

5<sup>th</sup> International Conference and Exhibition on

# Addiction Research & Therapy

October 03-05, 2016 Atlanta, USA



## Young Lee

*Manchester University, USA*

### A mathematical modeling approach to the dynamics of gambling

We take a mathematical modeling approach to the gambling epidemiology. Two deterministic models with ordinary differential equations are created to study the dynamics of gambling: one is for older adults aged 65-80 with four compartments; the other population is youth ages 16-24 composed of three classes. The models seek to examine dynamics of the system through stability analysis and a basic reproductive number. A sociological term for a basic reproductive number is a tipping point because it provides a point at which a stable system turns to an unstable one or vice versa, which is a threshold condition. All parameters are approximated, and numerical simulations are also explored. Analyses indicate that problem gambling is present in an endemic state among both older adults and young adults. One of the main goals for the young adult model is to see how prevalence rates of at-risk gambling and problem gambling change as adolescents enter into young adulthood. The parameters to which the system is most sensitive are identified and are translated to primary prevention for both models. Prevention and control strategies are discussed: school education on gambling addiction should be offered for young adults; a self-exclusion program for older adults, which is used to intervene problem gamblers or pathological gamblers by allowing them to voluntarily exclude from gambling establishments, should be extended to those who are identified as potential excessive gamblers. Although research has been active on gambling, this is the first mathematical modeling approach to study the dynamics of gambling.

### Biography

Young Lee completed multiple advanced degrees including her Doctorate of Philosophy in mathematics at University of Wisconsin – Madison. Her research interests are mathematical biology, scientific computation and computer system performance. She has published papers on infectious diseases and socioeconomic dynamics such as Ebola, H. pylori, juvenile crimes, and gambling using epidemiological models and stability analysis, also on numerical analysis of finite difference schemes, perturbations and fixed point theory in differential equations. Her models are often discussed both analytically and numerically. She has also worked on queuing network modeling and simulation and global memory systems in a network of workstations. She has taught mathematics and computer science at Manchester University since 1998.

[yslee@manchester.edu](mailto:yslee@manchester.edu)