



USE OF DATABASES AND REGISTRIES TO UNDERSTAND POST-OPERATIVE HIP FRACTURE MANAGEMENT

Ireland et al.'s (1) interesting study reveals the untapped potential of linking clinical registries and administrative databases. The authors analysed the Department of Veterans' Affairs (DVA) database of community-dwelling patients to compare rates of mortality, hospital readmission and independent living status following hip fracture with and without hospital-based rehabilitation (1). The 3 key findings of this study were:

- rehabilitation increased total length of hospital stay by 11 days and hospital costs by \$12,000 (AUD);
- rehabilitation is associated with improved early and late survival;
- no significant association was found between receiving inpatient rehabilitation and the likelihood of living independently for up to 2 years after hip fracture.

Ireland et al.'s study does not explain the extent to which patient selection for hospital rehabilitation biased the outcome for mortality. "The assessment of 'potential to benefit', which is integral to the process of selection for transfer into rehabilitation (REH) appears to identify factors associated with better survival" (1). Similarly, the authors were not able to determine the reasons why there was no change in the likelihood of living independently up to 2 years after hip fracture.

By choosing a cohort such as DVA patients, Ireland et al. were able to link relevant well-established administrative databases and highlighted the value obtained from analysing this data. However, this method has limitations, as administrative databases alone do not provide information about "patient characteristics, intra-operative practices, and postoperative outcomes" (2).

Hospitals in Australia and New Zealand are currently capturing data for the Australian and New Zealand Hip Fracture Registry (ANZHFR). This registry promotes the delivery of high-quality care and has the potential to improve quality of life for older people while generating cost savings in the healthcare system (3, 4). Initiatives such as the Government's My Health Record can further enhance the wealth of data available to researchers and policymakers.

Ireland et al. (1) suggest that "community-based programmes be further considered for hip fracture patients". While there have been a number of studies that have analysed data from hip fracture registries (5–7), these have not provided insights into the effectiveness of inpatient vs outpatient and community rehabilitation. To date there is limited research analysing the integrated data from a clinical registry and administrative databases. A current challenge is that "only islands of automation exist" (8) due to the limited integration of digital health information.

I take inspiration from Close's (9) point that we need to "embrace the reality that high-quality care costs less and recognise that upfront investment is required to put in place the necessary infrastructure and services to support secondary fracture prevention and deliver first-class hip fracture care to all Australians".

Accepted Oct 7, 2016 Epub ahead of print Nov 30, 2016

Dharani Nagarajan

Doncaster Rehabilitation Service,

371 Manningham Road, Doncaster, VIC 3108, Australia

E-mail: dharani.nagarajan@mannacare.org.au

RESPONSE TO LETTER TO THE EDITOR

We welcome the opportunity to respond to comments on our recent article (1). Nagarajan notes the potential role of linked administrative datasets for evaluation of complex conditions such as hip fracture but raises questions concerning the accuracy and completeness of their data. Both the strengths and limitations of administrative data are, we believe, clearly set out in the discussion section of our paper. The absence of some potentially important clinical variables is admitted, and our paper is careful not to ascribe any causative relationships between rehabilitation delivery and patient outcomes, citing only statistically significant associations.

While all administrative data undoubtedly include some errors of diagnostic coding, these are less evident

for hip fracture than for most other major conditions, with sensitivity rates as high as 97% reported worldwide (10) and specifically from Australian databases (11). The databases generated by the Department of Veterans' Affairs (DVA) have a primary function of validating billing claims, a feature known to promote greater accuracy (12), which is further enhanced through database linkage (13).

The claim that administrative data cannot reasonably describe patient characteristics or outcomes would seem to be refuted by the results of our paper. An extensive list of demographic and clinical items has been presented, while meaningful outcomes of death, hospital readmission, placement in aged care facilities,

and surrogate measures of defined independence, were tabled for a 2-year follow-up.

Many registries of hip fracture patients and treatment processes also acknowledge incomplete clinical data items. The paper by Inacio et al. (2), cited by Nagarajan, notes that some details of surgical process, fracture site definition and relevant comorbidities were lacking and that relationships between treatments and outcomes were not established. For some items the registry custodians made additional recourse to administrative data. Similarly the Australian and New Zealand Hip Fracture Registry has reported on selected performance items at facility level, but many clinical details await a patient-level audit format, which is still in pilot phase (3).

Linkages of administrative and registry data collections, as alluded to by Nagarajan, would seem likely to enhance the value of both.

Two specific questions have been raised about statements in the discussion section of our paper. These concern “lack of explanation” in respect of an apparent association between selection for rehabilitation and reduced mortality, and a similar lack concerning our final comment that community-based rehabilitation warrants further consideration as an alternative to in-hospital treatment. The wording of the paper in both instances has implied questions for consideration rather than definitive opinions and, as such, requires no “explanation”. We maintain that these questions

arise logically out of the data and other cited reports in our paper. With regard to mortality, no significant differences were found between study populations with and without rehabilitation in respect of patient age, sex, comorbidity or fracture type, all elements strongly associated with patient mortality (14). The existence of some other factor(s) inherent in the provision of post-fracture rehabilitation may therefore be queried.

Likewise, the failure of numerous studies to identify superior effectiveness for in-hospital over community-based rehabilitation (as noted by Nagarajan) together with the evidence of our study and numerous other cited reports for substantial cost differences, would be reason enough to suggest additional consideration be given to community programmes. We maintain that this is a logical conclusion to draw from the presented evidence and discussion.

Our paper does not attempt to present administrative data as the ideal vehicle for examining all aspects of any health service. However, the capacity of databases to raise relevant, evidence-based questions is a valuable asset. The definitive answers to many such questions require focussed reviews of clinical records. It is hoped that such studies will be part of the “further considerations” promoted by our paper.

Anthony W. Ireland

Department of Veterans' Affairs, Sydney, Australia

E-mail: tony.ireland@dva.gov.au

REFERENCES FOR BOTH PAPERS

- Ireland AW, Kelly PJ, Cumming RG. Associations between hospital-based rehabilitation for hip fracture and two-year outcomes for mortality and independent living: an Australian database study of 1,724 elderly community-dwelling patients. *J Rehabil Med* 2016; 48: 625–631.
- Inacio MC, Weiss JM, Miric A, Hunt JJ, Zohman GL, Paxton EW. A community-based hip fracture registry: population, methods, and outcomes. *Perm J* 2015; 19: 29–36.
- Close J, Armstrong E. Australian and New Zealand facility level audit of hospitals performing surgery for hip fracture November 2015. Australian and New Zealand Hip Fracture Registry, 2015. 36p. [Accessed 2016 Aug 21] Available from: http://anzhfr.org/wp-content/uploads/2016/07/ANZHFR_FLA_Report_2015_Final.pdf.
- Zeltzer J, Mitchell RJ, Toson B, Harris IA, Ahmad L, Close J. Orthogeriatric services associated with lower 30-day mortality for older patients who undergo surgery for hip fracture. *Med J Aust* 2014; 201: 409–411.
- Gjertsen JE, Engesaeter LB, Furnes O, Havelin LI, Steindal K, Vinje Tonas et al. The Norwegian Hip Fracture Register: Experiences after the first 2 years and 15,576 reported operations. *Acta Orthopaedica* 2008; 79: 583–593.
- Ellanti P, Cushen B, Galbraith A, Brent L, Hurson C, Ahern E. Improving hip fracture care in Ireland: a preliminary report of the Irish Hip Fracture Database. *J Osteoporos* 2014; 2014: 656357.
- Neuman MD. How clinical registries can make a difference in hip fracture care. *Anaesthesi* 2016; 71: 497–501.
- Iezzoni L. How much are we willing to pay for information about quality of care? *Ann Int Med* 1997; 126: 391–393.
- Close JC. Hip fracture in Australia: missed opportunities and a chance to improve care. *Intern Med J* 2013; 43: 1262–1264.
- Hudson M, Avina-Zubieta A, Lacaille D, Beernatsky S, Lix L, Jean S. The validity of administrative data to identify hip fractures is high – a systematic review. *J Clin Epidemiol* 2013; 66: 278–285.
- Henderson T, Shepheard J, Sundararajan V. Quality of diagnosis and procedure coding in ICD10 administrative data. *Med Care* 2006; 44: 1011–1019.
- Van Walderen C, Austin P. Administrative database research has unique characteristics that can risk biased results. *J Clin Epidemiol* 2011; 65: 126–131.
- Wu T-Y, Jen M-H, Bottle A, Liaw CK, Aylin P, Majeed A. Admission rates and hospital mortality for hip fractures in England 1998 to 2009. *J Public Health* 2011; 33: 284–291.
- Ireland AW, Kelly PJ, Cumming RG. Risk factor profiles for early and delayed mortality after hip fracture: analyses of linked Australian Department of Veterans' Affairs databases. *Injury* 2015; 46: 1028–1035.