Abstract:

Background: A timely risk assessment is desired to guide decisions on preventive transfusion safety measures during emerging infectious disease (EID) outbreaks. The European Up-Front Risk Assessment Tool (EUFRAT) model was developed to provide quantitative transmission risk estimates of EIDs through blood transfusion.

Study Design and Methods: The generic model comprises five sequential steps to estimate the infection risks in the blood transfusion chain: 1) the prevalence of infection in the donor population, 2) the risk of obtaining infected donations, 3) infected components, 4) infected blood products, and 5) the risk of transmitting the infection to recipients. The model uses inputs from epidemiologic characteristics of an EID and transfusion practice. The model was applied to data from a recent chikungunya outbreak in Italy.

Results: Based on data from the outbreak peak, an estimated prevalence of 1.07 (95% confidence interval [CI], 0.38-2.03) per 100,000 donors would lead to 0.04 infected donations (95% CI, 0.01-0.10), 0.13 infected blood components, 0.13 infected end products, and 0.0001 severe infections in recipients. This estimated risk can be reduced by increasing the duration of quarantine of the donated blood and becomes zero after 7 or more days of quarantine. The
model also estimated the probability of a donor returning from the outbreak area and subsequently donating infected blood in his home country to be 0.30 (95% CI, 0.01-0.65) per 100,000.

Conclusion: The model can be used to quantify EID outbreak risks to blood transfusion recipients and the effect of targeted safety interventions and as such support public health decision-making.