

Supplemental Online Content

Dhruva SS, Ross JS, Steinman MA, Gan S, Muluk S, Anderson TS. Intravascular Microaxial Left Ventricular Assist Device Manufacturer Payments to Cardiologists and Use of Devices. *JAMA*. Published online April 20, 2024. doi:10.1001/jama.2024.4682

eMethods. Methodological Details

This supplementary material has been provided by the authors to give readers additional information about their work.

eMethods

Data Sources

We linked data from the CMS Open Payments Program database, which includes industry-reported clinician-level data on marketing payments, to a 20% sample of Medicare fee-for-service Part B claims for physicians performing at least one PCI in any year from 2016 to 2018. We also linked Part B claims to Part A claims to identify hospitals capable of performing both intravascular microaxial left ventricular assist device (LVAD) and intra-aortic balloon pump (IABP).

Study Population

We used the following American Medical Association Current Procedural Terminology (CPT) codes to identify LVAD (33990, 33991, 33995, and 33975) and IABP (33967, 33970, 33973) insertion. We restricted our sample to cardiologists who performed percutaneous coronary interventions (PCIs) in each study year based on current procedural terminology (CPT) codes (C9600, C9601, C9602, C9603, C9604, C9605, C9606, C9607, C9608, G0290, G0291, 92920, 92921, 92924, 92925, 92928, 92929, 92933, 92934, 92937, 92938, 92941, 92943, 92944, 92973, 92980, 92981, 92982, 92984, 92995, 92996) and who performed these procedures at a hospital capable of performing both LVADs and IABPs, as evidenced by the presence of CPT codes for LVAD and IABP billed by at least one physician at that hospital.

Industry Marketing Payments

We linked data on industry payments from mechanical circulatory support device manufacturers using the CMS Open Payments database. The manufacturers of IABP mechanical circulatory support systems were Teleflex and Maquet/Datascope/Getinge, whereas Abiomed is the only manufacturer of LVAD mechanical circulatory support systems. Payment data were linked to procedure files by physician National Provider Identifier (NPI). We examined all general payments, which include gifts and service payments, and excluded research, ownership, and investment payments.

Study Outcomes

The primary study outcome was the performance of procedures for LVAD insertion to Medicare fee-for-service beneficiaries. This outcome was assessed for payments received in the current year (e.g., association between payments made in 2017 and LVADs performed in 2017) and in the year following payments (e.g., association between payments made in 2017 and LVADs performed in 2018). We also examined this outcome stratified by tertile of payment value among physicians who received LVAD payments. We also examined this outcome among physicians who received their first payment during a year in our study. Specifically, we examined physicians who had received no LVAD payment in the first year as the predictor variable and then assessed the proportion of physicians who received a payment (vs those who did not) in the following year and who then placed an LVAD.

Covariates

Covariates included physician gender, post-graduate year (categorized as <10, 10-20, >20 years in training, and missing), census region, volume of PCIs/year (categorized in quartiles), study year (2016, 2017 or 2018), placement of any IABPs, and payments from IABP manufacturers. Region data were as follows: Northeast (1074 cardiologists), Midwest (1398 cardiologists), South (2752 cardiologists), West (1171 cardiologists), and missing (3 cardiologists).

Statistical Analysis

The unit of analysis was physician-year. We assessed the primary outcome using multivariable Poisson regression with robust standard errors, adjusting for the covariates to estimate adjusted risk ratios (aRRs).

For analyses assessing the relationship between payments and procedures from the same year, all three years of data were used (2016-2018). For analyses assessing the relationship between payments and procedures in the same and subsequent year, payments data from 2016 and 2017 were used to models of procedures in 2017 and 2018, respectively.