

## **Adherence to Appropriate Use Criteria for Transthoracic Echocardiography in a Contemporary Canadian Cohort**

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### **Background:**

Echocardiography volumes have increased at a rate that exceeds the increase in disease prevalence. This has led to concerns by health care insurers about the appropriateness of echocardiography studies. Appropriate Use Criteria (AUC) for echocardiography have been developed, however, there is no published Canadian data on adherence to these criteria. We investigated the AUC adherence rate in a contemporary Canadian cohort and explored factors associated with AUC non-adherence.

### **Methods:**

We prospectively evaluated consecutive referrals for transthoracic echocardiography (TTE) at the UOHI echocardiography laboratory over a 4-week period to determine adherence to ACCF/AHA/ASE 2011 AUC for echocardiography. Patient demographics, inpatient/outpatient status, previous echocardiography study, referring physician speciality, and primary indication for the study were identified.

### **Results:**

During the 4-week period, there were 1303 referrals for TTE (median age 65 years, 56.1% male). Inpatient examinations accounted for 24.4% of all referrals (n=313). Cardiologists accounted for the largest physician referral group (49.0% of referrals). Primary care physicians and non-internal-medicine specialists accounted for 19.3% and 14.7%, respectively. The TTE referral requisition alone was inadequate to determine AUC adherence in 26.2% (n=341) of referrals. After review of the referral requisition, electronic records and contact with the referring physicians where necessary, 85.9% (n=1119), 6.1% (n=79) and 3.6% (n=47) of TTE referrals were classified as adherent (appropriate), non-adherent (inappropriate) and uncertain by AUC, respectively. Only 3.1% (n=40) of TTE referrals were unclassifiable. The AUC category of "Evaluation of Valvular Function" accounted for the largest number of non-adherent referrals (n=48). Outpatient referrals were more likely than inpatient referrals to be non-adherent to AUC (7.7% vs. 0.9%,  $p<0.001$ ). Referrals from cardiologists were significantly more likely than other physician groups to be non-adherent to AUC (8.5%;  $p<0.001$ ), whereas non-internal-medicine specialists were least likely to be non-adherent (1.6%,  $p=0.003$ ). Non-adherence rates were greater in referral requisitions with inadequate information to evaluate AUC adherence (17.6% vs. 2.0%,  $p<0.001$ ). After adjusting for potential confounders, the only independent predictor of AUC non-adherence was a TTE requisition that provided inadequate information to determine adherence (OR 7.3[3.9-13.5],  $p<0.001$ ). Patient age and gender were not associated with AUC adherence.

### **Conclusion:**

In a large, contemporary, consecutive patient population referred to a Canadian academic echocardiography laboratory, we observed that AUC non-adherence is low (6.1%).

However, TTE referrals with requisitions that contain inadequate information to evaluate AUC adherence should be closely scrutinized for their appropriateness.