INDUSTRIAL & SYSTEMS ENGINEERING SEMINAR

Wednesday, September 26
3:15 PM – Refreshments before the seminar
3:30 PM – Graduate Seminar
Mechanical Engineering Room 4125 A & B

Addressing Waiting Time Inconsistencies in Transplantion

Professor David A. Stanford
University of Western Ontario

Many studies of wait times for transplantation have revealed a common pattern: recipients of blood type O wait on average substantially longer than blood type A, which in turn wait substantially longer than blood type AB. Depending on the circumstances in some cases patients of blood type B wait somewhat longer than O, and in others, somewhat less. This situation arises in many countries seemingly regardless of or organ type, with only slight changes in degree. If cross-blood-type transplantation were not allowed, the anticipated results would be nearly the reverse of what we experience. The average wait times for blood types O and A (representing 46% and 42% respectively of the population in Canada) would be expected to be comparable and lowest, whereas those for blood type AB recipients (representing 3%) would typically have to wait a long time for the "right" AB organ to come along. Blood type B, at 9%, would be expected to fare somewhere in between these extremes. One can logically conclude, therefore, that a substantial amount of cross-transplantation must be occurring in jurisdictions reporting what has come to be known as the "blood type O problem." O, as universal donor, sees a fraction of its organs transplanted into recipients of other blood types, thereby limiting the only source of supply of organs to O recipients. Meanwhile, AB as universal recipient is not impacted by blood type at all. In this talk, I will review a number of the studies in which the "blood type O" phenomenon is reported. Using simple queueing models as a proxy, I will provide an indication as to what the likely order of magnitude for the wait times would have been in a strict no-cross-transplantation policy was in place. Finally, I will present a hybrid policy in which O-to-B and A-to-AB cross-blood-type transplantation is allowed while the rest are barred, thereby providing access to each patient to roughly half of the available supply. The talk ignores other key factors such as organ size and health, and genetic factors that further reduce the available supply, and as such needs to be seen as an idealized scenario that suggests the order of magnitude of the wait times.

BIO: David Stanford got his Ph.D. in 1981 from Carleton University in Ottawa for research on prediction of delays in queuing systems. Following five years working for Bell-Northern Research, he returned to academia, and since 1988 he has been a faculty member in the Department of Statistical and Actuarial Sciences at Western University (aka University of Western Ontario). His interests in health care include wait times for transplantation, for emergency, and for diagnostic imaging, as well as the Alternate Level of Care (ALC) problem. A former President of the Canadian Operational Research Society (CORS), he was involved in the 2005 INFORMS Applied Probability Society's meeting in Ottawa and numerous other conferences.

FOR MORE INFORMATION ON PROFESSOR STANFORD'S RESEARCH, PLEASE VISIT: http://www.stats.uwo.ca/modules/people/publication.php?fid=32