

Three different outlier calculation methods, their impact on DRG homogeneity and hospital funding

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The aim of outlier calculation method analysis is to evaluate three methods for determining outliers to choose the one that combines simplicity and accuracy in calculations, improves the homogeneity of [DRG] groups, has a low number of outliers, offers the economic balance at the level of expenditure of the National Health Service and income of the hospital, ensures the principle of fairness in health care funding.

Three methods for determining outliers in the DRG data array were used in this work:

1. Interquartile range (1.5 IQR),
2. Parametric confidence interval for a population mean, with the known standard deviation (STD),
3. Parametric confidence interval for a population mean, with a population variance (V%).

All calculations were made using MS Excel.

The cost data used for calculations are based on manipulation and bed day tariffs, not actual patient level costs. The reason – there are 3 pioneer hospitals just starting to calculate the patients level costs in Latvia.

The obtained results are different in terms of the number of outliers. In terms of percentage, the results of the first two methods were the closest - the IQR method recognized 6% of outliers from the whole data set, the parametric standard deviation method 7%. The parametric coefficient of variation method resulted in 22% of identified outlier cases in the entire DRG data set.

Evaluating the changes of the coefficient of variation (V%) after data trimming, it is concluded that in general a positive effect is observed, where between the first two methods used insignificant but better results are shown by the 2nd - Parametric Standard Deviation Method. The third method of detecting outliers after their trimming, has had the greatest effect on the positive change of V% - reducing number of cases (episodes of care), where V% amount is 50% and more, by more than 300 cases and increasing number of cases with V% from 0-50% three times.

All three methods have an impact on the level of funding for hospitals. The difference in funding mostly depends on the level of complexity of patient health conditions they treat, and resources are used for it. The last of the methods - Parametric Coefficient of Variation method is recognized as the most additional financial resource-intensive. The other two methods show similar results with a less impact on necessary funding amount.

The most appropriate method of identifying outliers is considered the first - interquartile range method, mainly due to the amount of additional funding required and the impact on homogeneity.