Reviewer’s report

Title: Mortality following acute pancreatitis: social deprivation, hospital size and time of admission: record linkage study

Version: 4 Date: 23 May 2014

Reviewer: Alex Bottle

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I have been asked to comment primarily on the statistical methods. I think the analysis is mostly OK, though I have some quibbles. Also, the justification for the study and the reporting and interpretation of the results need some more work.

MAJOR COMPULSORY REVISIONS

The study’s main objectives are given as, “to establish whether mortality is influenced by the following five factors; social deprivation, size of hospital, week day of admission, recruitment of newly qualified junior doctors each August and EWTDs for junior doctors’ working hours.” What I think is missing from the introduction is an argument why any of these factors should or might correlate with mortality following admission for acute pancreatitis. Gaps in the literature are not sufficient reason.

Methods: there were rather a lot of hypothesis and sensitivity tests performed. Some justification of the usual alpha of 5% is therefore needed in the methods, and some discussion of the possibility of false positive results is needed in the discussion. It strikes me that this is a big potential reason for various findings, such as the subgroup alcohol-related disease and the large-hospital group. On the subject of p values, I find it odd that there aren’t any. “P<0.05” isn’t enough information given the multiple testing.

Why were models run with and without adjustment for comorbidities?

Why was direct standardisation used? Some of the strata will be pretty small.

Was hierarchical logistic regression modelling considered to deal with the clustering of patients within hospitals? In theory, this ought to be done, esp with hospital-level covariates such as size and potentially important variations in staffing / junior changeover / weekend effects involved. I recommend you do this. What may happen is that some of the stat signif findings will become non-signif due to the correct standard errors being used – or nothing at all – but it needs to be checked.

MINOR ESSENTIAL REVISIONS

Introduction: “The mortality rate following acute pancreatitis typically varies between about 4% and 10% [2-9], but increases to about 15% to 30% in cases of severe necrotising [2].” Over what time periods?
Discussion: some reference is needed for the accuracy of primary diagnosis coding in Wales. I used PEDW in the late 1990s, and it was pretty ropy.

“We found evidence of increased mortality for alcoholic acute pancreatitis during the months from August to October, but no significant increase for acute pancreatitis overall or for gallstone acute pancreatitis. It is possible that an increase in mortality during popular holiday months such as August and September may be linked to a lack of senior consultant cover and low senior to junior doctor ratios, as well as the recruitment of newly qualified junior doctors in August.” I don’t see why you’d see a junior changeover effect for alcoholic acute pancreatitis and not the other types. If not simply due to multiple testing, why might this be the case?

The junior changeover effect was hypothesised to last one, two and then three months. While the odds ratios were similar for each version of this variable, why would one have expected the effect to last so long for acute pancreatitis? Might something like summer drinking be a possible alternative explanation?

Figures 1 and 2: are those lines error bars? They don’t help us compare the pairs of proportions, which is presumably part of the purpose of this plot.
I think Fig 3 is missing a caption.

Level of interest: An article whose findings are important to those with closely related research interests

Quality of written English: Acceptable

Statistical review: Yes, and I have assessed the statistics in my report.

Declaration of competing interests:
I declare that I have no competing interests