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Reply: Administrative Health Data: guilty until proven innocent

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We thank the authors for their interest in our manuscript and for raising several important issues. The purpose of our study was not to determine which claims based definition of hip fracture performs best, but instead, to simply describe the differences in hip fracture counts that will be obtained using several different definitions of fracture in the nursing home setting, and to encourage validation work. In our limitations section, we state that in the absence of a validation study with chart review, it is not possible to say which definition of hip fracture is preferable.

We disagree with the authors' claims that our results are misleading. First, the authors state that non-hospitalized hip fractures are "improbable." To the contrary, it is likely that some nursing home residents with hip fracture are not hospitalized given the frail status of nursing home residents and because many proxies designate a goal of comfort rather than life prolonging measures. Previous studies suggest that as many as 11.8% of nursing home residents with hip fracture do not undergo surgical repair.¹ Non-hospitalized fractures are thus much more likely for the unique population in nursing homes. Second, in the nursing home setting, Part B (outpatient) claims are typically generated from the primary care provider with the most comprehensive knowledge of the resident. Thus, the underlying process giving rise to the data differs for individuals residing in the nursing home, as compared with the community setting. Third, providers are now required to include diagnostic codes as part of outpatient claims. This practice has changed considerably since the early validation study the authors cite (Ray et al)², and it is unclear whether the low prevalence of true hip fractures ascertained via outpatient codes is still applicable. Many contemporary studies do use both inpatient and outpatient claims to ascertain hip fracture,^{3–5} and indeed, Current Procedural Terminology (CPT) codes can only be found in outpatient claims. Fourth, we did not include diagnostic codes for pathologic fractures (ICD-9 733.14) in order to avoid classifying non-osteoporotic fractures or fracture complications as incident

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fractures. We have separately looked at the proportion of hip fractures that would be obtained if we included the pathologic fracture code but excluded codes for cancer, aseptic necrosis, or other complications, and the proportions are quite similar.

Presently there is no gold standard definition of hip fracture via claims data that has been validated with a contemporary chart review, yet claims data remain a common and important method to study fracture. Our study suggests that at least in the nursing home setting, the addition of outpatient claims will identify 11% more hip fractures than inpatient claims alone, though we make no claim about which data source or hip fracture definition is most valid. We hope that our study will encourage investigators to publish the exact claims based definition of hip fracture that they use, especially for unique settings like the nursing home where prior validation studies may not apply. We also strongly advocate for future validation studies, particularly those with ICD-10 codes, in order to identify the most accurate definition of hip fracture. We believe these steps are necessary to advance claims based fracture research, particularly for important and historically understudied populations.

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