

Ebola: Impact of hospitals admission policy in an overwhelmed scenario

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Abstract

Infectious disease outbreaks sometimes overwhelm healthcare facilities with patients. A very recent case happened in West Africa in 2014 when outbreak of Ebola virus overwhelmed healthcare facilities in Sierra Leone, Guinea and Liberia. In this type of scenario, how many patients can hospitals admit to minimize the burden of the epidemic? In this work, we tried to find what type of admission policy by a hospital can better serve the community. Our result shows the determination of the policy depends on the initial estimation of the basic reproduction number, R_0 . When the outbreak grows extremely fast ($R_0 \gg 1$), it is better to stop admitting patients after reaching the carrying capacity because overcrowding in the hospital makes the hospital setting ineffective at containing infection, but when the outbreak grows only a little faster than the systems ability to contain it ($R_0 \gtrsim 1$), it is better to continue admitting patients beyond the carrying capacity because limited overcrowding still reduces infection more in the community. However, when $R_0 \leq 1$, both policies result the same because the number of patients will never go beyond the maximum capacity.

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