**Background**:

The existing Bacillus Calmette–Guerin (BCG) vaccination provides partial protection against tuberculosis (TB). The modified vaccinia Ankara virus-expressing antigen 85A (MVA85A) aims to boost BCG immunity. We evaluated the animal evidence supporting the testing of MVA85A in humans.

**Methods**:

Our protocol included in vivo preclinical studies of the MVA85A booster with BCG compared with BCG alone, followed by a TB challenge. We used standard methods for systematic review of animal studies, and summarized mortality, measures of pathology and lung bacterial load. The comprehensive literature search was to September 2014. Two independent investigators assessed eligibility and performed data extraction. We assessed study quality and pooled bacteria load using random effect meta-analysis.

**Findings**:

We included eight studies in 192 animals. Three experiments were in mice, two in guinea pigs, two in macaques and one in calves. Overall, study quality was low with no randomization, baseline comparability was not described and blinding not reported. For animal death (including euthanasia due to severe morbidity), studies were underpowered, and overall no benefit demonstrated. No difference was shown for lung pathology measured on an ordinal scale or bacterial load. The largest mortality trial carried out in macaques had more deaths in the MVA85A vaccine group, and was published after a trial in South Africa had started recruiting children.

**Conclusions**:

This independent assessment of the animal data does not provide evidence to support efficacy of MVA85A as a BCG booster. More rigorous conduct and reporting of preclinical research are warranted, and we believe the results of studies should be publicly available before embarking on trials in humans, irrespective of the findings.