CALIFORNIA STATE SCIENCE FAIR
2004 PROJECT SUMMARY

Name(s)
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Project Number
S1204

Project Title
A Computer Model of the SARS Epidemic

Abstract

Objectives/Goals
The purpose of this study is to simulate the SARS epidemic in a stochastic model.

Methods/Materials
The modeling uses a Monte Carlo approach. Monte Carlo simulation is a general technique that uses computer generated (pseudo) random numbers to directly simulate probabilistic occurrences in the real world. The model was programmed in C++ on Bloodshed DEV-C++ version 4. The results were compiled and graphed with Microsoft Excel 97.

Results
The simulated epidemics produced by the model are compared with outbreaks that occurred in several different countries during the 2003 outbreak. In general, the progress of typical model epidemics appears to be quite similar to that seen in the real world. Variation in the progression of epidemics in different countries can be understood in the model as resulting from differences in the effectiveness of the response of the public health system, as well as from stochastic variations. The model also allows one to explore the sensitivity of an epidemic's progression to factors such as transmissibility of SARS and the effectiveness of public health controls such a patient isolation.

Conclusions/Discussion
A stochastic computer model of the SARS epidemic has been developed that simulates some key features of the epidemic of 2003, and allows one to explore how epidemics might progress if some basic features of the disease, or the response of the public health system, were to change.
The simulated results show that SARS is sufficiently contagious to cause a very large epidemic if uncontrolled, but can also be contained and extinguished by basic public health control measures such as isolation.

Summary Statement
The purpose of this study is to simulate the SARS epidemic in a stochastic model.

Help Received