EFFECT OF POLLUTION ON DYNAMICS OF SIR MODEL WITH TREATMENT

Sudipa Chauhan*, Sumit Kaur Bhatia and Surbhi Gupta

Amity Institute of Applied Science, Mathematics,
Amity University, Sector-125, Noida, INDIA

sudipachauhan@gmail.com (*corresponding author),
sumit2212@gmail.com, surbhi.gupta0027@gmail.com

In this paper, an SIR epidemic model with treatment affected by pollution is proposed. The existence, local and global dynamics of the model are studied. It is shown that backward bifurcation occurs at $R_0 < 1$ and $p_0 < 1$ because of insufficient capacity of treatment.It is also found that due to pollution the number of infective has gone to a very high level. As a result, backward bifurcation occurs for $R_0 < 1$, even when $p_0 > 1$. Further, there exists bistable endemic equilibria for a very low capacity for $R_0 > 1$. Thus, we found that disease can be eradicated for $R_0 < 1$ only by increasing the capacity to a sufficiently high level. Persistence of endemicity of the system is obtained and the mathematical results suggest that the basic reproduction number is insufficient for disease eradication. Numerical simulations are presented to illustrate the results obtained [1].

References

[1] S. Chauhan, S. Bhatia, S. Gupta. (2015). *Effect of Pollution on Dynamics of SIR Model with Treatment*, International Journal of Biomathetics, 8 **(6)**, 1550083-1–1550083-20.