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Protocol for a systematic review and meta-analysis on the epidemiology of human and animal brucellosis in Kenya

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ADMINISTRATIVE INFORMATION

Support - CGIAR.

Review Stage at time of this submission - Preliminary searches.

Conflicts of interest - None declared.

INPLASY registration number: INPLASY202580035

Amendments - This protocol was registered with the International Platform of Registered Systematic Review and Meta-Analysis Protocols (INPLASY) on 11 August 2025 and was last updated on 11 August 2025.

INTRODUCTION

Review question / Objective To determine the prevalence and risk factors associated with brucellosis in humans and animals in Kenya, and to assess sources of heterogeneity across studies using meta-regression analyses.

Rationale Brucellosis is a neglected zoonotic disease in Kenya despite its recognised public health and economic burden. Multiple studies have been conducted in both human beings and animals, but data from these hosts are not combined systematically. The first systematic review of brucellosis in Kenya was conducted in 2015 without meta-analysis. Additionally, national prevalence estimates are lacking. A systematic review and meta-analysis can provide pooled prevalence estimates and identify risk groups from the existing literature. It will also provide updated information on all current studies in the country. This will greatly inform brucellosis control and prevention strategies.

Condition being studied Brucellosis in humans and animals (especially livestock) in Kenya. This includes seroprevalence, risk factors, and exploring sources of heterogeneity in studies. Identifying diagnostic approaches and risk factors to update the existing information will also be undertaken.

METHODS

Search strategy A comprehensive search will be conducted in PubMed, Web of Science, African Journals Online, Embase, and Scopus using predefined search terms combining the terms: (brucellosis OR brucella OR brucel* OR "Malta fever" OR "Mediterranean fever" OR "undulant fever") AND (prevalence OR incidence OR risk OR control OR prevention) AND Kenya AND (human OR livestock OR wildlife OR domestic OR rodent OR ruminant OR (cattle OR bovine) OR (camel OR dromedary) OR (sheep OR ovine) OR (goat OR caprine) OR (pig OR swine)).

Grey literature, including reports and theses, will also be screened. No date and language restrictions will be applied.

Participant or population Humans and animals (e.g., cattle, sheep, goats, camels, wildlife) in Kenya assessed for brucellosis as determined by serological, molecular, or culture diagnostic tests.

Intervention Not applicable.

Comparator Not applicable.

Study designs to be included Cross-sectional studies, cohort studies, case-control studies, case series, surveillance reports, and outbreak investigations reporting primary data on brucellosis prevalence or detection.

Eligibility criteria
Inclusion:
Studies conducted in Kenya
Studies reporting brucellosis prevalence
Studies using standard diagnostic methods (e.g., Rose Bengal, ELISA, culture, PCR)
Animal and/or human studies
Exclusion:
Reviews, editorials, opinion pieces
Experimental challenge studies
Studies on vaccine response without natural infection context
Purely KAP (Knowledge, Attitude, Practices) studies and those without original data.

Information sources PubMed, Web of Science, AJOL, Scopus, and Embase, and manual screening of reference lists.

Main outcome(s)
Pooled prevalence of brucellosis in humans and animals in Kenya.
Between-study heterogeneity.
Study- and population-specific brucellosis predictors using meta-regression (e.g., year, region, species, diagnostic method).

Additional outcome(s) Distribution of diagnostic methods, risk factors and brucellosis studies in the country and with time.

Data management References will be imported into Rayyan AI where duplicates will be removed. Screening of titles will be performed independently by two authors on Rayyan AI platform, after which data extraction will be performed using a pretested template. Discrepancies will be resolved by consensus or in consultation with a third review member.

Quality assessment / Risk of bias analysis Study quality will be assessed using the Joanna Briggs Institute (JBI) checklist for prevalence studies.

Strategy of data synthesis Random-effects meta-analysis using the DerSimonian-Laird method with a Hartung-Knapp adjustment. Heterogeneity will be assessed using Higgins' I^2 statistics and Tau squared (τ^2). Heterogeneity will be further explored through subgroup analyses and meta-regression using R (meta, metafor packages).

Subgroup analysis Subgroup analyses will be conducted using the following extracted variables: host species/category, diagnostic method, geographical region, and study period.

Sensitivity analysis Sensitivity analyses will be performed by excluding low-quality studies or outliers. Influence analyses will identify studies with disproportionate effects on pooled estimates.

Language restriction None.

Country(ies) involved Kenya, Germany.

Other relevant information None.

Keywords Brucellosis, Kenya, zoonosis, meta-analysis, prevalence, systematic review, livestock, diagnostics, One Health.

Dissemination plans Findings will be published in a peer-reviewed open-access journal. Furthermore, results will be shared with local One Health stakeholders and relevant public health authorities in Kenya.

Contributions of each author
Author 1 - Martin Wainaina - Author developed the protocol, will conduct searches, screen titles, carry out data extraction, conduct data analysis, and prepare manuscript.
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Author 2 - Elizabeth Cook - Author will screen titles, carry out data extraction, and prepare manuscript.
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