International Platform of Registered Systematic Review and Meta-analysis Protocols

INPLASY

Mucus plug in patients with respiratory diseases: a systematic review and meta-analysis

INPLASY202670088
doi: 10.37766/inplasy2026.7.0088
Received: 22 July 2026
Published: 22 July 2026

Du, D.

Corresponding author:
Dongru Du

dudongru@stu.scu.edu.cn

Author Affiliation:
West China Hospital of Sichuan University.

ADMINISTRATIVE INFORMATION

Support - This work was supported by the grant from 1·3·5 Project of State Key Laboratory of Respiratory Health and Multimorbidity, West China Hospital, Sichuan University (RHM24207), the National Natural Science Foundation of China (82170046, W2511097, 82300050).

Review Stage at time of this submission - Preliminary searches.

Conflicts of interest - None declared.

INPLASY registration number: INPLASY202670088

Amendments - This protocol was registered with the International Platform of Registered Systematic Review and Meta-Analysis Protocols (INPLASY) on 22 July 2026 and was last updated on 22 July 2026.

INTRODUCTION

Review question / Objective P: patients with respiratory disease; I: patients with mucus plug; C: patients without mucus plug; O: prevalence of mucus plug and mortality in patients with or without mucus plug; S: Observational studies and clinical trials.

Rationale (1) Prevalence and clinical characteristics of mucus plug in patients with respiratory diseases. (2) Prognostic value of mucus plug in patients with respiratory diseases.

Condition being studied Respiratory diseases are one of the leading causes of morbidity and mortality worldwide, contributing to a major public health burden.Mucus hypersecretion has been considered to contribute to the pathogenesis of many respiratory diseases. Excessive mucus, which cannot be adequately cleared, undergoes alterations in physicochemical properties and results in the formation of mucus plugs that occlude the airways. However, prevalence and clinical characteristics of mucus plug in patients with different respiratory diseases was still unknown, and whether mucus plug exert prognostic value in other respiratory diseases remained under investigations.

METHODS

Participant or population Patients with respiratory diseases.

Intervention With mucus plug.

Comparator Without mucus plug.

Study designs to be included Observational studies and clinical trials.

Eligibility criteria The inclusion criteria of this meta-analysis were: (1) Studies providing prevalence of mucus plug in patients with respiratory diseases. (2) Diagnostic criteria of

respiratory diseases were clearly defined. (3) Number of patients in eligible studies was more than 30. The exclusion criteria were: (1) Studies using the same group of patients. In this condition, only one study with the largest sample size would be included. (2) Studies not in English. (3) Reviews, case reports, comments or meta-analysis.

Information sources PubMed, Embase, Web of Science and Scopus.

Main outcome(s) Prevalence and clinical characteristics of mucus plug in patients with respiratory disease.

Additional outcome(s) Prognostic value of mucus plug in patients with respiratory disease.

Quality assessment / Risk of bias analysis Two authors independently performed quality assessments. Cross-sectional studies were evaluated via the Agency for Healthcare Research and Quality Scale. Cohort and case-control studies were evaluated via the Newcastle-Ottawa Scale. For clinical trials, the Cochrane Risk of Bias Tools was applied.

Strategy of data synthesis Prevalence of mucus plug in different respiratory diseases was calculated and showed as prevalence with 95% confidence intervals (CI). Clinical characteristics of patients with mucus plug compared to those without was summarized. Categorical variables were shown as odds ratio (OR) with 95%CI, while continuous variables were presented as mean difference (MD) with 95% CI. The prognostic value of mucus plug for patients with respiratory diseases were also summarized and presented as hazard ratio (HR) with 95% CI. Heterogeneity was assessed via I2 test and Q static. A random-effect model was applied if I2 >50% or p<0.1, otherwise a fixed-effect model would be applied.

Subgroup analysis Depending on availability of data.

Sensitivity analysis Sensitivity analyses will be performed via leave-one-out analyses.

Country(ies) involved China.

Keywords mucus plug, respiratory diseases, prevalence, prognostic value.

Contributions of each author

Author 1 - Dongru Du.
Email: dudongru@stu.scu.edu.cn