INTRODUCTION

• Case fatality risk (CFR) is the probability of a disease case being fatal. It is sometimes called the case fatality ratio or case fatality rate synonymously1.
• CFR for diseases has been estimated by case reports2 or through systematic review3.
• Yellow Fever, a flavivirus spread by mosquitoes, is endemic to sub-Saharan Africa and Latin America. Cases can be asymptomatic, mild, or severe4.
• The WHO estimates that approximately 50% of Yellow Fever cases are fatal5, but this estimate has not been systematically verified.
• This study aims to estimate the case fatality risk for severe Yellow Fever cases through a systematic literature review and meta-analysis.

METHODS

• Systematized literature review4, with search strategy run in PubMed and Ovid Medline on June 11, 2019
• Aimed to collect proportions of severe Yellow Fever cases that were fatal with a numerator and denominator.
• Cases in literature determined to be severe based on WHO criteria: fever accompanied by at least one of jaundice or hemorrhaging4.

Search strategy:

("Yellow Fever" in the title, abstract, or MeSH term)

AND

(fatal*, severe, fatal*, mortality, asymptomatic, symptoms, diagnosis, misdiagnosis, outbreak, or cases in multiple places)

AND NOT

("Vaccine" in title or abstract)

• Data analyzed using meta-analysis: logistic intercept-only meta-regression, with random effects for study.
• Inputs for meta.prop() function7 in R included proportions and their estimated standard errors.

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RESULTS

• Search strategy yielded 842 articles. After title/abstract screening, 164 remained. After full text screening and data extraction, 11 remained, providing 24 proportions of fatality among severe Yellow Fever cases (Figure 1, Table 1).
• Among all studies, the estimated CFR among suspected, confirmed, and total severe Yellow Fever cases was 39% (Table 2).
• Stratifying all severe cases by continent showed a largely higher CFR in South America compared to Africa
• Stratifying all severe cases by study type showed that articles with researchers involved in investigation and patient assessment had lower CFR than articles reporting cases from passive surveillance (Table 3)

DISCUSSION

• Difference between continents could be related to surveillance activities
• Difference between study types likely due to more diligent monitoring of cases. Most of these studies were conducted during outbreaks.
• This study offers an estimate of Yellow Fever CFR using a comprehensive search strategy and highlights potential effects of study design on such estimates.
• Data limitations: estimating CFR was not the purpose of the studies used, Yellow Fever cases likely underestimated8,9, and timing of fatal cases may impact fatality estimates9.
• Results of this study can be used in estimating underreporting of cases as well as for preparedness during future outbreaks.

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REFERENCES