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A Time since of Injection Model for Hepatitis C Amongst People Who Inject Drugs

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Abstract : Mathematical modelling techniques are now being used by health organizations worldwide to help understand the likely impact that intervention strategies treatment options and combinations of these have on the prevalence and incidence of hepatitis C virus (HCV) in the people who inject drugs (PWID) population. In this poster, we develop a deterministic, compartmental mathematical model to approximate the spread of the HCV in a PWID population that has been divided into two groups by time since onset of injection. The model assumes that after injection needles adopt the most infectious state of their previous state or that of the PWID who last injected with them. Using analytical techniques, we find that the model behaviour is determined by the basic reproductive number R_0, where $R_0 = 1$ is a critical threshold separating two different outcomes. The disease-free equilibrium is globally stable if $R_0 \leq 1$ and unstable if $R_0 > 1$. Additionally, we make some simulations where have confirmed that the model tends to this endemic equilibrium value with realistic parameter values giving an HCV prevalence.

Keywords : hepatitis C, people who inject drugs, HCV, PWID
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