Results of syntheses	20a	For each synthesis, briefly summarise the characteristics and risk of bias among contributing studies.	8, see below for further details
	20b	Present results of all statistical syntheses conducted. If meta-analysis was done, present for each the summary estimate and its precision (e.g. confidence/credible interval) and measures of statistical heterogeneity. If comparing groups, describe the direction of the effect.	8, no subgroup analysis was performed
	20c	Present results of all investigations of possible causes of heterogeneity among study results.	8-9
	20d	Present results of all sensitivity analyses conducted to assess the robustness of the synthesized results.	No sub-group analysis was performed
Reporting biases	21	Present assessments of risk of bias due to missing results (arising from reporting biases) for each synthesis assessed.	No subgroup analysis performed
Certainty of evidence	22	Present assessments of certainty (or confidence) in the body of evidence for each outcome assessed.	8-9

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Section and Topic	Item #	Checklist item	Location where item is reported
DISCUSSION			
Discussion	23a	Provide a general interpretation of the results in the context of other evidence.	9-14
	23b	Discuss any limitations of the evidence included in the review.	13-14
	23c	Discuss any limitations of the review processes used.	13-14
	23d	Discuss implications of the results for practice, policy, and future research.	14-15
OTHER INFORMATION			
Registration and protocol	24a	Provide registration information for the review, including register name and registration number, or state that the review was not registered.	3 & 5
	24b	Indicate where the review protocol can be accessed, or state that a protocol was not prepared.	5
	24c	Describe and explain any amendments to information provided at registration or in the protocol.	See below for details
Support	25	Describe sources of financial or non-financial support for the review, and the role of the funders or sponsors in the review.	17
Competing interests	26	Declare any competing interests of review authors.	17
Availability of data, code and other materials	27	Report which of the following are publicly available and where they can be found: template data collection forms; data extracted from included studies; data used for all analyses; analytic code; any other materials used in the review.	Online supplementary S1-4

From: Page MJ, McKenzie JE, Bossuyt PM, Boutron I, Hoffmann TC, Mulrow CD, et al. The PRISMA 2020 statement: an updated guideline for reporting systematic reviews. BMJ 2021;372:n71. doi: 10.1136/bmj.n71

For more information, visit: http://www.prisma-statement.org/

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PRISMA abstract checklist:

Section and Topic	Item #	Checklist item	Reported (Yes/No)
TITLE			
Title	1	Identify the report as a systematic review.	Y
BACKGROUND			
Objectives	2	Provide an explicit statement of the main objective(s) or question(s) the review addresses.	Y
METHODS			
Eligibility criteria	3	Specify the inclusion and exclusion criteria for the review.	Y (some) See paper for the rest
Information sources	4	Specify the information sources (e.g. databases, registers) used to identify studies and the date when each was last searched.	Y
Risk of bias	5	Specify the methods used to assess risk of bias in the included studies.	No, within the paper
Synthesis of results	6	Specify the methods used to present and synthesise results.	Y (some)
RESULTS			
Included studies	7	Give the total number of included studies and participants and summarise relevant characteristics of studies.	Y
Synthesis of results	8	Present results for main outcomes, preferably indicating the number of included studies and participants for each. If meta-analysis was done, report the summary estimate and confidence/credible interval. If comparing groups, indicate the direction of the effect (i.e. which group is favoured).	Y (no meta-analyses done)
DISCUSSION			
Limitations of evidence	9	Provide a brief summary of the limitations of the evidence included in the review (e.g. study risk of bias, inconsistency and imprecision).	Y (some)
Interpretation	10	Provide a general interpretation of the results and important implications.	Y
OTHER			
Funding	11	Specify the primary source of funding for the review.	No, within the paper
Registration	12	Provide the register name and registration number.	Y

7. Present the full search strategies for all databases, registers and websites, including any filters and limits used.

PubMed: (Rhinovirus OR Parainfluenza OR Adenovirus OR coronavirus OR "human metapneumovirus" OR enterovirus OR "respiratory syncytial virus" OR "bordetella pertussis" OR "Chlamydophila pneumoniae" OR "mycoplasma pneumoniae" OR Rhinitis OR influenza OR "common cold" OR flu OR sinusitis OR "rhino sinusitis" OR "acute pharyngitis" OR tonsillitis OR pharyngitis OR epiglottitis OR laryngitis OR pneumonia OR bronchitis OR "lung disease" OR "Respiratory tract disease*" OR "Respiratory illness*" OR "Respiratory tract infection*" OR "respiration disorder*" OR "respiratory system disease*" OR "upper respiratory tract illness*" OR "upper respiratory tract disease*" OR "Lower respiratory tract illness*" OR "Lower respiratory tract disease*" OR "Viral disease*" OR tuberculosis) AND (athlete* OR sport* OR exercis*) AND (risk factor*) NoT (asthma) NoT (COPD OR "chronic obstructive pulmonary disease" OR cancer OR animal* OR HIV OR "human immunodeficiency virus" OR AIDS OR "acquired immunodeficiency syndrome" OR post-operative) Filters: Journal Article, Humans, English, MEDLINE, from 1990-July 2020

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EbscoHost: (Rhinovirus OR Parainfluenza OR Adenovirus OR coronavirus OR "human metapneumovirus" OR enterovirus OR "respiratory syncytial virus" OR "bordetella pertussis" OR "Chlamydophila pneumoniae" OR "mycoplasma pneumoniae" OR Rhinitis OR influenza OR "common cold" OR flu OR sinusitis OR "rhino sinusitis" OR "acute pharyngitis" OR tonsillitis OR pharyngitis OR epiglottitis OR laryngitis OR pneumonia OR bronchitis OR "lung disease" OR "Respiratory tract disease*" OR "Respiratory illness*" OR "Respiratory tract infection*" OR "respiration disorder*" OR "respiratory system disease*" OR "upper respiratory tract illness*" OR "upper respiratory tract disease*" OR "Lower respiratory tract illness*" OR "Lower respiratory tract disease*" OR "Viral disease*" OR tuberculosis) AND (athlete* OR sport* OR exercis*) AND (risk factor*) NoT (asthma) NoT (COPD OR "chronic obstructive pulmonary disease" OR cancer OR animal* OR HIV OR "human immunodeficiency virus" OR AIDS OR "acquired immunodeficiency syndrome" OR post-operative) Scholarly (Peer Reviewed) Journals; Published Date: 19920101-20201231; Document Type: Article; Language: English, Species: Human

Web of Science: TOPIC: (Rhinovirus OR Parainfluenza OR Adenovirus OR coronavirus OR "human metapneumovirus" OR enterovirus OR "respiratory syncytial virus" OR "bordetella pertussis" OR "Chlamydophila pneumoniae" OR "mycoplasma pneumoniae" OR Rhinitis OR influenza OR "common cold" OR flu OR sinusitis OR "rhino sinusitis" OR "acute pharyngitis" OR tonsillitis OR pharyngitis OR epiglottitis OR laryngitis OR pneumonia OR bronchitis OR "lung disease" OR "Respiratory tract disease*" OR "Respiratory illness*" OR "Respiratory tract infection*" OR "respiration disorder*" OR "respiratory system disease*" OR "upper respiratory tract illness*" OR "upper respiratory tract disease*" OR "Lower respiratory tract illness*" OR "Lower respiratory tract disease*" OR "Viral disease*" OR tuberculosis) AND (athlete* OR sport* OR exercis*) AND (risk factor*) NoT (asthma) NoT (COPD OR "chronic obstructive pulmonary disease" OR cancer OR animal* OR HIV OR "human immunodeficiency virus" OR AIDS OR "acquired immunodeficiency syndrome" OR post-operative): Refined by DOCUMENT TYPES: (ARTICLE), LANGUAGES: (ENGLISH), SPECIES: (HUMANS) Time span: 1990-2020. Indexes: SCI-EXPANDED, SSCI, A&HCI, CPCI-S, CPCI-SSH, BKCI-S, BKCI-SSH, ESCI, CCR-EXPANDED, IC.

10a. List and define all outcomes for which data were sought. Specify whether all results that were compatible with each outcome domain in each study were sought (e.g. for all measures, time points, analyses), and if not, the methods used to decide which results to collect.

All studies included in the review reported the overall domain of risk factors for ARill and ARinf (undiagnosed and diagnosed). The small number of studies assessing each risk factor or biomarker made it difficult to draw consensus conclusions for most risks. Furthermore, the differences in the methodologies for classifying respiratory illnesses/infections further impaired comparisons.

10b. List and define all other variables for which data were sought (e.g. participant and intervention characteristics, funding sources). Describe any assumptions made about any missing or unclear information.

All details of variables are reported in the paper. No assumptions were made, however risk association was determined based on the types of statistical tests performed and whether this took confounders into account or not as well as whether the statitiscal test was a multi-variable analaysis or not.

13b. Describe any methods required to prepare the data for presentation or synthesis, such as handling of missing summary statistics, or data conversions.

Not all papers performed an analysis to determine risk association, risk association and strength of association was determined based on a 4 level metric to classify the type and strength of an association between a risk factor and ARill and ARinf as follows: no association (0, 00 or 000), some association (+), good association (++) or strong association (+++). For more details please review paper.

14. Describe any methods used to assess risk of bias due to missing results in a synthesis (arising from reporting biases).

The domains from the modified Downs and Black tool that assessed risk of bias were (yes, no or unable to determine):

If any of the results of the study were based on "data dredging", was this made clear?
Were the statistical tests used to assess the main outcomes appropriate?
Were the main outcome measures used accurate (valid and reliable)?
Were losses of patients to follow-up taken into account?

These 4 questions were part of the quality assessment. It must be noted that this review is not on RCTs, so the bias is not as clear as in reviews of RCTs, and therefore this was not specifically taken into consideration when performing the synthesis. The overall quality of article was assessed as per guidelines (including this risk of bias, however was used as an overall measure).

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16b. Cite studies that might appear to meet the inclusion criteria, but which were excluded, and explain why they were excluded.

We cite studies on asthma and allergy that appeared to meet the inclusion criteria but were excluded after IOC consensus subgroup 1 meeting which resolved that asthma and allergy were being covered by another IOC sub-group as such they should be removed from this study.

20a. For each synthesis, briefly summarise the characteristics and risk of bias among contributing studies.

As mentioned above, that this review is not on RCTs, so the bias is not as clear as in reviews of RCTs, and therefore this was not specifically taken into consideration when performing the synthesis. The overall quality of article was assessed as per guidelines (including this risk of bias, however as an overall measure). Therefore for each synthesis the bias was not reported, this was further validated as no studies were rated as ”poor” with all 48 studies rated as either excellent or good.

21. Present assessments of risk of bias due to missing results (arising from reporting biases) for each synthesis assessed.

There was no meta-analysis performed for this study and no studies with missing data were included in the review, therefore no assessment of risk of bias due to missing results (arising from reporting biases are presented in this review.

24c. Describe and explain any amendments to information provided at registration or in the protocol.

The protocol was amended by the following:
-The search period was extended by 7 months from 2019 to July 2020, due to the COVID-19-related delay of the IOC consensus meeting.
-The exclusion criteria were revised to exclude studies that only included non-infective acute respiratory illnesses such as asthma and allergy.