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Using linked records to improve National estimates of hospital admissions for coronary heart disease (CHD)

Lopez, Derrick[1*], Nedkoff, Lee[1], Hobbs, Michael[1], Briffa, Tom[1], Preen, David[1], Heyworth, Jane[1], and Sanfilippo, Frank[1]

[1]The University of Western Australia

Objectives

National statistics for hospital admissions for acute CHD based on unlinked administrative data are inflated because of inter/intra-hospital transfers or related readmissions for further investigations or procedures. Our objective was to estimate the inflation of CHD inpatient counts using multiple approaches based initially on Western Australian data that can be applied to future National studies.

Approach

We used a linked hospital morbidity dataset from the Western Australian Data Linkage System to determine hospitalisations for each CHD subcategory from 1990-2010. Transfers were defined as contiguous admissions separated by $\leq$1 day. Episodes-of-care (EOC) were defined as admissions (with/without transfers) that were within 28 days of the initial CHD admission. As the principal diagnosis may vary between hospitals involved in transfers or admissions within an EOC, we explored four approaches for allocating a diagnosis: i. Hierarchical diagnosis: selection of diagnosis based on clinical severity (ST-elevation myocardial infarction (STEMI)>non-STEMI>unstable angina>stable angina>other CHD>chest pain)
ii. Hospital hierarchy: diagnosis based on highest hospital level (tertiary>private>other metropolitan non-tertiary>rural)
iii/iv. Temporal order of diagnosis: diagnosis based on first or last record in transfer/EOC

Results

The proportion of cases that were transferred varied according to disease severity and time: 13% (1990) to 27% (2010) for STEMI; 5% to 7% for stable angina and unchanged at 4% for chest pain. Compared to transfer-level data using the first approach, unlinked data overestimated STEMI counts by 3% (1990) to 11% (2010), stable angina by 3% to 5% and chest pain by 6% to 6%. Similarly for EOC-level data, the overestimates were 5% (1990) to 12% (2010) for STEMI, 13% to 19% for stable angina and 20% to 14% for chest pain. The four approaches for allocating a diagnosis produced differing counts with the difference being larger for more clinically severe diagnoses than for less clinically severe diagnoses. For example, using transfer-level data, the differences between approaches i and iv in 2010 were 12%, 2% and 1% for STEMI, stable angina and chest pain respectively.

Conclusion

There is a potential to overestimate counts of CHD in inpatient data if transfers and readmissions are not taken into account, and this inaccuracy can differ across disease subcategories and approach used. This has important implications where higher disease severity, such as myocardial infarction, is an indicator of population health. Transfer- or EOC-level data are more likely to reflect true CHD hospitalisation counts than unlinked-level data, and are more appropriate for epidemiological studies of CHD rates.

*Corresponding Author:
Email Address: derrick.lopez@uwa.edu.au (D. Lopez)

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