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## **Transesophageal Echocardiography in Cardiac Surgery: Impact of Advanced Cardiac Imaging on Clinical Outcomes**

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Cardiac surgery is a mainstay of treatment among the highest-risk subset (~300,000 annually) of the 15.5 million US adults with cardiovascular disease. Transesophageal echocardiography (TEE) is a cardiac imaging modality used in certain valve surgeries for pre-procedural diagnoses and assessment of a surgical repaired/replaced valve. Because of these diagnostic capabilities, the American Heart Association (AHA) and American College of Cardiology (ACC) have made TEE a Class I Recommendation in mitral valve repair surgery and the surgical management of infective endocarditis. But TEE is a Class II Recommendation in all other types of cardiac surgery because, in the face of a significant evidence gap, the benefits to TEE use remain unclear. This project aims to close the evidence gap between TEE and outcomes, and characterize the determinants of high vs low use of TEE by accomplishing the following aims: (1) test the association between TEE and clinical outcomes using national registry data from the Society of Thoracic Surgeons (STS); (2) analyze national patterns of TEE use in order to identify hospital and geographic factors associated with TEE using logistic regression and nonlinear machine learning techniques. Once complete, the proposed project will build evidence for the clinical context(s) in which TEE has an outcomes benefit and provide new information on the hospital, geographic, and provider correlates on the variation of TEE use in cardiac surgery. This work will enable the evolution of future AHA/ACC guidelines for TEE in cardiac surgery, and will provide me with the skills to develop an R01 level implementation project testing different models of TEE resource allocation on cardiac surgical outcomes.