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# Medical Stop-Loss: A Multiyear Design

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Employers that sponsor self-funded medical benefit programs generally purchase specific medical stop-loss reinsurance to protect against the financial consequences of catastrophic claims. The standard stop-loss program does an adequate job of addressing many important financial risks. However, it falls short of managing the risk of longer term catastrophic claims.

## A Tough Situation

Suppose you are the risk manager for ABC Corp., an employer with 1,000 employees and families covered under its self-funded medical policy. One year ago, you purchased specific stop-loss coverage with a \$100,000 specific attachment point. The annualized stop-loss premium is \$120,000.

An employee suffered a catastrophic illness during the stop-loss contract year. The total bill during the year is \$225,000. ABC funded the first \$100,000, and the stop-loss carrier paid the remaining \$125,000. The patient is not doing well. Case managers estimate that total bills for the employee could reach \$450,000 by the end of next year. You are not aware of any other catastrophic claims at this time.

Today, you are making final stop-loss purchasing decisions for the next 12 months. Your current stop-loss carrier proposed a 30% premium rate hike to \$156,000 annually because of this claim. All other stop-loss carrier have either declined to provide a proposal or excluded this claim from their proposed coverage.

## Financial Evaluation

Your only real alternative is to accept the 30% increase offered by your current stop-loss carrier. Your benefits advisor assembled the data shown in Table 1 to help you determine the value of the program.

"As shown in this table," the advisor says, "you will have received more in 1997-98 from the stop-loss program than you paid in premiums. The 1998-99 premium is only \$31,000 more than the expected payout. That excess is needed to pay the insurance company's administrative expenses and fund any additional catastrophic claims that you may incur."

TABLE 1  
Premiums versus Stop-Loss Recovery

|                             | Stop-Loss Year |           | Two-Year Total |
|-----------------------------|----------------|-----------|----------------|
|                             | 1997-98        | 1998-99   |                |
| Stop-Loss Premium           | \$120,000      | \$156,000 | \$276,000      |
| Expected Stop-Loss Recovery | 125,000        | 125,000   | 250,000        |
| Premiums Minus Benefits     | \$ -5,000      | \$ 31,000 | \$ 26,000      |

As a business manager, you cannot argue that the insurance company needs to charge enough to make a reasonable profit. However, you are feeling cheated because this stop-loss program is not meeting your risk management needs. You counter with the following observations:

- If the entire \$450,000 claim had both begun and concluded in the 1997-98 contract year, ABC's exposure would be limited to \$100,000.
- Because the claim will span two contract years, ABC's exposure doubles increases to \$200,000.
- In addition, because the stop-loss carrier increased the premium by \$36,000 in the second year, ABC is ultimately stuck with financing the entire claim.

## A Multiyear Solution

ABC Corp. takes calculated risks in its core business with the intent of achieving financial success. Although it is willing to accept some morbidity risk, ABC is not—and does not wish to be—in the insurance business. The company purchases stop-loss coverage to insulate itself from the morbidity risks associated with its medical program. As demonstrated above, those morbidity risks can span more than one year.

ABC would prefer stop-loss coverage that limits its total exposure to morbidity risks that manifest during the contract year but continue into the following years. Examples may include Parkinson's disease, certain malignancies, or AIDS. However, I believe this coverage is not available because:

- Stop-loss carriers prefer shorter morbidity tails so that they can settle their books quickly and determine whether the business was profitable.
- Insurers perceive the cost of providing tail coverage to be high because the risks associated with stop-loss tail coverage have not been adequately researched.

As actuaries, we may have limited influence on the desire to settle books quickly. However, we are well suited to take on the second issue.

Let's begin by slightly modifying a traditional specific stop-loss design. Consider the following design:

- The employer selects a standard stop-loss attachment point, such as \$100,000, and an extension period, such as three years
- The contract year is defined as a 12-month period during which a claim must exceed the stop-loss attachment point to be eligible for reimbursement
- A stop-loss-eligible claim is one that exceeds the stop-loss attachment point during the contract year.

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- The total stop-loss recovery for each stop-loss-eligible claim is equal to the total benefits paid for that claim during the contract year and during the runout period minus the stop-loss attachment point.

To establish a framework for assessing how much more this contract would cost than a standard specific stop-loss contract, we need to define some notation. Consider the following for a standard specific stop-loss policy:

$$CC_t^1 = \sum_x q_x^{(m)} \times [B_{x,t} - D] \quad (1)$$

where:

$CC_t^1$  = single-year claim cost for a standard specific stop-loss policy

$q_x^{(m)}$  = probability that benefits for individual  $x$  will exceed the stop-loss attachment point during the stop-loss year

$B_{x,t}$  = total benefits expected to be paid for individual  $x$  during year  $t$ , and

$D$  = the stop-loss attachment point.

Then, let's define notation for a multiyear stop-loss policy using similar notation:

$$CC_t^n = \sum_x q_x^{(m)} \times \left[ \left( \sum_{t=1}^n B_{x,t} \right) - D \right] \quad (2)$$

where:

$CC_t^n$  = multiyear claim cost

$q_x^{(m)}$  = probability that benefits for individual  $x$  will exceed the stop-loss attachment point during the stop-loss year

$B_{x,t}$  = total benefits expected to be paid for individual  $x$  during year  $t$ , and

$D$  = the stop-loss attachment point.

Using this notation, we can subtract Formula (1) from Formula (2) to determine a formula that defines the additional claim costs associated with the extended coverage. The resulting difference is shown as Formula (3) below:

$$CC_t^n - CC_t^1 = \sum_x q_x^{(m)} \times \sum_{t=2}^n B_{x,t} \quad (3)$$

The next step, of course, in determining the cost associated with the extended coverage is to evaluate Formula (3) using live data. Data to pursue this investigation are available from a variety of sources. A numerical analysis demonstrating the incremental cost would be an interesting follow-up to this article.

**Market Differential**

To the best of my knowledge, the stop-loss program design is not available. There are variations, such as the 12/18 contract, which covers claims incurred during a 12-month period and paid during that period or the following six months. In my experience, the reality of certain illnesses, the timing of care in relation to the stop-loss year, and how these claims are handled by the administrator cause the current stop-loss designs to fall short of addressing the purchaser's true risk-management needs.

Based on anecdotal information, I believe that the stop-loss design described in this article is financially viable and will, if priced properly, enjoy widespread acceptance. If so, the carrier bringing this design to the market first is likely to realize significant marketing successes. We, as actuaries, have a responsibility, however, to ensure that this marketing success translates into both sound risk management for employers buying the new design and financial success for the insurance companies writing it.

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