INDIVIDUAL HEALTH INSURANCE

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CHAPTER 4

MANAGING ANTISELECTION

The secret to managing antiselection lies, in this author’s judgment, in having an antiselection model that is at least moderately accurate at predicting the impact of antiselection on blocks of policies.

A good model produces forecasts which can be used by management to successfully scenario test (do “what if’s”), and thereby choose an optimal management strategy. Often that strategy comes down to implementing rate increases to minimize losses (or, sometimes, generate profits).

This chapter provides a basis for understanding and modeling antiselection, and thus managing it. Sections 4.1 through 4.4 provide a basic understanding. Section 4.5 describes some theoretical considerations that need to be addressed in order to build an effective antiselection model.

4.1 THE THREE FACES OF ANTISELECTION

An elder actuary once offered something like the following about the nature of antiselection:

*Antiselection is that annoying tendency people have of doing what’s best for themselves.*

When people (insureds) do what’s best for themselves, at least in this context, they make choices to maximize the value they receive in return for what they pay. When looked at this way, antiselection seems to reflect human nature. It’s annoying to those who work in this industry, however, because it keeps sneaking up to bite us in the nose when we least expect it.

Antiselection can occur in a very specific context, such as the antiselection you’d expect when providing an optional rider to cover maternity benefits (only the pregnant need apply). It can also be very general, such as that...
which occurs because someone perceives himself as unhealthy, and is being provided an opportunity for rich coverage. The specific type of antiselection is relatively easy to manage, and typically fairly obvious (if you provide service A, people who need service A will tend to buy it), so will not be dealt with in detail in this chapter. It is the less specific type that will draw our attention.

In general, we can think of antiselection as happening at one of three times in the course of a policy’s life: (1) as the person is first becoming insured, (2) while they are insured, and (3) as they make decisions about whether to end the contract. These three situations can be defined as, respectively, external antiselection, internal antiselection, and durational (including cumulative) antiselection.

Imagine yourself to be uninsured. Imagine then that you suddenly develop a health condition which makes it very likely that you will become disabled (or have large medical expenses, or need long term care.) It is human nature for you to seek insurance coverage, hoping that someone else (the insurance company) will pay that (perhaps rather scary) claim, in return for a much smaller and more predictable premium payment. However, this is also contrary to the basic principles of what makes insurance work – that insured events are relatively random, and outside the control of the insured. This situation is an example of external antiselection – antiselection which happens as an impaired risk initially seeks coverage.

Imagine now that there are two insureds with major medical coverage, and a major medical program with the same deductible – $250. Insured A has developed a severe recurring illness with high medical costs. Insured B perceives himself as healthy, and has no impending claims. The insurer now notifies both insureds of a 25% rate increase, and reminds them that they can offset a good portion of that increase (say $400 a year) by switching plans to a higher deductible ($1,000.) Both insureds are likely to do the arithmetic, comparing a $750 increase in deductible against a $400 savings in premium. Insured A is more likely to say no to the offer of a higher deductible, because the likelihood of having a claim is near 100%. A’s additional self-insured cost of $750 won’t be worth the $400 savings. Insured B is more likely to think the exchange is worth it, since the likelihood of having to pay that higher deductible is small. This combination of tendencies (A’s and B’s) causes lower-cost risks to gravitate to leaner plans, while higher-cost risks will tend to take the richest plan possible. This combination results in higher cost to the insurance company. For purposes
of this text, this effect will be termed internal antiselection, since it occurs while the insureds are internal to the insurance plan.

Finally, imagine now that there is a block of insureds who have all had their coverage for awhile, who are faced with that same 25% (or higher) increase. Higher cost insureds (like Mr. A, above) will tend to keep their coverage in force more often than lower cost insureds, implying they find it of greater value compared to the cost. This form of antiselection is called cumulative antiselection. The extent to which this is an emotion-based tendency (fear of losing coverage), or a practical consideration (finding it more difficult to obtain other coverage), isn’t clear. What is clear, however, is that this tendency seems to happen more when: (1) there are larger rate increases, and (2) lapse rates are relatively high (major medical, for example, with annual lapse rates typically in the 15-40% range, unlike non-can disability income coverage with ultimate lapse rates in the 5% range.)

4.2 UNDERWRITING THE INDIVIDUAL RISK (EXTERNAL ANTISELECTION)

Potential insureds who know they are likely to have a claim are more likely to seek coverage than potential insureds who don’t think they will have a claim. This external antiselection is controlled by insurers through a variety of mechanisms, including:

- Individual (medical) underwriting before issue,
- Policy provisions that exclude or limit coverage due to pre-existing conditions,
- Requiring an enrollment mechanism that doesn’t permit antiselection (such as minimum participation percentages for associations).

In truth, risk selection (underwriting) begins with the initial selection process used by the agent or sales representative who initially contacts the applicant. This is particularly true for coverages that don’t heavily underwrite (accident coverages, for example), and must rely on the sales agent to qualify the prospect. Once initial contact is made, an application can be filled out, which begins the medical underwriting process.

The term “medical underwriting” is used by different people in the insurance industry to mean two different things: (1) For those schooled in a life
Predictive Models

A predictive model is any model that provides a prediction (in this context) of future claims. Today there are a number of such models available, and there is much work being done to measure and improve them. The simplest one is a credibility formula – an individual’s expected claims will be modified based on past claim dollars, dampened because some part of the claims might be due to random fluctuation. A modified credibility formula, based on a linear combination of past subsets of claims (perhaps inpatient, outpatient, and other claims) provides substantial improvement over a univariate credibility formula, and rivals the predictive ability of commercially produced, diagnosis-based risk adjusters, which are yet another predictive model.

Debit manuals are early versions of predictive models. Today, large data sets and powerful computing power have allowed the development of other predictive models, some of which are commercially sold today. Early commercial risk adjusters were developed in order to retrospectively measure the relative risk of larger populations, such as all Medicare enrollees of an HMO, for reimbursement. More recently, predictive models have evolved to a point where there can be risk prediction used for underwriting or rating purposes.

The Society of Actuaries has undertaken a periodic study of the predictive ability of various commercial risk adjusters. Their efficacy continues to improve over time. This area promises much advancement over the next decade or so. It is clear that changes in underwriting, particularly due to risk adjusters, are happening quickly. For the moment, they cannot replace medical underwriters, because they are not sophisticated enough to reliably handle the potential antiselection of an individual (although they are more in use in small and medium sized groups.)

UNDERWRITING ACTIONS

It is most helpful to translate the collection of information about the applicant (and his or her family, if a family contract) into the additional claim dollars expected because of any existing conditions. Sometimes this information is first translated into debit points, and the insurer’s rating system does the further translation of debits into dollars.

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Ultimately, a decision is made on whether to offer coverage to the applicant, and if so, under what conditions. At one end of the spectrum, the applicant might be offered full coverage with no restrictions. At the other end, the insurer will decline coverage completely. In between, there are a number of alternative responses which the insurer might use:

- **Offer coverage at a higher ("substandard") premium rate.** Many carriers will sometimes offer coverage if the applicant is willing to pay some multiple (perhaps 125%-300%) of the standard premium. The added premium load can be either temporary or permanent, depending on the nature of the condition. Most carriers will consider removing the substandard load at a later date if the insured can demonstrate (through underwriting) a better risk profile at that time.

- **Offer a standard policy, but excluding coverage for that specific condition or affected body system.** This is accomplished by use of a “waiver,” “impairment,” or “exclusion” rider. These riders are often used for recurrent or chronic illnesses. They are useful if the condition can be well defined and isolated, but are less useful for systemic sorts of medical conditions (like obesity) that might impact multiple body systems. This solution is viewed negatively by some regulators, because it excludes coverage for the condition for which the insured has the greatest need. On the other hand, it might provide an opportunity for insurance that might not otherwise be available at all.

- **Offer a different policy or plan than the one applied for.** Some carriers have separate pools used for substandard risks, and may decline to issue unless the applicant is willing to be part of that pool. This tends to be a solution offered by Blue Cross/Blue Shield plans, in certain states. Other carriers might have limited benefit plans (with relatively low inside limits or benefit maximums) which they will offer in lieu of the CMM benefit applied for, particularly where the condition carries a risk of catastrophic claim.

- **Offer a different plan of benefits than the one applied for.** This option is useful where, for example, the applicant might have a chronic condition that is unlikely to become high cost, but will likely continue at a low cost. This is particularly useful in DI or LTC coverage, where existing conditions (asthma, for instance) can be addressed by a longer elimination period or shorter benefit period, while still providing full benefits.
Limitations in Underwriting Actions

Depending on the coverage and the jurisdiction, there are a variety of limitations which might apply to the underwriter’s ability to take underwriting action.

For Medicare Supplement coverage, the federal government imposes limitations on the underwriting of the coverage, which began with the Omnibus Budget Reconciliation Act of 1990 (OBRA). Insurers are required to offer a six month open enrollment period for new enrollees of Medicare Part B. If an insured enrolls during this period, the insurer cannot decline coverage, and, in many states, cannot charge a different premium based on health status. There are some specific additional situations (less frequent) in which the insurer cannot underwrite. Further, pre-existing condition clauses for Medicare Supplement policies are limited to six months from issue and cannot be used in certain circumstances.

For CMM coverage, the federal Health Insurance Privacy and Portability Act (HIPAA) put requirements on states to find ways to ensure the insurability of individuals who would otherwise lose their coverage. CMS (the federal agency responsible for administering the law) said the following in their Transmittal No. 99-029:

Section 2741 of the PHS Act and the implementing regulations at 45 CFR § 148.120(a)(1) set forth the general rule that issuers that sell health insurance coverage in the individual market must offer all policy forms that they actively market in that market to “eligible individuals,” and may not impose any preexisting condition exclusions on those individuals. There are two exceptions to this rule:

- If a State implements an acceptable alternative mechanism under State law, the rules of the alternative mechanism apply; and

- If a State does not implement an acceptable alternative mechanism under State law, the issuer may choose to offer eligible individuals only two policies, which must meet certain specified criteria and which cannot impose any preexisting condition exclusions.

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9 www.cms.hhs.gov
weight (a topic with much recent press coverage and research), presence
and nature of other coverage (such as ‘24-hour’ coverage vs. non-
coverage of work-related costs, or coordination with OASDI disability
benefits), and sometimes situation-specific factors (such as whether the
policyholder converted from another plan of the same insurer).

5.3 FUNDAMENTAL PRICING

Fundamental pricing involves using tables or claim costs developed
through other sources as the basis for pricing. This is particularly useful
when pricing a new benefit, or if the available experience is either inap-
propriate or insufficient for the current pricing exercise.

Generally, using a company’s own experience is preferable to using
other sources, because it usually was generated by a group of policies
that were underwritten in the same way, by the same underwriting de-
partment, used the same network of providers, was administered by the
same claim department using similar interpretations of provisions, was
produced by the same network of producers, and came from a similar
pool of prospects. There are a myriad of reasons why, for example, a
published table’s experience might differ from a company’s own experi-
ence. It is the pricing actuary’s responsibility to sort through these rea-
sons, and give quantitative estimates of those that are material. It is much
easier to start with existing experience, and avoid the higher risk of not
seeing or understanding some of the reasons for differences.

There are three basic methods used in fundamental rate development: (1)
tabular, (2) build up and density functions, and (3) simulation.

5.4 FUNDAMENTAL PRICING – TABULAR METHOD

In this method, an existing table, or a modification of it, is used as the
morbidity (claim cost) basis for pricing. Typically, this method is used
for long term, non-inflation sensitive products, like DI. (For inflationary
policies, where future claims and premiums will both be leveraged up-
ward by unknown and highly unpredictable trend rates, the value of pre-
cise calculations, afforded by the tabular method, disappears.)
Today, the most common basis for pricing of disability income is some modification of the 85CIDA tables\(^5\), developed by a Society of Actuaries committee. The most recent available public experience\(^6\) shows that the 85CIDA tables overstate claim terminations for the first 18 months of claim, and thus understated claim duration (and claim costs) by a substantial amount. At the same time, frequencies of claim were about on target overall with that predicted by the table, but this varies significantly among certain occupational classes.

The exact method used for the tabular approach depends on the number of “claim states” (and their order) in which a claim can occur. For example, a DI claimant might be first fully disabled, then partially disabled, then return to fully disabled. Similarly, there tend to be multiple such decrements in LTC insurance as well, such as progression from assisted living to visiting nurse to nursing home care.

The modeling technique used for this purpose is typically a deterministic one. (Stochastic models are studied under another pricing method – the simulation method.) A representative policy is followed throughout its potential lifetime, with probabilities of claim at each duration, multiplied by the corresponding cost of that claim. The sum of all such products is then the claim cost per unit of coverage (such as ‘per $10 of monthly benefit”) or net premium, which forms the basis (along with expenses and profit) of the gross premium. In symbols, the calculation of the net premium might look like this:

\[
NP = \sum_{z=\text{issue yr}}^{\text{final yr}} \Pr\{\text{Clm}_z\} \times AC_z \times u^l \times l_z
\]

where:

- \(z\) varies from the year of issue to the final possible year of the contract,
- \(\Pr\{\text{Clm}_z\}\) is the probability of a disability claim occurring (“incidence rate” or “frequency rate”) in year \(z\),
- \(AC_z\) is the average claim (assuming a claim occurs) in year \(z\),


\( \nu^t \) is the present value factor at duration \( t \) corresponding to year \( z \), \((1+i)^{-t}\), and

\( \ell_z \) is the proportion of originally issued lives still in force in year \( z \), typically calculated by applying decrements for lapsation and death to the starting model population.

In turn, \( AC_z \) is calculated as the sum of the product of a number of things. This might be thought of as a conditional calculation – assuming a claim occurs in year \( z \), then the average cost of that claim is the sum of the cost calculated in each future period, multiplied by the probability of the claim continuing to the end of that period.

\[
AC_z = \sum_{s=1}^{FnlCmPty} \{CmS\} \times Pr\{1-Tn_s\} \times \nu^s
\]  

(5.2)

where

- \( s \) is the claim duration.
- \( CmS \) is the claim dollars payable at claim duration \( s \);
- \( Pr\{1-Tn_s\} \) is the probability of a claimant at claim duration 0 remaining disabled at duration \( s \); and
- \( FnlCmPty \) is the claim duration of final possible claim payment.

These calculations are easily done with the aid of today’s spreadsheet programs.

**EXERCISE 5.1:** Using unmodified 85CIDA as the morbidity basis\(^7\), to a female policyholder age 45, in occupation class 1, with 91 day elimination period, and to-age-65 benefit period, calculate:

(a) the probability of not having a claim in the first policy year, but then having a claim in the second policy year,

(b) the probability of remaining disabled for exactly 6 months, and

(c) the claim cost assuming a monthly benefit of $5,000 (assuming 5% interest rate).

\(^7\) The relevant data and solutions to this and all other exercises are included on the CD with this text.
For most other coverages, there are not publicly available tables comparable to the CIDA table. As spreadsheet programs have proliferated, there has been greater ability within insurance companies to analyze and create their own claim costs, so the demand for published tables dropped dramatically. Nevertheless, these techniques are still used with a company’s home-grown claim cost tables.

Tabular rating calculations can be much more complex than these relatively easy formulae and example. Such complications might be necessary for any or all of the following reasons (or for others, as well):

- **Modal premiums.** This refers to premiums which might be paid other than annually. Since most tables use annual modes (such as annual claim costs), but most insurance policies are paid more frequently, this needs to be reflected in the calculations.

- **Modal lapse rates.** If premiums are paid more frequently than annually, lapse rates will need to be calculated, and perhaps vary, for matching frequency. This is particularly true at the earliest durations, when lapse rates are still changing sufficiently to make “within the year” variation worth pursuing.

- **Exposure calculations.** Various elements of the premium calculation might be expressed as a function of earned premium, written premium, received premium, incurred claims, paid claims, claim reserves, number of policies, number of premium payments in a year, first year premium, face amount, or others. If they are needed for the calculation, then these exposure values must be calculated.

- **Additional benefits.** DI and LTC policies have a wide array of additional benefits and benefit modifications which complicate these calculations. For example, one add-on benefit might be a DI or LTC benefit that automatically increases claim payments (once the claim occurs) by 3% per year, to address inflation in costs of living. In calculating the claim cost for this modification, then, the pricing actuary must index the stream of benefit payments in Equation 5.2 as follows:

\[
CC_z = \sum_{s=1}^{FntCmPyt} \{CmS\} \times \{1.03^{s/12}\} \Pr \{1 - Tn_s\} \times \nu^s \quad (5.3)
\]
(The calculation of the index has been simplified for exposition, by assuming the indexing occurs monthly. Typically, it would actually be a step function, with indexing occurring annually.)

- **Interest.** For many years, interest assumptions for present value calculations were set at a fixed rate over the future life of the policies. In today’s environment we often need to view interest in a more complex way. This might be by: (1) varying the interest rate assumed to occur over time in the future, (2) testing alternative interest rate scenarios, or even (3) treating interest as a stochastic variable. For pricing purposes, this is often simplified to a single future rate for each year, or a rate for all years. For coverages where asset accumulation can be a significant part of the profit equation (such as DI and LTC), care should be taken to adequately assess the interest risk.

- **Multiple decrements.** Most coverages have two “states” that the insured can be in – either on claim or not. Some, however, can have multiple states. LTC coverage, for example, might have care paths which involve no care, home health care, assisted living, and nursing home care. DI coverage might involve full disability, partial disability, and residual disability. Some of these decrements might be conditional on having a prior condition (such as residual disability requiring full disability for a certain period first, or recovery facility care in a medical contract requiring an inpatient stay first.)

There are a variety of actuarial or mathematical techniques available to model such benefits. These include Monte Carlo simulations, where a specific individual is assigned a path based on random numbers applied to probabilities. Another is Markov processes, which use linear algebra to model the change in claimants’ states over time. Yet another is classical multiple, contingent decrement actuarial commutation functions.

Most commonly, though, multiple states are studied using detailed, deterministic models based on computer spreadsheets which successively predict each future year from the prior one, using assumed decrement rates.

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8 See the December, 1994 report of the American Academy of Actuaries’ Task Force on Health Organizations Risk Based Capital, for a classic example.
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Bill Bluhm is a Principal and Consulting Actuary with Milliman in Minneapolis. Bill joined that firm in 1983, when he opened the Albany office with a new practice, and has been in Minneapolis since 1987.

Bill has built a substantial reputation in the health insurance field, working with insurers, health benefit providers, and governments. Some of his particular areas of expertise include financial management, reinsurance, appraisals, strategic planning, model-based analysis, risk-based capital, regulations, health care reform, and expert testimony.

Bill has been a frequent speaker and author. His paper, “Cumulative Antiselection Theory”, won the triennial prize for best eligible paper published in the Transactions of the Society of Actuaries during 1980-1982 and was included as one of the seven “milestone” papers reprinted in the Society of Actuaries’ 50th Anniversary Monograph. His paper, “The Minnesota Antiselection Model,” won the Actuarial Education and Research Fund’s Practitioner’s Award in 1991. He is currently writing a textbook on individual health insurance. Many of his works are required reading on the Society’s exam syllabus.

A Fellow of the Society of Actuaries and the Conference of Consulting Actuaries and a Member of the American Academy of Actuaries, Bill has also been an officer and a member of the Board of Directors of all three organizations, and currently is Past President of the Conference of Consulting Actuaries and President-Elect of the American Academy of Actuaries.

Bill lives in Minnesota with his wife, Christine, and their children, Samantha and Joseph. His interests include cooking, fishing, guitar, and volunteer work for The Mankato Project.

About The Text

The health care issue in the United States has exponentially increased the focus on health insurance for individuals not covered by a plan through their employer. While Medicare and Medicaid programs have (at least to some extent) addressed the needs of the retired and working poor, there still remains a large population with no coverage in the United States.

*Individual Health Insurance* contains an up-to-date and comprehensive treatment of one of the most rapidly changing risk management topics. The author is an internationally known expert on the subject and supplemented his knowledge with specialized expertise from several of his colleagues.

This book covers the history of the individual marketplace, the role of government health policy, products currently available, regulation, and all aspects of the development and management of this business.