



COMMENT ON DESAI ET AL.

Health Care Utilization and Burden of Diabetic Ketoacidosis in the U.S. Over the Past Decade: A Nationwide Analysis.

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We read with great interest the outstanding study by Desai et al. (1) in the recent issue of *Diabetes Care*. The authors aimed to determine the incidence and costs of hospitalizations for diabetes ketoacidosis (DKA) in the U.S. The authors searched the National Inpatient Sample (NIS) database for all DKA admissions during 2003–2014. Consistent with recent Centers for Disease Control and Prevention reports (2), the study confirmed a decrease in hospital mortality but a significant increase in the number of hospitalizations for DKA. Notably, they reported a significant increase (56%) in the “inflation-adjusted hospital charges” for DKA admissions, from \$18,987 in 2003 to \$26,566 in 2014 ($P < 0.001$). Thus, the inflation-adjusted “national bill” for DKA hospitalization was estimated to be \$5.1 billion in 2014. It is noteworthy that the authors used the terms “charges” and “costs” interchangeably in the abstract and article.

Extensive evidence supports that hospital charges should not be used as a direct estimate of the cost of hospital care (3–5). For instance, hospital charges, defined as the amount billed by hospitals for the services rendered, do not actually reflect hospital costs, defined as how much the hospital service actually costs or was paid to the hospital. Hospital costs are the actual expenses incurred by hospitals in rendering the service, including wages, supplies, and utility

costs. For example, hospital charges can be twice the actual cost of care (4). Moreover, some U.S. hospitals charge patients more than 10 times what Medicare pays for the services (4). Using the cost-to-charge ratios makes the strong estimation that the charge for a specific service is proportionate to the true economic cost (4,5). Hospitals may set their charges without knowing the relative cost of different services. There are strategic reasons to overcharge for some services and to undercharge for others. For the purposes of group-level comparisons, conversion of hospital charges to costs appears to represent a reasonable compromise between accuracy and ease of implementation (4,5).

The NIS database, part of the Healthcare Cost and Utilization Project (HCUP), sponsored by the Agency for Healthcare Research and Quality, is the largest, publicly available, inpatient database in the U.S. The NIS provides only hospital charges, thus the Agency for Healthcare Research and Quality created the HCUP cost-to-charge ratio files to translate charges to true hospital costs (5). Thus, the estimated hospital bill for DKA of \$5.1 billion in 2014 could be misleading for several reasons. Charges and costs are correlated, but readers need to interpret with caution the total bill.

In conclusion, we congratulate Desai et al. (1) for their great contribution to

our current knowledge on DKA in the U.S. and encourage them to provide an updated hospital cost analysis. Thus, researchers and health care policy experts can plan future studies and programs based on the actual health care utilization burden for DKA in the U.S.

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The authors of the cited article did not respond.

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