Proceedings of the 7th Annual World Conference
of the Society for Industrial and Systems Engineering,
Binghamton, NY, USA
October 11-12, 2018

An Exploratory Application of Systems Dynamics Modeling to Improve Cesarean Section Delivery Policies and Decision Making

B. Thompson and C. Woody

Department of Systems Engineering
United States Military Academy
West Point, NY, USA

Corresponding author's Email: clay.woody@usma.edu

Author Note: Brandon Thompson and Clay Woody completed this research as part of their graduate studies at Virginia Polytechnic Institute and State University (Virginia Tech). Dr. Navid Ghaffarzadegan served as their faculty advisor for this project.

Abstract: According to the Center for Disease Control reports, the rate of cesarean section (C-section) births in the United States increased significantly from 5.5 percent in 1960 to a peak of 32 percent in 2009. However, from 2009 to 2013, the rate of C-sections began to decrease slightly. Medical research over the last three decades indicates that C-section births increase the risk for both mother and baby and are more expensive. The purpose of this exploratory research is to apply systems dynamics modeling tools to the increase in C-section births in the United States of America which are associated with higher costs, higher risks of neonatal respiratory issues, higher maternal morbidity, and secondary pregnancy complications. The resulting analysis identified the variables that influence the delivery method decision and produced a model of their causal relationships. A policy analysis concerning key variables resulted in potential ways to decrease the number of C-sections in the US and better inform policy makers and health care professionals in order to reduce the risks associated with C-sections.

Keywords: system dynamics, policy analysis, modeling