

# Ebola Forecasting - Residual Analysis

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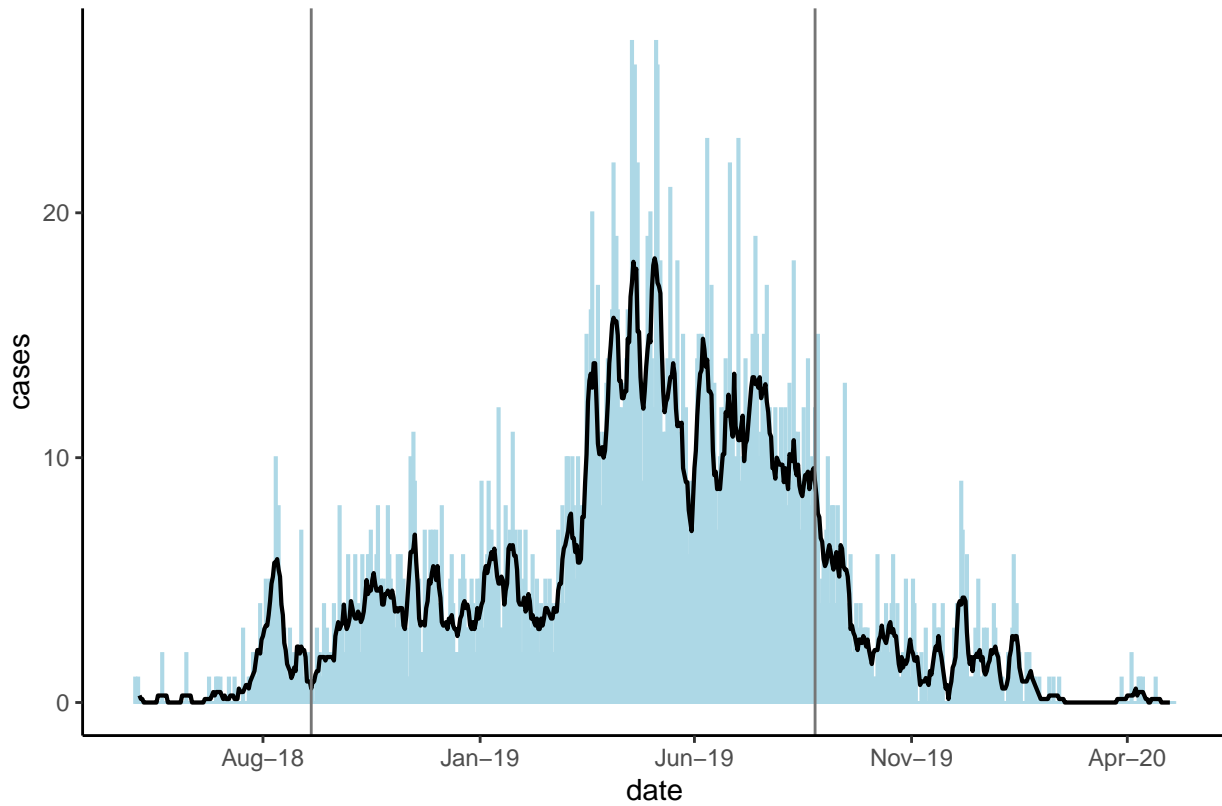
9/11/2020

## 1 Setup

We define the beginning, middle, and end of the outbreak such that the beginning is from May 3, 2018 to September 4, 2018, the middle from September 5, 2018 to August 25, 2019, and the end from August 26, 2019 to May 4, 2020.

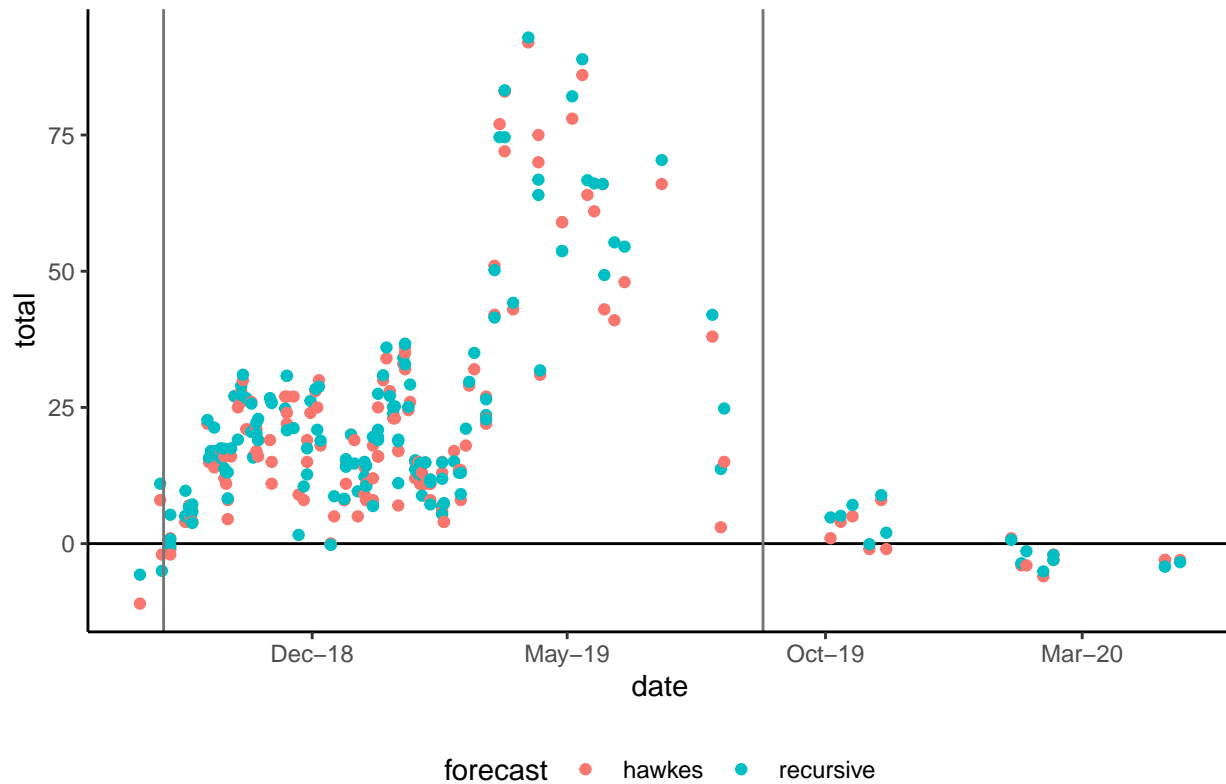
## 2 New Ebola Cases by Day

The figure below shows the number of new Ebola cases in West Africa by day during the outbreak. The grey lines represent boundaries between the beginning, middle and end of the outbreak (see section 1).



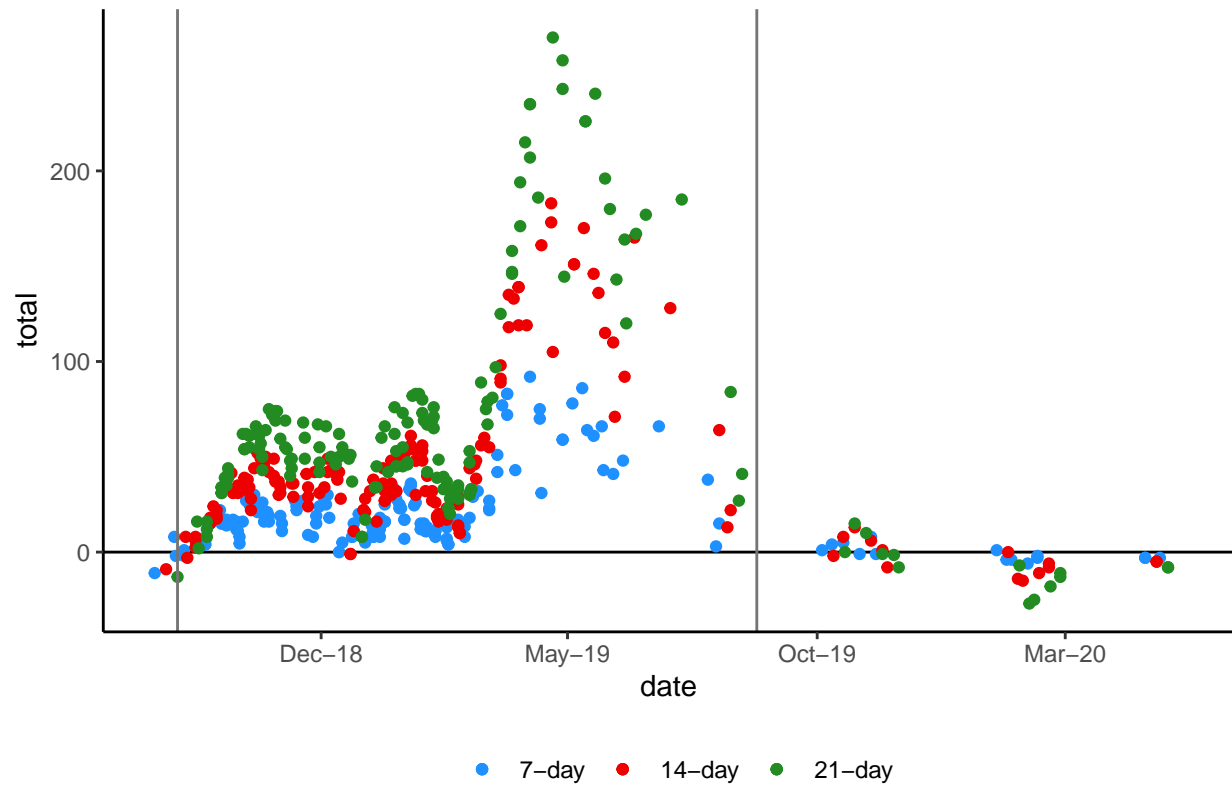
Ebola Cases by Day in West Africa with 7-day Rolling Average

### 3 Hawkes vs Recursive 7-Day Residual Plot



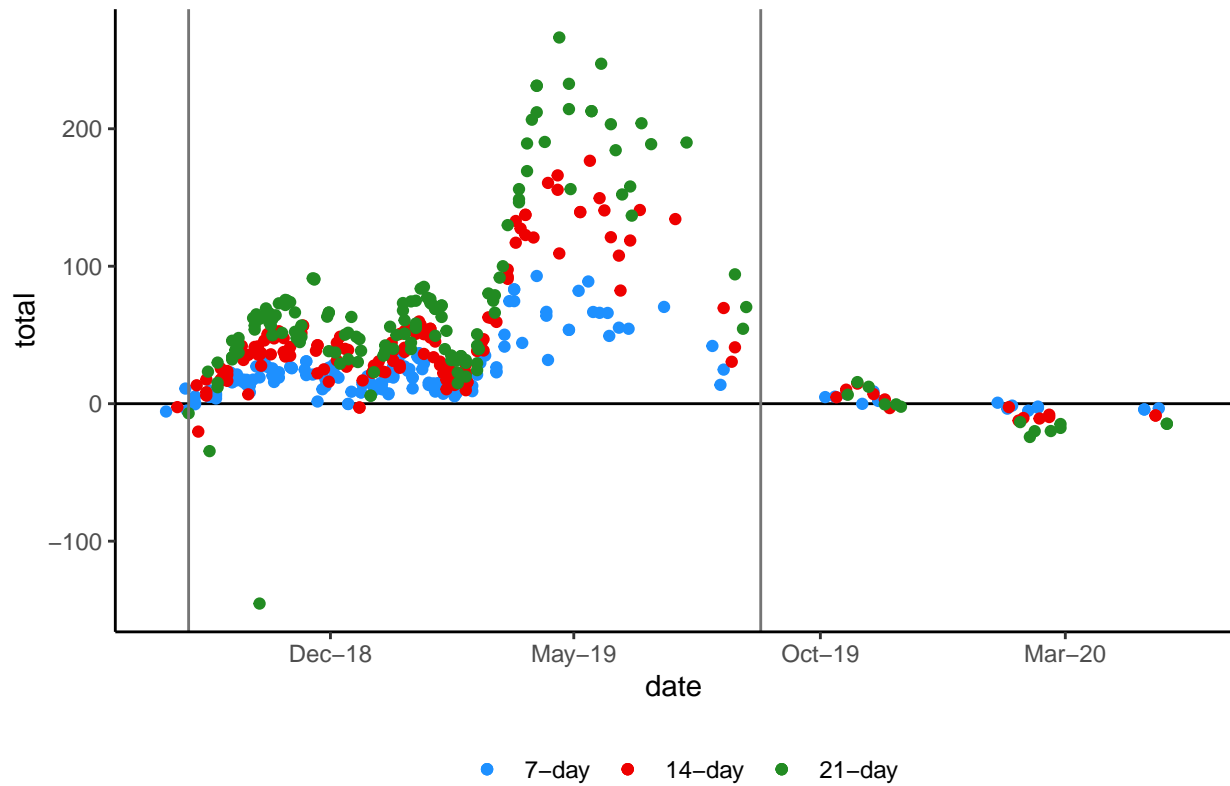
Residual plot of Hawkes and Recursive 7-day models

## 4 Hawkes-Only Residual Plot



Residual plot of Hawkes 7-, 14-, and 21-day models

## 5 Recursive-Only Residual Plot



Residual plot of Recursive 7-, 14-, and 21-day models

## 6 RMSE Calculation During Outbreak

### 6.1 RMSE Calculation

The table below shows the RMSE values from both the Hawkes and Recursive models during the beginning, middle, and end of the outbreak. The dates for each section are defined in section 1.

Table 1: 7-Day Hawkes and Recursive RMSE values during the outbreak

	Hawkes	Recursive
Beginning	5.70	5.88
Middle	30.75	31.72
End	3.80	4.35

It is clear that both models are most accurate in the beginning and end of the pandemic as opposed to the middle portion.