

# Effectiveness of rVSV-ZEBOV vaccination during the 10th Ebola virus disease epidemic in the Democratic Republic of the Congo: a retrospective observational analysis

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## Background

The recombinant vesicular stomatitis virus–Zaire Ebola virus (rVSV-ZEBOV) vaccine is the only vaccine recommended for use to respond to Zaire ebolavirus outbreaks by SAGE. A single ring vaccination trial found the efficacy to be 100%; however, no estimates of real-world effectiveness have yet been published.

## Methods

We conducted a retrospective test-negative case-control analysis to estimate effectiveness of rVSV-ZEBOV vaccination against Ebola virus disease (EVD) during the 2018 - 2020 epidemic in the Democratic Republic of the Congo (DRC), using data on suspected cases collected at Ebola treatment centres. Missing data were imputed using multivariate imputation. Among those who reported contact with an Ebola case before symptom onset, each EVD-positive case was matched to one EVD-negative control by sex, age, health zone and month of symptom onset. Effectiveness was then estimated from the odds ratio of being vaccinated vs. unvaccinated among cases and controls, after adjusting for the matching factors.

## Results

The primary study population contained 309 cases and controls each, on average, of which between 11 and 23 cases (3.6 – 7.4%) and between 48 and 80 controls (16 – 26%) were recorded as vaccinated at least ten days before symptom onset. We found rVSV-ZEBOV vaccination at least ten days before symptom onset was 84% effective against developing EVD (95% credible interval [70%, 92%]). There was no apparent difference in effectiveness by sex, age, or due to a change in vaccination protocol.

## Conclusion

This study is the first to estimate real-world effectiveness of rVSV-ZEBOV vaccination EVD during the second largest EVD outbreak ever recorded. Our findings confirm that rVSV-ZEBOV vaccination is highly protective against developing EVD and support its reactive, targeted use in at-risk people during future outbreaks.

Using a retrospective test-negative study design, we estimated the real-world effectiveness of the rVSV-ZEBOV vaccine and confirmed that it's highly protective against developing the disease.

