Abstract: Liver transplantation is often a life-saving treatment for patients who are suffering from various diseases of the liver; however, its use is limited by the shortage of deceased-donor livers. In the United States, the two most common indications for liver transplantation are endstage liver disease (ESLD) and hepatocellular carcinoma (HCC), which is a type of liver cancer. The US liver allocation policy prioritizes ESLD candidates on the liver transplant waiting list based on their laboratory model for end-stage liver disease (MELD) scores. Candidates with HCC meeting Milan criteria are eligible to for higher priority through MELD exception scores, which were defined subjectively based only on a candidate’s waiting time and not objective medical criteria.

The goal of our research is to address the problem that a significantly higher proportion of patients with HCC receive liver transplantation than patients with ESLD. We propose objective MELD exception scores for HCC candidates based on the candidate’s 90-day risk of dropout or exceeding Milan criteria, as predicted using a candidate’s MELD score and total tumor size. To evaluate our proposed policy, we build a validated computer simulator model of the liver allocation system. Our simulator predicts that compared to the current liver allocation policy, our proposed policy will reduce the gap in the proportions of HCC and ESLD candidates transplanted from 15% to 5%; and result in a 7.5% increase in the 5-year transplant benefit.

Bio: Dr. Zachary Leung is an assistant professor of Management Sciences at the City University of Hong Kong. He earned his BSc and MSc from National University of Singapore, and his PhD from the MIT Operations Research Center. After graduating with his PhD, he spent one year as a postdoctoral fellow at the CMU Tepper School of Business. The focus of his research is to tackle important real-world problems by applying analytics and operations management techniques. His research interests include: revenue management, supply chain management, and healthcare operations.