Use of in-hospital mortality to assess ICU performance may bias quality measurement

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In-hospital mortality for ICU patients is often used as a quality measure, but discharge practices may bias results in a way that disadvantages large academic hospitals, according to a recently conducted study.

"Hospitals differ in the number of patients they transfer to other hospitals or post-acute care facilities," said lead author Lora Reineck, MD, post-doctoral fellow at the University of Pittsburgh School of Medicine. "These differences can affect in-hospital mortality measurement if some hospitals discharge patients more frequently or earlier than others, since in these cases the mortality burden is shifted to other facilities. While it's known that discharge practices alter in-hospital ICU mortality measurement, it was previously unknown whether this effect is uniform across hospitals or whether certain types of hospitals are more affected than others."

The results will be presented at the ATS 2012 International Conference in San Francisco.

"We found that this 'discharge bias' disproportionally hurts large hospitals and academic hospitals, which frequently accept many patients in transfer from other hospitals," said Dr. Reineck. "Hospitals that care for a large number of patients insured through health maintenance organizations (HMOs) are also affected, since these organizations typical restrict transfers. Mortality measures tied to a specific time point, such as 30-day mortality, are less biased by discharge practices but are harder to calculate."

In recent years, quality measures have increasingly been publicly reported and tied to financial incentives through pay-for-performance. It is important that these quality measures accurately assess performance and are not flawed by bias. According to Dr. Reineck, "our study reveals that large academic hospitals, as well as hospitals with a high proportion of commercial HMO patients, are more negatively affected by using in-hospital ICU mortality compared to 30-day mortality than other hospitals. Accounting for this bias might prevent these hospitals from being unfairly penalized in public reporting or pay-for-performance programs."

The retrospective cohort study used data on 43,830 ICU patients admitted to 134 hospitals in Pennsylvania in 2008. Discharge bias was defined as 30-day mortality minus in-hospital mortality; greater discharge bias makes a hospital appear of relatively higher quality.

Mean risk-adjusted hospital-specific 30-day and in-hospital mortality rates were 13.1 ± 1.6% and 9.6 ± 1.3%, respectively, resulting in a mean hospital-specific discharge bias of 3.5% ± 1.3%. Discharge bias was greater in small hospitals, non-teaching hospitals, and hospitals with fewer commercial HMO patients, thereby making these facilities appear relatively better in quality compared to large teaching hospitals or those with a high proportion of commercial HMO patients. Hospital rank was greatly affected by discharge bias, with 29.1% of hospitals increasing in rank by at least one quartile and 26.9% decreasing in rank by at least one quartile. Large teaching hospitals and hospitals with the highest proportion of patients with commercial HMO insurance were more likely to decrease in rank than small, non-teaching hospitals or hospitals with a lower proportion of commercial HMO patients.

"State and national programs that use in-hospital mortality to benchmark hospitals should note how discharge bias unfairly disadvantages certain types of hospitals," concluded Dr. Reineck. "Discharge bias must be

accounted for to prevent unfair performance assessments."

Future studies are planned to assess the effects that using this measure in public reporting has on outcomes of ICU patients.

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