Modeling of impact of the hospital heterogeneity during a survey method: study managed in Clermont-Ferrand in 2013

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Background
Since 2008, in France, health structure having a MCO activity (Medicine, Chirurgy, gynecology-Obstetrics) has to pass a set of quality indicators. The HAS (the Haute Autorité de Santé or French national authority for health) developed these quality indicators (such as patients’ record keeping) and the survey method by drawing random samples of 80 records in each structure. The objectives are to modulate the DRG (diagnosis related group) financing according to quality criteria (such as the “pay of performance” programs in others countries). This survey method is under the hypothesis of intra-structure homogeneity neglecting the fact that in bigger hospitals, homogeneity is related to services, thus leading to global intra hospital heterogeneity.

Methods
Our study computes on simulated databases the impact of the heterogeneity inside a big hospital. It is based on real data from a big teaching hospital having an internal heterogeneity related to each service. This simulation is based on some quality indicators that are patients’ record keeping indicators.

Results
Under homogeneity hypothesis, there is an expected reduction of variance due to the number of drawing lots. Under heterogeneity, the reduction of the variance is not constant or may be lacking. The variance under heterogeneity is much more wide than under homogeneity (from 3 to 20 fold) leading to an increased size of the confidence interval (at 95%) from 9 (given HAS sources) to 21 (for the maximum of internal heterogeneity). So, the intra-structure heterogeneity may explain most of the actual variations of a quality indicator from year to year and between hospitals. These variations are not related to changes in quality policy of the hospitals and may lead to errors in terms of pay for performance.
Conclusions
In order to build strong survey methods for quality indicators, we have to check the level of intra-structure heterogeneity for the biggest hospitals and/or to use distributed computerization to get measures as close as possible to the reality.

Key messages
• The survey method by drawing lots of 80 records under intra-structure homogeneity hypothesis to develop quality indicators is not suitable for large-sized hospitals.
• All financing modulation based on such indicators has to take into account the level of intra-structure heterogeneity and/or to use distributed computerization to obtain measure close to the reality.