

# Situation Report: Uganda Ebola Virus Disease Outbreak

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**Data as reported by:** 18-12-2019

## Context

A community in the Southwestern part of Uganda is currently experiencing an outbreak of the Ebola virus Disease (EVD). Uganda is a country in the east of Africa. The South Western part of Uganda, highlighted in the black dashed region in the map below, shares a border to the west with the Democratic Republic of Congo and to the south with Rwanda. The community has a population of 452 people. Nothing is known about the exact geographic location, and the age and sex distribution of the population.



Figure 1: Map of Uganda (source: Googlemaps, ). The Southwestern region is indicated in the black dashed region.

## Highlights

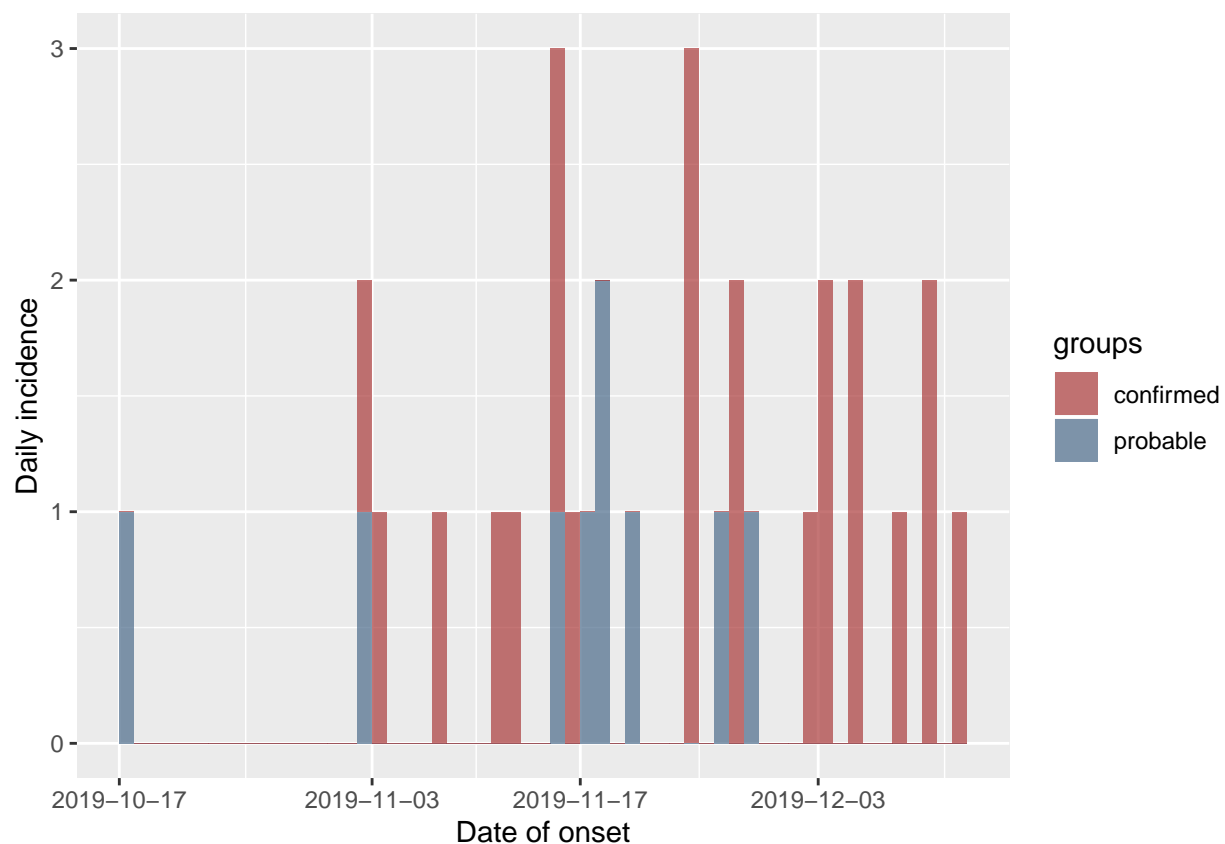
### First outbreak

- From 2019-02-04 to 2019-02-05, one probable and confirmed case were reported in the community but this outbreak did not take off.
- No deaths were reported from this outbreak in January, 2019.

### Second outbreak

- On 2019-11-09, a second outbreak was reported.
- As of 2019-12-18, a total of 33 EVD cases, including 23 confirmed and 10 probable cases have been reported in Uganda.
- Of the total confirmed, 18 are female and 5 are male.

**Figure 2: Disease status of reported cases for the second outbreak by date of onset.**



### Case fatality

- As of 2019-12-18, there have been 5 deaths among the confirmed cases, with a case-fatality ratio of 21.7% (95% CI, 7.5% to 43.7%).
- There has not been any fatalities among male confirmed cases but females have a case-fatality ratio of 0.277778%, (95% CI, 0.1% to 0.5). The high case fatality ratio among females compared to the males seems to be in agreement with the EVD outbreak in the Democratic Republic of Congo.
- We suspect the case-fatality ratios are underestimates of the actual value due to a mean reporting delay of 6 days.

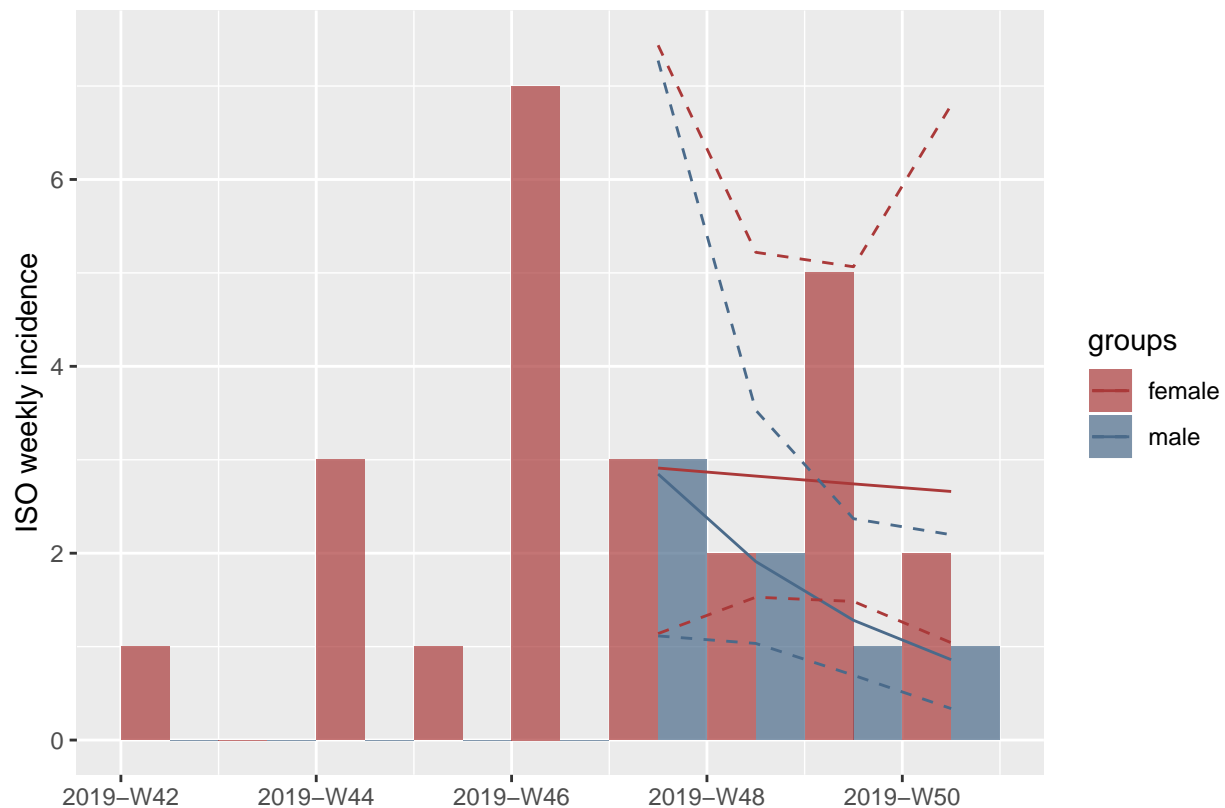
## Modelling

### Forecasting

We used the incidence package in R to fit an exponential model to the latest reported data on the second outbreak to estimate the peak of the epidemic. We determined that the peak occurred on the Nov 11, 2019. It appears that the peak of the outbreak has been reached and the outbreak is currently stable. We also performed a subgroup analysis and we found that there appears to be a decreasing trend in the number of cases in males but is stable among females. However, this should be interpreted with caution due to the delays in reporting the cases.

The figure below shows the fitting results.

**Figure 3: Exponential fit to the second outbreak.**



### Transmissibility

We estimated the  $R_0$  to be 1.6 (95% CI, 0.3 to 6.4) using the  $R_0$  package in R. This means that on average an infected person infected up to 1.6 other people by Nov 11, 2019.

To estimate  $R_0$ , we used the optimal splitting time point for determining the epidemic peak from the previous section. We also assumed a Gamma distributed generation time for the cases with a mean of 12 days and a standard deviation of 5.2, obtained from Chowell et al, 2014.

## Conclusion