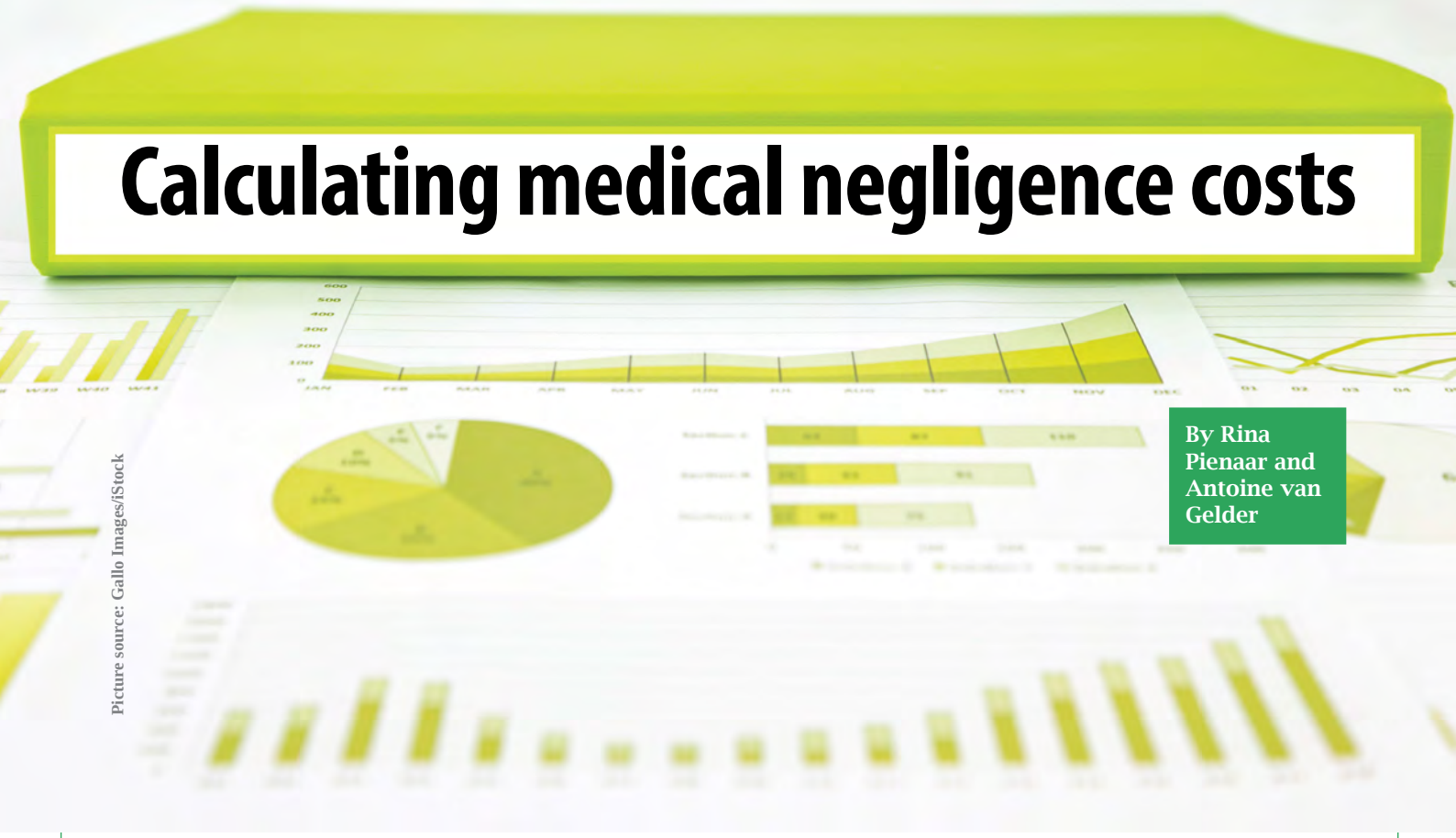
# Calculating medical negligence costs



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When dealing with a claim for future medical expenses in a personal injury claim, one finds that future medical expenses are sometimes subdivided into further categories namely, surgical expenses, emotional and psychiatric expenses and future treatment, such as medication. The question of future surgical expenses proves to be a problem as it entertains the probability of the occurrence of an uncertain future event.

In *GC Bester v Dr van der Westhuizen* (FB) (case no 4045/08, 10-4-2015), it was necessary to quantify such a claim for future surgical costs for a plaintiff who carried a high risk of recurrent bowel obstructions. In accordance with data obtained from research studies, the expert surgeons expressed the chance of future surgery as a percentage. They stated that – provision should be made for the 20% probability of a lifetime cumulative risk of developing recurrent intestinal obstruction and the cost of surgical re-intervention, reparative abdominal surgery and related care, which are estimated to engender costs of R 125 000 per event. For purposes of this discussion we have excluded alternative management options relevant to the management of bowel obstruction. The discussion that follows should be seen in context of the above scenario where the medical experts agreed to the plaintiff having a 20% chance of a recurring bowel obstruction, which would cost her R 125 000 and that the quantification result would be the amount for which the defendant should be liable. A suggestion to simply calculate 20/100 X 125 000/1 (= R 25 000) failed to satisfy several questions, among others:

- What is the basis for using such a formula?
- What are we calculating and for what exactly would the defendant be paying?
- In addition, in the event of such a future surgical event realising, why would the plaintiff be penalised by receiving only 20% of the surgical costs?

The correct way of calculating the costs of an uncertain event is not foreign to scientific and statistical principles. The emphasis should be on the difference between the pre-morbid chance of surgery and the post-morbid chance of surgery, or put differently the effective increase in risk suffered by the plaintiff. Risk is normally quoted in two ways, relative and absolute, creating some confusion as to the 'correct' use. The correct use depends on one's interest – in the case of public health, one is interested in the absolute number of cases in a population. So, for example, if there is a doubling of cases of measles this year compared to last year (relative increase 2X) it tells nothing about the number of cases to be treated. For this, one needs to know the absolute number of how many cases there were last year. If there were 100 cases last year, then a doubling says this year there are 100 more cases than last year. However, if 10 000 cases occurred last year, a doubling means there are 10 000 more cases this year. This number of cases would be a considerable burden on health services.

In clinical medicine and therapeutics one is interested in how much better one treatment is relative to another. Comparing by means of a ratio is therefore appropriate: 'Treatment A is twice as effective (or 100% better) than treatment B', is more meaningful than to say 'in the study of 100 people, 30 on treatment A lived longer than five years compared to 15 on treatment B.' When faced with the latter information one almost automatically asks the question 'how much better is treatment A than treatment B' leading to the more meaningful answer given by the relative risk calculation: 'It's twice as effective' or '100% better.'

When applying the above formula to the research results of the surgeons in the above scenario, the estimate by the medical expert surgeons was that 20% (proportion of people in need of surgery, expressed as percentage) of patients in a

similar situation as the plaintiff will develop bowel obstruction possibly in need of surgery in the next ten years. It is widely accepted among medical experts that healthy people without previous abdominal surgery (ie, the abovementioned plaintiff's pre-morbid state) less than 1% of people being similar to a pre-morbid plaintiff will develop obstruction (one can assume 0,5%, which is a worst case estimate as it means five per 1 000 people over 60 years of age get bowel obstruction spontaneously).

Motulsky (Motulsky *Intuitive Biostatistics* 2ed (New York: Oxford University Press 1995)) explained that one way 'to summarise the data results is to calculate the difference between the two proportions.' The difference is 20% – 0,5% = 19,5%. The latter difference is formally called the attributable risk, but the terms 'actual risk increment' and the 'absolute risk increase' are also used. So what does this 19,5% risk increment or increase mean? Further, according to Motulsky, it is 'often more intuitive to think of the ratio of two proportions rather than the difference.' This ratio is termed the relative risk.

The relative risk for the above plaintiff is therefore calculated as:
Risk with damage: 20%
Risk without damage: 0,5%
Relative risk: = 20% / 0,5%
= 4 000%, or 40 times more.

A relative risk between 0,0 and 1,0 means the risk decreases with exposure to risk factor. A relative risk greater than 1,0 means that the risk increases. A relative risk = 1,0 means that the risk is identical in the two groups.

Taking the above into consideration it is concluded that the above scenario should be interpreted as follows:

A relative risk of 1X would have been the same risk before and after the complicated surgery. A risk of 2X, would undeniably be a risk more likely than had the surgery not been complicated. Just as a risk of 0,5X would have been a post-morbid risk undoubtedly less likely than had the surgery not gone wrong. In fact, in this calculation the risk by the damage is increased by much more than merely doubling, the risk is 40 times more after the damage caused by the surgery than before.

The American courts are on the right path in finding a solution regarding the correct determination of an increased risk. Various American courts have determined that a relative risk of two passes the 'more likely than not' criterion, which is known as the 'more likely than not' rule. (*Reference Manual on Scientific Evidence* 3ed at 570 http://www.fjc.gov, see also http://schachtmanlaw.com). The manual used by the American courts clarified the above issues by stating that: 'To determine the proportion of a disease that is attributable to an exposure, a researcher would need to know the incidence of the disease in the exposed group and the incidence of disease in the unexposed group.'

The attributable risk is therefore calculated as:

$$AR = \frac{\text{(incidence in the exposed)} - \text{(incidence in the unexposed)}}{\text{(incidence in the exposed)}}$$

The above formula is applied to the above scenario. The risk of the plaintiff of developing obstruction in ten years time, before injury was that of a normal person of her age, estimated to be 0,5%. The risk of developing obstruction in ten years after injury is 20% according to the medical expert surgeons. The calculation of the risk attributable to the exposure to the complicated surgery (risk expressed as a percentage) is therefore:

$$AR = \frac{20\% - 0{,}5\%}{20\%}$$

$$AR = \frac{20\% - 0{,}5\%}{20\%}$$

$$AR = 97{,}5\%$$

It is, therefore, argued that if the court should find that a proportional allocation based on the increased risk of bowel obstruction should be made, it therefore means that the proper factor, which should be used is that part of the risk attributable to the contribution of the injury to her present risk. Therefore, an allocation for future risk should be multiplied by a factor of 0,975 (or 97,5%) (ie, 97,5/100 X 125 000/1). The defendant should be liable for R 121 875 as opposed to the unsupported amount of R 25 000.

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