

# Misclassification of Obesity in Claims Data

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We read with interest the study by Singh et al. (1) examining the association between obesity and the risk of serious infections in biologic-treated patients with inflammatory bowel disease (IBD). Obesity was not associated with an increased risk of serious infections in patients with IBD treated with biologics (hazard ratio: 0.74, 95% confidence interval: 0.55, 1.01). Of interest, the unadjusted hazard ratio for this association was 1.15 (95% confidence interval: 0.86, 1.54), in contrast with the direction of the adjusted effect. We contend that these results are affected by misclassification of the exposure (obesity) and by related residual confounding.

In this study, patients were considered obese if they had an *International Classification of Diseases (ICD)-9* code 278.00, 278.01, or V85.30-V85.44 or *ICD-10* code E66.x in the year preceding the initiation of biologics, whereas those without these codes were classified as nonobese. This definition of obesity can result in differential misclassification of exposure. Indeed, although the identification of obese patients by the presence of obesity-related *ICD* codes has high specificity, the default classification of nonobese patients by the absence of these codes is likely affected by misclassification because obesity is generally undercoded in electronic health-care databases. We showed that the proportion of obese patients in a general population without

obesity-related *ICD* codes can be as high as 55% (2). Besides, the authors state that up to 35% of patients with IBD are obese. However, only 8.8% of their cohort is classified as obese, further indicating potential misclassification of obese patients in the nonobese group. This exposure misclassification in the comparison group can result in a diluted effect of obesity on the rate of infection, which will vary depending on the extent of the misclassification.

In addition, confounding adjustment in the presence of exposure misclassification may also be undermined (3), as the strong change in direction between the crude and adjusted estimates may indicate. The validity of confounding adjustment depends, partly, on the association between the hypothetical confounder and the outcome among the nonobese. However, if a large proportion of the nonobese individuals is actually obese, this adjustment is erroneous and can lead to biased results so that appropriate statistical tools to quantify and account for this misclassification are needed (4).

In conclusion, although obesity-related *ICD* codes can be used to identify a cohort of obese patients with high accuracy, the patients without these codes should not be classified as nonobese without further chart validation of the patient population or restricting to patients with a weight-related *ICD* code. Doing so will result in exposure misclassification and yield spurious estimates. It would be informative for the readers if the authors could perform an analysis quantifying the extent of the bias that may be caused by the misclassification of the exposure.

## CONFLICTS OF INTEREST

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