

## **105: LIMITATIONS AND PRECAUTIONS TO THE USE OF IN-HOSPITAL MORTALITY AS A QUALITY OF CARE INDICATOR**

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### **Objective:**

For many years, in-hospital mortality has been used as an outcome quality indicator in several countries to compare and benchmark hospital performance. There are however controversies about the meaning and value of this indicator. In Switzerland it is now also possible to measure this outcome indicator since the availability of routinely collected hospital discharge administrative data. The objective of this study was to show how in-hospital mortality should be measured and what are the limitations and precautions to its use.

### **Methods:**

In the Canton of Valais, Switzerland, routinely collected administrative data have been transmitted since the year 2000 to the Canton Health Observatory by six acute care community hospitals (totalling about 800 beds). The medical part of these administrative data includes patients' demographic characteristics, discharge status including death, up to 10 diagnostic (ICD-10) and procedure (ICD-9 CM) codes. Bivariate and multivariate analyses were conducted. The model was adjusted using the variables age, gender, and the Charlson comorbidity index. We calculated crude and adjusted relative risks for global and disease specific in-hospital mortality. For the latter, we used five major diseases corresponding to an important burden in term of morbidity and mortality: pneumonia, pulmonary embolism, coronary artery disease, stroke, and congestive heart failure. We also reported indexes of hospital variations for global and disease specific in-hospital mortality. These measures of variation included a description of the distribution (mean, median, inter-quartile range, entire range), the coefficient of variation, the extremal quotient, and the chi-square test.

### **Results:**

Adjusted odds ratio (OR) (95% CI) for global in-hospital mortality were 1.00 (reference) for hospital A, and respectively for hospitals B to F: 1.28 (0.88-1.87), 2.29 (1.62-3.22), 1.32 (0.94-1.85), 1.73 (1.26-2.37) and 1.77 (1.20-2.59). For disease specific in-hospital mortality we observed higher, statistically significant, results for hospital B (pneumonia, OR (95% CI): 10.78 (1.38-84.51)), for hospital D (pulmonary embolism, OR (95% CI): 7.69 (1.53-38.78), and stroke, OR (95% CI): 11.82 (1.40-100.02)), and for hospital E (pneumonia, OR (95% CI): 10.35 (1.35-79.26)). Indexes of hospital variations demonstrated that the coefficient of variation and the extremal quotient were respectively 19.94 and 1.66 for global in-hospital mortality. For disease specific in-hospital mortality these same indexes varied from 14.74 to 88.05 and from 1.67 to 12.66, respectively. The chi-square test was statistically significant for global mortality, pneumonia, pulmonary embolism and coronary artery disease.

### **Conclusions:**

Interpretation of differences of in-hospital mortality between providers is a complex matter that requires taking several factors into account. Precautions in the use of in-hospital mortality consist in case-mix adjustment and a combined analysis of global and disease-specific mortality. It is important to check if one hospital has consistent results across measures. Our results show that hospital D had statistically significantly more deaths for two diseases out of four (pulmonary embolism and stroke) and hospital E for global mortality and death linked to pneumonia. However, global data were not consistent enough to allow a diagnosis of a quality of care issue. Results of disease specific mortality were also difficult to interpret because of small numbers. In-hospital mortality measures should be evaluated in the light of potential limitations such as the fact that many factors play a role in the process of the death, which are not always linked to a quality of care issue. Furthermore, in-hospital mortality alone is not sufficient to allow a global judgment about quality of care in a hospital. This indicator should be evaluated simultaneously with other outcome and process indicators.