

Forecasting the ongoing Ebola epidemic in DRC using phenomenological growth models

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On August 1, 2018, the Democratic Republic of Congo declared its 10th and largest outbreak of Ebola inflicting North Khivu and Ituri provinces in an active conflict zone. The spread of Ebola to Congolese urban centers along with deliberate attacks on the health care workers and health centers has hindered epidemiological surveillance activities, leading to substantial reporting delays. Reporting delays distort the epidemic incidence pattern misrepresenting estimates of the epidemic potential and outbreak trajectory. To assess the impact of reporting delays, we conducted a real-time analysis of the dynamics of the ongoing Ebola outbreak in Democratic Republic of Congo using epidemiological data retrieved from the World Health Organization Situation Reports and Disease Outbreak News. We analyzed temporal trends in reporting delays, epidemic curves of crude and reporting-delay adjusted incidences and changes in the effective reproduction number, R_t . As of March 12, 2019, a total of 927 Ebola cases have been reported. The average reporting delay exhibited 80.4% decline from a mean of 17.4 weeks (95% CI 13- 24.1) in May, 2018 to 3.4 weeks (95% CI 2.7-4.2) in September, 2018 (F-test statistic= 31.6, p-value =0.011). The most recent estimate of the average reporting delay is 1.4 weeks (95% CI: 1.3, 1.6) for the last month of the epidemic (February 4-March 4, 2019). Using adjusted incidence curves, we also generate short-term forecasts of the epidemic using various phenomenological models in a statistical inference framework.