DEPARTMENT OF DEFENSE
UNITED STATES AFRICA COMMAND
OPERATION UNITED ASSISTANCE (MA205 PROJECT)
MONROVIA, LIBERIA

REPLY TO
ATTENTION OF

AFRICOM-J35   18 NOV 2014

MEMORANDUM FOR Liberian Government

SUBJECT: Funding Recommendations for Treatment Plans

1. The intent of this Memorandum is to provide recommended Courses of Action for the Liberian Government in regard to combating the Ebola Epidemic. It is assumed that the provided General Model as well as the specific parameters for the dynamics of the Ebola virus in Liberia are all accurate and consistent. Also, it must be assumed that the funding programs available are accurate and consistent.

2. In order to better understand the system of differential equations, stability analysis was done by evaluating the long-term behavior of the system. This process is outlined in Appendices A and B. After doing this long-term analysis, analysis was then done to determine what the best allocation of money would be given three possible programs to affect the spread and death rate of the virus. This was done in Appendix C and explores two possible courses of action.

3. A key takeaway from the analysis is that the system is only stable if the proportion of people susceptible to the disease is less than 50%. Another takeaway is that in order to limit the deaths caused by Ebola all aid money must be spent and that different strategies of combating the disease will affect the overall number of people that die from the disease.

4. Two courses of action were pursued. The first course of action is to minimize the number of people that got exposed to the virus. In order to do this the β coefficient must be minimized. By using the processes shown in Appendix C, spending $35 million in program 1 and $15 million in program 2 would minimize the number of people exposed and therefore limit the number of deaths. The second course of action was to spend $33 million in program 1, $12 million in program 2, and $5 million in program 3. This course of action would decrease the number of people exposed as well as increase the number of people that survive after being infected. The results if no action is taken is illustrated in Appendix D. The results of course of actions 1 and 2 are illustrated in Appendices E and F respectively. The suggested course of action is course of action 1 as it produces the fewest amount of deaths. Appendix G outlines another possible program that could be implemented to combat the spread of Ebola. This program would be to spend part of the grant money to develop vaccines and conduct research on the disease.