DAMAGE EXTRAPOLATION AND SAMPLE SIZE DETERMINATION IN THE HEALTHCARE SECTOR

1 Example of a calculated warranty loss over an observation period of 20 quarters, based on two performance figures considered

Investigating authorities and health insurance companies note time and again incorrect or implausible invoices for nursing services and contract physicians. We use statistical extrapolation to assist them in reaching a more efficient settlement.

The common phenomenon of fraud has recently received more attention in the media, especially, in the healthcare sector. Furthermore, there even appear to be connections to organized crime for some eastern European care services. Since May 30, 2016, a law to combat corruption (StGB § 299a, § 299b, SGB V § 197a), has made bribery and corruption illegal in the health services industry.
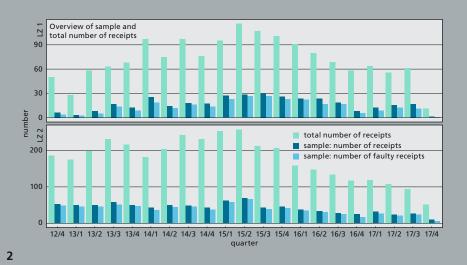
Example: Home care billing fraud

At the same time, the public insurance and law enforcement agencies experience great difficulties in investigating conspicuous cases. This is especially true in suspected fraud cases concerning home care. It is very costly to check all of the individually billed services for correctness while, at the same time, difficult to undoubtedly prove the faultiness of a single bill. This is due to the special situations in outpatient care (possibly demented patients, many "small" services).

To avoid a review of all services, we determine on behalf of the investigating authorities a so-called "guaranteed damage" as a lower limit for the total damage due to the billing fraud. For this, we take a statistical sample from the whole set of billed services. Only this much smaller number of claims is evaluated by the investigating authorities.

On this basis of a few claims, taking into account the resulting statistical uncertainty, we determine a lower bound to extend to the whole population. Only with a very low probability of error will the true total damage lie below this predetermined bound. Our procedure is legally established in court for cases of medical billing fraud. Usually, a confidence interval of 99.5 percent is used. Then on average, only one in 200 cases is below the calculated guaranteed damage.

The greater the statistical uncertainty (quantified by the safety margin) is, the lower the guaranteed bound for the damage becomes. This margin significantly depends, among other things, on the size of the survey sample. At the same time, sample size is one of the few factors that can be directly influenced by the investigative authorities prior to conducting the survey.

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Consequently, we often perform a sample size determination before conducting the survey. A minimum sample size is determined in such a way that a meaningful guaranteed damage can be calculated for the vast majority of possible realizations of the sample.

New method enables faster billing review

We always take into account the specific structure of the invoices. Nurse and physician cases differ in the choice of a meaningful sample unit. A new method, developed in close cooperation with the investigating authorities, makes it possible to check invoices dealing with nursing care much faster. The period for which services are billed is important for the legal proceedings. Our method also covers this necessary periodization of the claim.

The approach can be used both in home care cases (SGB V and SGB XI) and in medical billing fraud cases (in-patient and out-patient). In particular cases, we specifically adapt the statistical methodology, for example, for very small rates of faulty claims, for cases of clearly observable varying rates, or for smaller but more expensive billing populations.

Our calculation of a guaranteed damage gives investigative agencies the ability to track cases involving a number of small individual claims that cannot be fully investigated simply because of the lack of time and staff. Because of our additional optimization of the number of cases prior to the sample survey, we are able to provide substantial relief to the investigative resources of the authorities. In some cases, an investigator only works one month on a review that used to take up to twelve months to complete.

2 *Example of a settlement profile for a population and the number of claims for a sample that has actually been checked; in light blue, the receipts objected to in this sample.*