

# The rate and influencing factors of SARS-CoV-2 Reinfection: systematic review and meta-analysis

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## Abstract

Background: Understanding the SARS-COV-2 reinfection rate and its potential influencing factors is essential for further improvement and development of prevention and control strategies and measures to reduce the reinfection rate of SARS-CoV-2. This study aimed to quantitatively summarize the evidence of current reinfection studies. Methods: We reviewed all English studies published up to Dec 4, 2022. Information extracted from each selected articles and quality assessment of these articles was used to evaluate the risk for bias in studies. The meta-analysis was performed to examine the rate and influencing factors of SARS-CoV-2 reinfection and protective effect of primary infection on reinfection in our study. Sources of heterogeneity were identified using a subgroup analysis defined by the minimum time interval of days to reinfection and variant strains. Results: The weighted pooled rate of reinfection for SARS-CoV-2 was 1.08% ([95% CI, 0.77%-1.52%], I<sup>2</sup> = 100%, P < 0.001). Subgroup-analysis of the minimum time interval definition for reinfection showed that rates of reinfection are 0.71%, 0.75%, 1.46% and 1.62% in less than 90 days, 90 days, greater than 90 days, unknown groups, respectively and 0.64%, 1.8%, 3.08%, 0.95% in Alpha, Delta, Omicron, unknown groups. The weighted pooled RR value of the protective effect of primary infection on reinfection was 0.09 ([95% CI, 0.06-0.13], I<sup>2</sup> = 92%, P < 0.01). Conclusions: Overall, the reinfection rate of SARS-CoV-2 is relatively low and appears to be on the rise as duration from the first infection to the second infection and the novel coronavirus strain mutates.

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