



EDITORIAL

Roll the Dice

In the 2014 annual meeting of the Korean Society of Mathematical Biology, the managing editor proposed an interesting idea: viewing problematic gambling as a contagious disease [1]. One article was then submitted and enlisted in the June issue of this journal [2]. As part of our efforts to imprint a unique feature to the readers of biomedical journals by publishing at least one mathematical model paper, we have included models for HIV, malaria, *Vibrio vulnificus* infection, pandemic influenza, nosocomial outbreaks, and food-and-mouth disease outbreaks [3–9].

Problem gambling (i.e., ludomania) is a disorder characterized by an urge to continuously gamble despite harmful negative consequences or despite a desire to stop; it is associated with social and family costs. Problem gambling and wider gambling-related harms constitute a significant health and social issue [10]. Shaffer and Korn [11] used a classic public health model for communicable disease, which examines the interaction between host, agent, environment, and vector. Furthermore, some sociologists have shown that a significant predictor of ludomania is peer pressure in the sense that its occurrence depends on the number of individuals involved; the number of individuals who may be involved; and the frequency, duration, priority, and intensity of association with peers [12,13]. Therefore, ludomania may be considered a contagious disease. Viewing gambling as a communicable disease, Lee and Do [1,2] recently used a mathematical modeling approach to study the dynamics of problem gambling.

In the current issue of *Osong Public Health and Research Perspectives*, the optimal modeling approach to study the dynamics of problem gambling is included [14]. The authors assert that well-analyzed scientific strategies are necessary to control the gratuitous growth of gambling. They aim to analyze mathematically the adequacy of the health of society by immediately treating

patients by early prevention. Their model is based on the model of Lee and Do [1,2] with the addition of control parameters.

Pontryagin's Maximum Principle is used to obtain the optimal control strategy. The aim of three control measures is to minimize the rate of transition from susceptible gamblers to latent gamblers and the rate of transition from the latent gamblers to problem gamblers. At the same time, it is necessary to maximize the rate of transition from problem gamblers to healed gamblers. The results of their model are that three full controls are necessary nearly all of the time and that the type of society greatly affects the scenario. Prevention and treatment for the elderly with ludomania is the main intervention strategy.

The authors found that optimal timely implementation of the intervention strategies are more effective. The optimal control strategy varies with the initial number of gamblers. However, three intervention strategies have been considered, among which preventing people from all types of gambling proved to be the most crucial.

The authors' conclusion is significant in the sense of public health. The goal is to show that it is possible to implement time-dependent control techniques while minimizing the cost of implementing such control measures. This study provides a mathematical model to measure the effect of three different stages of intervention to gambling. It could be used and proven in various clinical settings.

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