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Operator volume and outcomes in percutaneous coronary intervention using the nationwide inpatient sample

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We read with interest the article by Badheka and colleagues¹ describing the relationship of institutional and operator volume with clinical outcomes in patients undergoing percutaneous coronary intervention (PCI) procedures using the Nationwide Inpatient Sample (NIS) data. While the analyses add to an existing body of literature on hospital volume and PCI outcomes, we have several concerns related to the authors' analyses of operator volume.

Unlike the CathPCI registry where unique physician identifiers are consistently captured for each PCI procedure, identifying PCI operators in a reliable fashion is very difficult in the NIS dataset. Although not entirely clear from the article, we believe that the authors used the 'MDNUM2_R' variable available in the NIS dataset to identify PCI operators.² We have significant concerns with the use of this approach. First, a large number of states do not report this variable or only report it inconsistently, which explains the exclusion of a large number of patients (N=382,385) from the sample due to missing information. Second, the information captured by this variable is not uniform even in states that report these data. States use this variable differently to denote the 'operating physician' (n=9), the 'primary or operative surgeon' (n=6), the 'provider performing the principal procedure' (n=6) or the '1st other physician' (n=9), respectively. Given that there are no standard criteria regarding which physician (operating physician, surgeon, attending physician, or consulting physician) is identified using the 'MDNUM2_R' variable, we would think it is prudent to be very cautious in attributing meaning to this variable. Third, in the description of the 'MDNUM2_R' variable on the Healthcare Cost and Utilization Project (HCUP) website, some of the reporting states specifically caution against its use to track physicians within a hospital even during a given year as they assign the same identifier to all physicians within the same group.² Fourth, although the NIS data includes up to 15 procedures for each

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patient, the 'MDNUM2_R' variable is not directly linked with a specific procedure variable. Therefore, for patients undergoing multiple procedures, it is likely that the PCI procedure in this study was incorrectly attributed to a physician who was in reality associated with a different inpatient procedure, which may not even be a cardiovascular procedure. This also explains why the median operator PCI volume reported in this study was only 33 in 2009 compared to a median operator PCI volume of 75 reported from the NCDR CathPCI registry during the same period.³ In fact, 25% of the operators in this study had a median annual PCI volume of 15, which seems highly implausible. Due to these glaring limitations, previous studies using the NIS dataset have avoided the use of the above variable to identify operating physicians.⁴ We believe that the issues we have raised are critical and threaten the validity of the study's findings.

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