

# HEALTH SECTION NEWS



"For Professional Recognition of the Health Actuary"

Issue Number 40, April 2001

## Chairperson's Corner

by Leigh M. Wachenheim

**L**ike most of you, I really enjoy being an actuary. I'm thankful to be part of a profession that provides us with an opportunity to make a good living doing the type of work we enjoy, while contributing something really valuable to our society. Because we enjoy and believe in its value, most of us want to give something back to our profession, too. Not only do we want to ensure that

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## Health Insurance Fraud

by Joe Campbell

**H**ealth insurance fraud is costing billions of dollars each year. A significant portion of the rising health insurance costs is due to fraud. How significant is it to you? This will depend on your company, and the control measures you have (or don't have) in place.

So, you are a small insurance company. Your claims are sky-high. Your CEO is sure there must be fraud involved. You are the actuary, with access to data. Suddenly, it's your job. So where do you start? This is my situation, so I'll explain some of the resources our company found to locate and eradicate fraud.

The Federal Bureau of Investigations in our area sponsors a quarterly meeting on



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475 N. Martingale Road, Suite 800  
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Fax: 847-706-3599

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**Jeffrey D. Miller, FSA**

*Health Section News* Editor  
6806 West 132nd Terrace  
Overland Park, KS 66209  
913-685-8191  
913-685-8199 (Fax)  
E-mail: [jdmfsa@aol.com](mailto:jdmfsa@aol.com)

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(847) 706-3548 - Phone

**Lois Chinnock**, Section Coordinator  
([lchinnock@soa.org](mailto:lchinnock@soa.org)) - E-mail  
(847) 706-3524 - Phone

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## Letter from the Editor *Greetings to All Health Actuaries!*

by Jeffrey D. Miller

**T**his edition of the *Health Section News* has fewer articles than previous editions, but the quality is just as high. Our objective for this newsletter is to give health actuaries some new ideas and reinforce their practice in some traditional areas. This edition certainly achieves those two objectives.

First, I'd like to apologize to Karl Volkmar for the errors in his fine article in our December 2000 edition. An erratum has been published through our blast e-mail system and is also included in this newsletter. We'll try to do better next time, Karl. Please keep those articles coming.

I'm particularly focused on Joe Campbell's article on health insurance fraud. This problem seems to be growing, and we all need to focus our attentions on dealing with it. No health actuary can price a product to provide for fraudulent claims. Some of my recent experiences in Colombia have driven that point home big time!

Jim O'Connor also gives us a good refresher course on our role in mergers and acquisitions. While some of this material may be review for those of us with gray hairs from transactions of the past, we can all use some review on the basics, particularly as they apply to health-care and health insurance business.

Bill Lane continues his series on small-group pricing with a discussion of renewal rating. Clearly, all companies have been forced closer to the middle on this topic because of regulations and market realities.

Kevin Pedlow gives some excellent discussion of claim reserving using authorized bed days. Nearly everyone involved in claim reserving is looking for more reliable leading indicators. Kevin has some good ideas.

Rowen Bell provides an excellent discussion of the final health privacy rules under HIPPA. We all face a huge administrative challenge from this rule in the very near future.

Finally, Johan Lotter continues his series on critical illness. I suspect that most health actuaries have fielded questions on this topic in the last few months.

Welcome to Leigh Wachenheim as our new Section chairperson, as well as all other new members of the council. Thanks, also, to all of those who have sent kind comments about our newsletter. I look forward to continuing to serve as your editor over the coming year.

*Jeffrey D. Miller, FSA, MAAA, is a consulting actuary in Overland Park, KS. He can be reached at [jdmfsa@aol.com](mailto:jdmfsa@aol.com).*



*Jeff Miller, Editor*

## Chairperson's Corner

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we will be able to enjoy the benefits provided by our career field for many years to come. We also want to pass the same opportunities onto others who will follow after us, who have the same interests and talent.

Fortunately, there are a remarkable number and variety of opportunities available to give back to our profession. I would ask that you take a moment and consider if and how you might get involved, today — if you aren't involved already. No matter what your forte, there are many opportunities to contribute. Consider these possibilities:

- *Writing:* If you like to write, consider contributing an article or letter to the editor to one of the many periodicals published by our actuarial organizations. These include, the *Health Section News*, *The Actuary*, *Contingencies*, and the *North American Actuarial Journal*, among others. These publications are also edited by volunteers, and opportunities to serve in that role also come up frequently.

- *Speaking:* The Health Section Council sponsors about 60 sessions every year at the Spring and Annual meetings. Several volunteers are usually involved with each session, including a session coordinator, moderators, presenters, and recorders. In addition, the Health Benefit Systems Practice Advancement Committee's Seminars Committee sponsors several seminars a year.

What many folks don't know is that they can be proactive in creating a speaking opportunity about a topic about which they feel passionately. If you would like to speak on a particular subject at a Spring or Annual Meeting, contact a member of the Council or the meeting coordinator. If you have an idea for a seminar, contact a member of the seminar's committee. (The names of council and committee members are listed on the Society's Web page.)

- *Research:* If research is your strength, consider getting involved with a project, either as a primary researcher or by providing guidance to others by serving on a project oversight group. The Health Section Council frequently lends financial support to research projects and is always looking for new projects to sponsor that will add value to our membership. Of course, research is also one of the primary undertakings of the Society, and opportunities to help are also available through the Committee on Health Benefit Systems Research.

- *Planning:* All of the activities listed above involve extensive planning. Consider running for the Health Section Council. (If you are interested in running this year, please let any member of the Council know by May 1.) Take a look at the list of health related committees under the direction of the Health Benefit Systems

Practice Advancement Committee. If you would like to serve on a committee, contact the chairperson and let him or her know.



Leigh Wachenheim

No doubt, there are times in life when one can do more than at other times. If you are at a point where time is hard to find, consider contributing in small ways. Take a few moments to fill out one of the surveys conducted by the Society, contribute to a Web discussion, or contact a member of the Council with a suggestion or new idea.

The examples I've listed here are just the proverbial tip of the iceberg of possibilities within the Society. In addition, many other organizations, such as the American Academy of Actuaries and local actuarial clubs, are also continually looking for volunteers.

In short, get involved when and where you can. It's an chance to give back to and advance our profession, have fun, and make new friends all at the same time!

*Leigh M. Wachenheim, FSA, MAAA, is principal at Milliman & Robertson, Inc. in Minneapolis. She can be reached at leigh.wachenheim@milliman.com.*

## Health Insurance Fraud

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insurance fraud. This is a good forum to exchange ideas, as well as a classroom to learn about specific fraud items. The FBI is a great resource in knowing what type of information is essential for prosecution, in knowing what types of fraud are typical for your area, and in acting as an intermediary between insurance companies.

Following are three examples of fraud, which I rate as "Outrageous Fraud," "Criminal Fraud," and "Soft Fraud." By using the term "Soft," I am in no way condoning the actions, but the evidence is harder to grasp on to.

First is **Outrageous Fraud**. I can't believe stuff like this happens. One "medical" company was passing out flyers to people in lines at the unemployment office. The flyers suggested that a great way to earn money was to come and get a "CT-scan." The unemployed person was given cash, the CT-scan was never performed, or was faked, and the bill was sent to Medicare.

Second is **Criminal Fraud**. A recent Medicare fraud alert estimated that \$720,000 was paid incorrectly over a period of four years to a single ambulance provider. They were billing transports of patients to a physician's office as if it were a round trip basic life support to a hospital. They used the hospital modifier, which would ensure payment by Medicare. Medicare fraud alerts are published on the HCFA Web site: [www.hcfa.gov/medicare/fraud](http://www.hcfa.gov/medicare/fraud). Look at "Recent schemes uncovered by Medicare," but be aware that the site is not updated regularly.

Third is **Soft Fraud**, which is the most common. Soft fraud involves, for instance, exaggeration of services provided. One example of this is upcoding: CPT code 99215, which suggests 40 minutes face to face with a physician, might be used instead of 99214, which suggests only 25 minutes of face to face. Sometimes a physician will even waive the copay, and bill with the higher code,

"so that the patient can afford the service." The FBI gathered data from available insurance companies on certain suspect providers, and found that some were billing for more than 24 hours of service in a single day.

Other instances of fraud that we have examined include:

- Psychiatrists (billing using medical codes) —  
**Soft Fraud**
- New patient billings (for example, a clinic was billing with the new patient codes instead of established patient codes) —  
**Soft Fraud**
- Assistant surgeons (billing as if they were the primary surgeon) —  
**Soft Fraud**
- Facility charges (for example a cosmetic surgery would be performed, and the hospital would bill without referencing it as such) —  
**Criminal Fraud**
- Unnecessary procedures (for example, one provider would remove a patient's gallbladder, and then at the same time do a breast augmentation/reduction surgery). —  
**Criminal Fraud**
- DRG billings (for example, a hospital bills for second admit, when in reality it is only one admit) —  
**Criminal Fraud**

Medicare is good to publish fraud alerts, but you should also check what your payments are when Medicare is in effect. Especially in cases of end-stage renal disease, services could be covered under Medicare, but often are not claimed to Medicare. Since we've been investigating this, our costs for services such as kidney transplants have decreased dramatically. Although, note that it has to be denied by the insurance company before Medicare will cover the cost. In order for this to be covered on Medicare,

there must be a specific exclusion in the policy contract.

Also, although it might not be direct fraud, it definitely costs your company money when you are the primary payer, and you shouldn't be. Potential Medicare enrollees should be scrutinized.

Coordination of benefits (COB) with other insurance companies should also be examined closely. Especially note that if a person is disabled, they are not considered actively employed, and are therefore paid as secondary on COB.

So, you are now an actuary/fraud control team. The CEO of your small company is elated about recoveries and savings, as they appear on paper. Your workload is tripled, but at least management is happy, as long as what appears on paper turns into reality. And don't forget that the end of the quarter is coming up. Priorities are tight.

For these critical issues, there are two things to always consider. First is to stop the hemorrhaging. The life-blood of your company (in dollars and cents) is leaking away. Second, always second, is the slow process of recovery. Once the check has gone out, the likelihood of ever getting the money back decreases dramatically. So, if a provider is suspect, hold their claims for a week or so for an audit. Do all you can to keep suspicious claims from being paid. Guilty until proven innocent is the model to be desired.

Before you begin trying to recover money, consider whom you will be collecting the money from. Go for the bigger entities first. In decreasing order, I would suggest Medicare, other insurance companies, hospitals, physicians, and lastly, the patients.

Perhaps your search for fraud might even be directed along these same lines, with investigation of claims from these larger entities holding the higher priority.

*Joe Campbell is an actuary with Educators Mutual Insurance Association in Murray, Utah. He can be reached at [campbejo@educatorsmutual.com](mailto:campbejo@educatorsmutual.com)*

*His phone number is 801-262-7476 x 2933.*

# Actuarial and Underwriting Implications of the Final Health Privacy Rule

by Rowen B. Bell

**EDITORIAL NOTE:** *Shortly before this issue went to print, it was announced that the purportedly final federal health privacy rule discussed in the article below was being reopened for additional public comment. Consequently, some of the interpretations made in this article may no longer be applicable after the rule has been reshaped. An update of this article will be provided once the privacy rule reaches its ultimate form.*

In December 2000, the Department of Health and Human Services published its final rule on "Standards for Privacy of Individually Identifiable Health Information." Companies will need to attain compliance with this rule, which is the second of the HIPAA "administrative simplification" regulations to be published in final form by February 26, 2003.

This final rule supplants the proposed rule, which had been exposed for public comment in November 1999. The proposed rule contained several ambiguities that created significant interpretative questions as to how the rule would impact actuarial and underwriting processes.

The final rule achieves greater specificity on these issues, with many of the open questions having been recognized by HHS, thanks in part to comment letters submitted on the proposed rule by insurers and insurance trade organizations.

The intent of this educational article is to provide a brief overview of the final privacy rule followed by a discussion, organized topically, of its implications for actuarial and underwriting functions. Please note that any opinions expressed herein are merely the author's interpretations and should not be considered definitive. The privacy rule is a highly complex subject, and any organization should consult legal counsel to gain an

appropriate understanding of how it will be impacted by the rule.

## What is the scope of the privacy rule?

The principal subject of the privacy rule is "individually identifiable health information," or "IIHI." The passage below is an excerpt from the definition of IIHI [§164.501] highlighting the aspects of greatest relevance to health actuaries:

*"[IIHI includes] ... information that is created or received by a health plan ... and relates to ... the past, present, or future payment for the provision of health care to an individual ... and with respect to which there is a reasonable basis to believe the information can be used to identify the individual."*

For example, a listing of paid claims by claimant where the claimant is identified by name or by social security number would qualify as IIHI.

The phrase "health plan" has a specific meaning here. An insurer would only be considered a "covered entity" to which the privacy rule applies insofar as it is performing activities that fall under the definition of "health plan." As a result, some portions of a health insurer's business may be subject to the privacy rule while other portions are not.

Most notably, an issuer of an insured medical, Medicare Supplement, Medicare+Choice, dental, or long-term care contract would be considered a "health plan," and thus the privacy rule would apply directly to such operations.

However, an insurer would not be considered a "health plan" with respect to its activities as: an issuer of stop-loss, disability income, accident-only, life insurance, or workers compensation contracts; as a reinsurer of medical or



long-term-care business; or as an administrator of medical business under ASO contracts. Therefore, it would not be considered a "covered entity" subject to the privacy rule with respect to health information arising from such activities. Nonetheless, it may still be impacted by the privacy rule under the "business associate" provisions when acting as a reinsurer or administrator of medical business, as we discuss below.

## What is the main thrust of the privacy rule?

The privacy rule prevents covered entities from using or disclosing individually identifiable health information except under certain circumstances delineated within the rule, the most notable of which is the following:

*"A covered entity is permitted to use or disclose [IIHI] ... pursuant to and in compliance with a consent that complies with §164.506, to carry out treatment, payment, or health care operations." [§164.502(a)(1)(ii)]*

The terms "use," "disclose," "treatment," "payment," and "health care operations" are given explicit definitions in the privacy rule. Later, we shall discuss specific situations where these definitions govern what one can and cannot do with IIHI under the privacy rule.

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The phrase “pursuant to and in compliance with a consent that complies with §164.506” should, in practice, have little impact for health insurers. To wit: An insurer may, but is not obliged to, seek consent from its enrollees to use their PHI for purposes of payment or health care operations [§160.506(a)(4)]. If the insurer decides to seek such consent, then it is allowed to make each enrollee provide that consent as a condition of enrollment [§160.506(b)(2)].

The consent must state that the enrollee has the right to request that the insurer restrict its use of his/her PHI; however, the insurer does not have to agree to any requested restrictions, although if it were to agree then it would be bound by the agreed-upon restrictions [§160.506(c)(4)]. In short, an enrollee should not be in a position to unilaterally

### *Business Associates*

An entity subject to the privacy rule (e.g., an insurer or a self-insured group health plan) might want a third party to perform certain essential business functions requiring that third party to have access to PHI. Examples of this would include the following:

- An insurer hiring a TPA to process claims
- An insurer hiring an MGU to perform underwriting and enrollment functions
- An insurer hiring a consultancy to perform actuarial work
- An insurer ceding risk to a reinsurer

entity [§160.103]. In each of the previous examples the third party would be considered a “business associate” of the covered entity.

Business associates are not directly subject to the privacy rule. Rather, the rule requires the covered entity to insert privacy-related clauses into its contracts with business associates and prevents it from having business associates do anything that the privacy rule would forbid the covered entity from doing itself:

*“A contract between the covered entity and a business associate must establish the permitted and required uses and disclosures of [PHI] by the business associate. The contract may not authorize the business associate to use or further disclose the information in a manner that would violate [the privacy rule] if done by the covered entity, except that [the business associate may] use and disclose [PHI] for the proper management and administration of the business associate...”*  
[§164.504(e)(2)(i)]

***“Business associates are not directly subject to the privacy rule. Rather, the rule requires the covered entity to insert privacy-related clauses into its contracts with business associates and prevents it from having business associates do anything that the privacy rule would forbid the covered entity from doing itself.”***

prevent the insurer from making use of his/her PHI in a way normally permissible under the privacy rule.

### **What are some of the other important concepts in the privacy rule?**

There are three other concepts in the privacy rule that one should be familiar with: “business associate,” “de-identified information,” and the “minimum necessary” standard.

- A self-funded group hiring an insurer to perform administrative services
- A self-funded group ceding risk via stop-loss insurance to an insurer

In recognition of the existence of such business arrangements, the privacy rule defines a “business associate” as someone who either: performs certain specified functions involving the use or disclosure of PHI on behalf of the covered entity; or provides certain specified services to the covered entity necessitating the receipt of PHI from the covered

### *De-identified Information*

In theory, one could “de-identify” individually identifiable health information by stripping away those pieces of data that could be used to identify the individuals involved. Once PHI has been sufficiently de-identified through such a process, the remaining information could be used and distributed without raising privacy concerns. However, the framers of the privacy rule were faced with the following dilemma: how much information needs to be removed or masked before there is no longer a “reasonable basis” to believe that the information remaining could be used to identify the individuals?

Under the privacy rule, in order for health information to be considered as

having been de-identified, one of two alternative conditions must be satisfied.

The first alternative is that “a person with appropriate knowledge of and expertise with generally accepted statistical and scientific principles and methods for rendering information not individually identifiable ... determines that the risk is very small that the information could be used, alone or in combination with other reasonably available information ... to identify ... [the] subject of the information” [§164.514(b)(1)].

The second alternative is that a prescribed list of data elements must be removed or encrypted:

*“The following identifiers of the individual or of relatives, employers, or household members of the individual, must be removed:*

- (A) Names;
- (B) All geographic subdivisions smaller than a State, including ... zip code ... except for the initial three digits of a zip code if ... the geographic unit formed by combining all zip codes with the same three initial digits contains more than 20,000 people ... ;
- (C) All elements of dates (except year) for dates ... including birth date, [and] admission date ... ; ...
- (G) Social security numbers; ...
- (I) Health plan beneficiary numbers;
- (J) Account numbers;
- (K) Certificate/license numbers; ...” [§164.514(b)(2)(i)]

While the passage above refers only to removal, a later clause indicates that encryption is equally acceptable, so long as the decryption key (if retained) is kept secret [§164.514(c)(2)], thus preventing the user of the de-identified data from reconstructing the individual identifiers.

*Minimum Necessary Standard*

While the privacy rule permits the use or disclosure of IIHI in certain circumstances, at the same time it places burdens on entities to ensure that such use or disclosure is minimized:

*“When using or disclosing [IIHI] or when requesting [IIHI] from another covered entity, a covered entity must make reasonable efforts to limit [IIHI] to the minimum necessary to accomplish the intended purpose of the use, disclosure, or request.” [§164.502(b)(1)]*

The rule clarifies an entity’s responsibilities in adhering to this “minimum necessary” standard:

*“A covered entity must identify those persons ... in its workforce who need access to [IIHI] to carry out their duties, and for each such person ... [the entity must identify] the categories of [IIHI] to which access is needed and any conditions appropriate to such access ... A covered entity must make reasonable efforts to limit the access of such persons ... to [IIHI] consistent with [the categories to which access is needed].” [§164.514(d)(2)]*

Similar clauses apply to an entity’s disclosures of IIHI and to an entity’s requests for IIHI from another covered entity.

**How does the privacy rule affect underwriting of new cases?**

We have already mentioned that IIHI may be used or disclosed by a covered entity for the purposes of “health care operations” (or “HCO”). The definition of HCO [§164.501] contains many clauses, the most important of which from the health insurer’s standpoint is clause (3):

*“[HCO includes] underwriting, premium rating, and other activities relating to the creation, renewal or replacement of a contract of health insurance or health benefits, and ceding, securing or placing a contract for reinsurance of risk relating to claims for health care (including stop-loss insurance and excess of loss insurance) ...”*



Thus, the final privacy rule explicitly permits a prospective client to disclose, and an insurer to use, IIHI in order to design and price an insurance product for that client. This is a significant improvement over the proposed privacy rule, which would have explicitly prevented a prospective client from disclosing IIHI to an insurer for underwriting or rating purposes prior to its becoming a client of that insurer.

The final privacy rule does stipulate that an insurer who receives IIHI in order to underwrite a prospective client cannot use or disclose that information for any other purpose in the event that the client does not enter into an insurance contract with the insurer [§164.514(g)].

It is also worth noting that the privacy rule would force a health care provider to obtain explicit authorization from an individual in order to disclose that individual’s health information to an insurer for purposes of pre-enrollment underwriting. Of course, if the individual refuses to authorize the provider to disclose the information requested by the insurer, then the insurer has the right to refuse to enroll the individual [§164.508(b)(4)(ii)(A)].

**How does the privacy rule affect underwriting of renewal cases?**

As noted above, clause (3) of the HCO definition incorporates underwriting and rating for renewal business, and hence the use of IIHI for such purposes is permitted.

## ***Actuarial and Underwriting Implications of the Final Health Privacy Rule***

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Note that clause (3) also addresses policy replacement, which may be of particular importance in the individual market. The proposed privacy rule did not mention policy replacement and thus raised questions as to whether an insurer would be permitted to take policyholder experience into account in underwriting or pricing for a replacement policy form; the final privacy rule places no new restrictions on doing so.

However, in order to comply with the privacy rule's minimum necessary standard, the insurer may need to adopt new procedures regarding the internal use of health information by its underwriting department. The following illustration appears in the preamble to the privacy rule:

*"For example ... a health plan could permit its underwriting analysts unrestricted access to aggregate claims information for rate setting purposes, but require documented approval from its department manager to obtain specific identifiable claims records for the purpose of determining the cause of unexpected claims that could influence renewal premium rate setting." [Preamble, p. 82544]*

If underwriting is outsourced to an unrelated company (e.g. an MGU), then that company is considered a "business associate" of the insurer, and the contract between the two companies will need to address certain issues related to the use and disclosure of IIHI, as discussed earlier.

### **How does the privacy rule affect the disclosure to a group of its own experience?**

There are two separate issues here: the disclosure of IIHI to the group; and the use of IIHI by the insurer to create non-

IIHI exhibits for the group.

The main problem with respect to the first issue, as perceived by the framers of the privacy rule, is how to strike a balance between the plan sponsor's legitimate need for certain pieces of health information versus the desire to prevent health information from being used by the plan sponsor for employment-related purposes.

To that end, the privacy rule focuses on the relationship between the group health plan (not the insurer, but rather the group's benefit program) and that plan's sponsor (the employer itself). However, there are two distinct circumstances in which the rule discusses the insurer's role. The first is that the insurer can disclose "summary health information" to the plan sponsor to allow the sponsor to solicit premium quotes or to facilitate the sponsor's efforts to modify, amend, or terminate the health plan [§164.504(f)(1)(ii)]. The definition of "summary health information" is as follows:

*"... information, which may be [IIHI], and that summarizes the claims history, claims expenses, or types of claims experienced by individuals for whom the plan sponsor has provided benefits under a group health plan, and from which the information described at §164.514(b)(2)(i) has been deleted, except that ... geographic information ... need only be aggregated to the level of a five digit zip code." [§164.504(a)]*

The "information described at §164.514(b)(2)(i)" appears earlier in this article, in the section on de-identified information. Thus, it would appear that the summary claims information



disclosed to the sponsor could include a listing of paid claims by claimant where the claimant was identified only by birth year, gender, and five digit zip code (and not by name or SSN).

The second circumstance embedded in the rule involves the plan sponsor's need for IIHI in order to perform administrative functions relating to the group health plan:

*"[§164.504(f)] permits group health plans ... to authorize health insurance issuers ... to disclose [IIHI] to plan sponsors if the plan sponsors voluntarily agree to use and disclose the information only ... for plan administration functions performed on behalf of the group health plan ..." [Preamble, p. 82508]*

Procedurally, the plan sponsor will need to make certain specified amendments to its plan documents and will need to certify to the group health plan that those amendments have been made [§164.504(f)(2)]. (For example, one of the required amendments states that the plan sponsor will not use or disclose such information for employment-related actions.) Once the insurer has received this certification, it may disclose the necessary IIHI to the plan sponsor. This approach was designed to minimize the obligations of the insurer with respect to such disclosures:

*"We have included this certification requirement ... to reduce the burden on [health insurers]. Without a certification, [health insurers] would need to review the plan documents in order to ensure that the amendments have been made before they could disclose [IIHI] to plan sponsors. ... The receipt of the certification ... is sufficient basis for the [health*

*insurer] to disclose [IIHI] to the plan sponsor.” [Preamble, p. 82508].*

Returning now to the second issue, clause (6)(ii) of the HCO definition states that HCO includes “customer service, including the provision of data analyses for policy holders, plan sponsors, or other customers, provided that [IIHI] is not disclosed ...”. Thus, the privacy rule preserves the insurer’s ability to use IIHI to prepare exhibits for customers, so long as IIHI is not actually contained in such exhibits. The preamble to the rule provides some examples of the types of “data analyses” contemplated by this clause:

- “... a plan sponsor may want to understand why its costs are rising faster than average;”
- “... a plan sponsor may want to understand ... why utilization in one plant location is different than in another location;”
- “... an association that sponsors an insurance plan for its members may want information on the relative costs of its plan in different areas.” [Preamble, p. 82491]

The rule also anticipates that different insurers may need to cooperate in preparing such exhibits for a common client:

*“... when a plan sponsor has several different group health plans, or when such plans provide insurance or coverage through more than one health insurance issuer or HMO, the covered entities may jointly engage in this type of analysis ...” [Preamble, p. 82491].*

### How does the privacy rule affect ratemaking and reserving?

As mentioned earlier, “premium rating” is included in clause (3) of the HCO definition. There is every reason to believe that this phrase is meant to permit the use

of IIHI for both the general (creating the manual rates) and specific (modifying those rates for a particular policy) aspects of the ratemaking function.

Clause (6) of the HCO definition states that HCO includes “business management and general administrative activities of the entity.” The preamble clarifies that this clause is intended to include all “general administrative and business functions necessary for the covered entity to remain a viable business” [Preamble, p.82490]. Reserving, and any other financial reporting functions requiring the internal use of IIHI, can be presumed to fall into this category. While the privacy rule preserves the right of an insurer’s actuaries to make internal use of IIHI for ratemaking or reserving, it may also require changes in business practices regarding actuaries’ access to claims information.

For example, it is not uncommon today for an employee of a health insurer’s actuarial department to have complete access to a database of enrollees’ claims payments, where that database contains individual identifiers such as names or social security numbers. However, since the vast majority of that

should be retained, so that comparisons can be made between the dual and original databases, but it should be kept guarded. The creation of the dual database would be a batch job run nightly, so that its information is as up-to-date as that in the original database.

The actuarial department would be given unlimited access to the dual database, which would suffice for most situations. For certain specified purposes, access to the original database would be permissible; an example here would be reserving for large claims, where the actuary would need to know the claimant’s identity in order to converse with case management personnel as part of the reserving process.

Note that this dual database would not need to consist of “de-identified information” in the sense defined in the privacy rule. It could contain items necessary for actuarial work that do not meet the de-identification standard, such as actual admission dates, group identifiers, and five digit zip codes. The key point is that this two-database structure would provide the actuarial department with the information needed to perform its work while limiting the potential for privacy violations.

***“While the privacy rule preserves the right of an insurer’s actuaries to make internal use of IIHI for ratemaking or reserving, it may also require changes in business practices regarding actuaries’ access to claims information.”***

employee’s work would not require the employee to need to know the identity of the claimants, this unlimited access would violate the privacy rule’s “minimum necessary” standard.

Here is an outline of one possible approach to this problem. The insurer could establish a “dual” of the claims database, containing the same information but with many of the individual identifiers removed (e.g., names) or encrypted (e.g., social security numbers). The encryption algorithm

If the insurer subcontracts ratemaking or reserving to an actuarial consultant, then the insurer would be allowed to disclose IIHI to the consultant for that purpose, and in this case, the consultant becomes a “business associate” of the insurer, as evidenced by this excerpt from the definition thereof [§160.103]:

*“[Business associate includes] a person who ... provides, other than in the capacity of a member of the workforce of such covered entity,*

# Actuarial and Underwriting Implications of the Final Health Privacy Rule

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*... actuarial ... services to or for such covered entity ... where the provision of the service involves the disclosure of [IIHI] from such covered entity ... to the person."*

Again, the minimum necessary standard would apply with respect to the disclosure of IIHI to the consultant. If the consultant's work can be performed using strictly de-identified information, then that is the preferred route, since doing so would not create a business associate relationship.

Otherwise, the insurer can rely on the consultant's representation that the information requested is the minimum necessary for the stated purpose [§164.514(d)(3)(iii)(C)].

## How does the privacy rule affect reinsurance?

The final privacy rule clarifies that reinsurers, and also stop-loss insurers, are not covered entities and thus are not directly subject to the privacy rule.

If an insurer assumes risk from a covered entity under a reinsurance contract, then it is considered a business associate of the ceding carrier. (Note that this applies to medical, dental, or long-term care reinsurance assumed, but not to disability income or workers' compensation, since those latter lines of business are excluded from the scope of the privacy rule.)

The ceding carrier is allowed to disclose IIHI to the insurer for underwriting or rating purposes, but the reinsurance contract needs to specify what information will be disclosed and under what circumstances. The insurer may use the IIHI received from the ceding carrier for its own business purposes, such as reserving, and it can further disclose that IIHI if necessary for that purpose (e.g., if it hires

a consultant to set the reserves on the assumed business).

The above comments apply equally to an insurer issuing stop-loss insurance to a self-funded group health plan; the insurer is a business associate of the group, not a covered entity, and its contract with the group needs to address the insurer's use and disclosure of IIHI.

If an insurer instead cedes risk under a reinsurance contract, then as noted earlier, the reinsurer is a business associate. Also, the act of "obtaining payment under a contract for reinsurance" is specifically mentioned in the privacy rule definition of "payment" [§164.501], and thus the use or disclosure of IIHI for such purposes is permitted, subject as always to the minimum necessary standard.

## How does the privacy rule affect the performance of due diligence for acquisitions?

Clause (6)(iv) of the HCO definition reads as follows:

*"[HCO includes] due diligence in connection with the sale or transfer of assets to a potential successor in interest, if the potential successor in interest is a covered entity or, following completion of the sale or transfer, will become a covered entity."*

The preamble clarifies that this clause is intended to include sales, mergers, acquisitions, and consolidations involving all of, or just a division of, a covered entity. Thus, it is sufficiently broad to permit the disclosure of IIHI to, and use thereof by, potential buyers in virtually any M&A activity involving two health insurance entities. This wording did not exist in the proposed privacy rule.

Of course, the seller is bound by the minimum necessary standard in determining which information is to be disclosed for due diligence purposes:

*"[For any disclosure not made on a routine or recurring basis] a covered entity must develop criteria designed to limit the [IIHI] disclosed to the information reasonably necessary to accomplish the purpose for which disclosure is sought." [§164.514 (d)(3)(ii)(A)]*

This might imply, for instance, that any policy or claims listings provided to prospective buyers should contain encrypted social security numbers rather than actual ones.

*Rowen B. Bell, FSA, MAAA, is an associate actuary at Blue Cross/Blue Shield Association in Chicago. He can be reached at rowen.bell@bcbsa.com.*



## *Accident and Health Working Group of the Life and Health Actuarial Task Force Meeting Summary*

*November 30 - December 1, 2000*

**T**he Codification Subteam of the Accident and Health Working Group held two conference calls prior to the Spring, 2001 National Meeting to continue work on recommendations addressing whether cost containment expenses should be included in losses or loss adjustment expenses. It is anticipated that recommendations will be presented to the Statutory Accounting Principles Working Group no later than the Spring, 2001 National Meeting

The working group agreed to send recommendations to the Regulatory Framework (B) Task Force concerning revisions to the Model Regulation to Implement the Small Employer Health Insurance Availability Model Act (Small Employer Insurance Model Regulation). The recommendations addressed rating issues in the Small Employer Insurance Model Regulation.

The working group adopted the November 6, 2000 draft of the *Health Reserves Guidance Manual*. The purpose of the Health Reserves Guidance Manual is to provide guidance regarding the calculation and documentation of health reserves for statutory financial statements as described in the NAIC's Health Insurance Reserves Model Regulation.



The working group adopted the November 8, 2000 draft of the Medicare Supplement Insurance Issue Paper with a few revisions. This paper is the Accident and Health Working Group's response to the Medicare Supplement Working Group of the Senior Issues Task Force regarding concerns that were raised regarding Medicare supplement rate increases and their impact on the consumer and the market. Additionally, the working group agreed to continue discussions for other possible alternative broad-based solutions to Medicare Supplement insurance rating issues. Those alternative solutions could include recommendations for elimination of initial loss ratios and/or benefit restructuring.

The working group discussed the November 17, 2000 draft of the *Guidance Manual for Rating Aspects of the Long-Term Care Insurance Model Regulation*. The Long-Term Care Insurance Rate Adequacy Subteam (LTC Subteam) held a meeting Saturday, December 2, 2000 to continue discussions on the guidance manual. Also, the LTC Subteam will hold a conference call prior to the Spring, 2001 National Meeting to discuss language for additional sections to the manual.

The working group agreed to indefinitely remove rate adequacy issues concerning disability income insurance from the charges for the Accident and Health Working Group.

The Society of Actuaries' Task Force to Recommend Morbidity Standards for Valuation of Credit Disability presented a final report.

The working group held an additional half-day meeting to give feedback to the American Academy of Actuaries' committee that is studying revised approaches to rate regulation of medical expense insurance.

# The Art & Science of Pricing Small Group Medical Coverage

## Renewal Pricing

by William R. Lane

### Regression Toward The Mean — The Wearing Off of Underwriting

**W**hen an actuary is considering how to set rates on renewal for a block of small group medical business, one tendency of medical loss ratios is critical to understand. The claims experience of individual small employers is not fully credible. To some extent, the most recent experience will indeed be a strong predictor of its future experience. But to a significant extent, the experience of a small employer will tend to migrate toward “average” experience for an employer with those particular case characteristics.

There are several underlying reasons that this is true. These include the fact that people with serious chronic conditions tend to utilize more health care resources than average on a year-in-year-out basis. High loss ratios tend to indicate a higher than average proportion of people with serious chronic conditions and vice versa. Thus, if the most recent experience is better or worse than average, there are possibly good reasons that the following year will follow suit.

On the other hand, many expensive conditions are temporary and once fixed do not have a strong predictive value in estimating future health care usage. Also, the employees of a small employer can leave and be replaced with another person whose health care usage is unknown. For example, people who use a significantly high amount of health care resources in a year will have a very high mortality rate as a group. This is true of large employers, but in a large employer, there is a much higher probability that the group of terminating employees is relatively representative of the employer as a whole.

Let us suppose that we could divide all small employers in a given region into six categories based on their most recent usage of health care resources relative to the overall average usage for all small employers. The categories are as shown in the table below. For the sake of clarity, let’s assume that the groups in column one were assigned by individual medical underwriting. Therefore, their relative cost as shown in the first column probably could not be measured directly by the carrier. Column two then represents the experience of these cases in their first



year of coverage, and column three represents the first renewal year. Each column shows the relative cost per employee after all (age, gender, dependent, etc.) adjustments. The actual numbers would depend on a number of factors including average employer size and the managed care arrangements prevalent in the area. Note also that the distribution of employers by category will not follow a normal curve. Many employers will be in the “best” category, and relatively few will be in the “worst” categories.

Prior Usage	Cost Prior To Issue Relative To Average	First Year Cost Relative To Average	Renewal Year Cost Relative To Average
A. Under 50%	21%	44.8%	61.4%
B. 50% to 70%	58%	69.6%	78.6%
C. 70% to 100%	84%	89.6%	92.7%
D. 100% to 140%	119%	112.7%	108.8%
E. 140% to 200%	165%	145.3%	131.7%
F. Over 200%	390%	303.7%	243.0%

What has happened is that some employers who used to be in the best category will migrate "upward" and become higher cost relative to average than they were the year before. The reverse will also hold true. In other words, if you take all employers in category "A" this year, that group of employers will not all be "A" the next year, but will be a mix of "A" through "F."

If there were no credibility to prior experience, the current "A" group would have 100% of average experience the following year, as would the current "F."

If there were 100% credibility to prior experience, the current "A" group would have almost the same experience relative to average in the next year as it did in this year.

The actual credibility is in between the two extremes.

### Ideal Renewal Pricing

Many companies look at the experience of a small employer in order to estimate the premium needed for the following year. When quoting business, the health status of individuals is reviewed, and when renewing business, the prior claims usage is used. In either event, an attempt is made to categorize that employer relative to an "average" risk.

Prices are then set accordingly. Low risk employers receive low premiums and high risk employers receive high premiums. In the world of Small Group Reform laws, there are limits on both how low and how high the premiums may be, but the principle is the same.

Let us suppose that a carrier was actually able to price at will and had perfect experience with which to judge small employers.

The carrier magically groups together all of the small employers in a marketplace according to their prior usage of health care resources and/or the known health status of each employee. The very best small employers are grouped together, and it is noted their claims experience is 21% of average. The premium that must be charged to cover the claim costs in the following year, however, needs to have a claim cost set at 44.8% of average.

Vice versa, again in an ideal world, the very worst employers are grouped together

and their claims experience has been 390% of average. The premium that must be charged to cover the claim costs in the following year, however, only needs to have a claim cost set at 303.7% of average.

Suppose, in this ideal world, the carrier had been quoting on new business and had given the category "A" groups rates set at 45% of manual and category "F" groups rates set at 304% of manual. All other things being random and equal, the carrier would make their risk charge on both sets of employers in their first year.

The problem sets in when the carrier seeks to renew the groups. The original category "A" groups now need rates at 61% of manual, and the original category "F" groups now need rates at only 243% of manual. If an actuary acts accordingly, the marketing department will go berserk.

The marketing department will say that you have two blocks of business that performed exactly on target this last year, but you are giving a 37% increase (plus trend) to the "best" employers (because they are going from 44.8% of average to 61.4% of average) and a 20% decrease (plus trend) to the "worst" employers (because they are going from 303.7% of average to 243.0% of average). This goes against all "common sense."

This illustrates a very common misconception in setting renewal rates. Namely, many people firmly believe that the renewal rate *percentage increase* that a group should receive can equal trend if the group achieved its profit margins in the prior year. In larger groups with strong credibility, this concept will generally work relatively well. In small employers, it simply isn't true. The truth sounds very similar, but is quite different. A group with better than average experience in the prior year can generally be offered a renewal rate which is also better than average (but not as much so), and, in an ideal world, vice versa.

The mechanism that many companies use to accomplish this approach is called "blending." The renewal rate that a case would generate based on its own experience is blended with an average or manual rate. The weight given to a group's own experience is called its "credibility." And the complement of the credibility is the weight applied to the manual rate. The net

result is that the rates for "good" cases go up, and the rates for "bad" cases go down. I won't claim that marketing departments like credibility blending, but it is a fairly common practice that handles the problem of "regressing toward the mean" without explicitly pointing out that better cases will have higher trend and vice versa.

Many carriers over the years have had an opportunity to "cherry-pick" various blocks of business, meaning that they had access to claims experience and could offer rates only to the best employers. In far too many cases, these carriers lost money on these blocks. The employers they selected were indeed better than average, but the pricing by the carrier was based on the actual claims of the employers that were offered coverage and did not contemplate that the cases would tend to migrate toward average as a block and that premiums had to accommodate this effect.

Ideally, a carrier will attempt to charge premiums to the "best" business at rates that are well above the minimum needed to meet profit goals in the following year. Renewal increases can then be much more moderate, allowing the carrier to retain the block even though the profit margin on this portion of the block will rapidly diminish. The "worst" cases will still be offered rates that would produce expected margins in the first year, but these cases as a whole (if they all persist) might then receive trend increases that would produce growing profit margins on this block of business.

Years ago, this approach was possible, but is not any more in most states.

### Real World Renewal Pricing

Small Group Reform laws have put severe restrictions on rating practices of carriers. A typical set of restrictions might be an allowance for rates to be set at a minimum of 65% of manual and a maximum of 135% of manual. In addition, the percentage of manual that the carrier is charging cannot be increased at renewal by more than 15%.

This creates a number of issues for pricing a block of business.

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**The Art & Science of Pricing Small Group Medical Coverage**

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On the one hand, the rating laws force a carrier to charge higher than necessary rates on the best groups. Given human nature, as noted above, this is a practical approach. On the other hand, however, the “worst” cases are charged very inadequate rates to cover their actual costs. Even though these cases might, as a block, get better each year, it would take many years for these cases as a whole to reach the point where 135% of average is sufficient to cover their actual cost. Hence, you must have a good mixture of better cases if you have any reason to expect to make a profit on the block.

In addition, if the person or persons who had the high health care resource usage leave the group, the employer can easily go to a new carrier at a much reduced rate. While ideally the block of the “worst” cases should improve over time, the departure of employers who recognize they can get better prices elsewhere causes the remaining block of “worst” cases to stay at a high claim cost level.

Another, but similar, anti-selection problem applies to the “best” cases. They received their very low rate because no one within the group had any significant health issues at all. Even though as a block, these employers will have a sharp increase in health care costs, many of these employers will remain very healthy. If these employers are offered renewal rates that reflect an expectation that the health status of their group will deteriorate, then they can and will shop for better rates from another carrier. This

type of anti-selection can cause the experience of the “best” employers to deteriorate even faster than random statistics would indicate.

Imagine a carrier which magically has been able to write only the very best, most select business at a rate which produces the expected gain in its first year. The wearing off of underwriting will cause the claim costs for this block of business to rise by roughly 37% in addition to trend. Either the carrier must raise its entire manual rating structure to allow for this increase (which will cause it to be unable to sell new business in the second year and will also cause very high lapsation), or the carrier will be forced to keep its renewal rate increases to trend plus 15% as mandated by law (and will therefore lose a lot of money because claims will be 19% higher than the premium can cover).

No carrier can write only such select business, but if the “best” business that a carrier writes is merely making the pricing margin in the first year, the problem remains for this portion of the business. Either the manual rates must rise sharply for all cases, or a significant portion of the block will lose a significant amount of money in the second year.

In essence, a carrier must have a strong margin on the most select business that it writes or the rating laws will cause this portion of its second year business to lose money.

In essence, you have to reconsider every case each renewal. You can’t just

treat them as members of a category that get the same treatment.

Similarly, if you keep all of the “worst” cases at a maximum load, the “worst” cases as a block never will reach a profitable level. As noted before, part of the reason that some of these cases get better is that the one or two very unhealthy people within the group leave the employer. The case is now an average or better risk. It can go to another carrier and get a much lower rate than it has been paying. In other words, if you keep its rates at maximum load, it won’t stay within the pool of “worst” cases and the average risk in the pool won’t improve.

For cases in the middle (Categories “C” and “D”), renewal rating can offer trend increases and be safe. These cases are running close to average, and a trend increase, more or less, will keep them as a block at about the right rate for the following year.

Without adjustment, the net result can be significant. Consider the two fictional blocks of business below. The first block has a distribution of cases that matches the overall market. The experience on this block by category matches our average assumptions for a second-year (or renewal) block and produces a relative cost of 100% of average. The second block has lost about 30% of its “best” groups in Category “A” during renewal and 30% of its best Category “F” groups as well. It also lost 15% of its better Category “B” and “E” groups. This causes the distribution of business to be more concentrated in the middle categories, but it makes the expected claims for both the “A” category and the “F” category higher than expected. Overall, the average cost is now 105.8% of average.

Category	First Block		Second Block	
	% of Cases	Cost	% of Cases	Cost
A	30.0%	61.4%	24.7%	68.5%
B	15.0%	78.6%	15.0%	80.2%
C	21.7%	92.7%	25.5%	92.7%
D	18.3%	108.8%	21.5%	108.8%
E	6.0%	131.7%	6.0%	136.2%
F	9.0%	243.0%	7.4%	294.4%
Average		100.0%		105.8%

Anti-select lapsation on renewal can easily add 5% or more to the increase in costs on a block of small group business. The change in the cost within a category is because you are losing the better cases within the category. The amounts shown are based on statistics which were developed for one specific set of circumstances and will differ based on more external factors than we can list. The rough bottom line result, however, is very likely to be the same in almost all cases with strong anti-select lapsation.

### One Example of A Projected Real World Renewal

The following calculations are based on various assumptions with regard to how cases migrate by year from one risk category to another and the lapse rates according to both how much of a better price a group can obtain from the "market" and whether the employer is aware of a serious health condition (or the disappearance of a serious health condition) that hasn't yet surfaced to the point where the carrier is aware of the condition. The assumptions will vary by a variety of factors, but the general result will be the same for almost all blocks of small group medical business.

Assume a block which was well-underwritten and the pricing by risk category assumed the need for strong margins at the best risk categories to offset the loss at the worst risk categories. I am assuming a "follow the market" pricing approach as outlined in the article from the last issue.

Assume that groups which increased in risk category received the maximum 15% increase in rates, while all other groups, even those that improved, received no change in rates. I am assuming that trend and expenses are 0% for these calculations to keep the mathematics as simple as possible, but obviously in the real world, trend and expenses are critical components.

Projecting claims based on current risk category and distributing the cases by the percentages that will change risk category, we arrive at an initial conclusion that the ratio of claims to net risk premium will be 96.8%. Looks good so far.

You decide that you can lower the premium on those cases that "got better" from the original quote and allow a 12% discount when the risk category dropped from the initial quote to the first year experience. The ratio of claims to net risk premium now rises to 100%. That means, all other things being equal, you will make your risk margins. Sounds great, but we're not done yet.

If we compare the renewal price as offered to the price we would have quoted on a new group, we can assume that the lapse rate for cases which are offered renewals well above "market" rates will be high and vice versa. When we make reasonable estimates of this impact, the risk ratio now rises to 103.3%. The real world has eaten away some of our margins.

If we assume that some of the cases which are going to change risk category in the new year will use that advance knowledge to their advantage, then we have to readjust the lapse rates further. Our risk ratio is now projected at 105.6%.

We now have two choices: raise the entire manual structure, or go back and selectively increase the groups which "got better" and eliminate their rate reductions. Just eliminating rate reductions does about equal harm as good. We get more premium on paper, but the lapse rates work against us more as well.

Based on the assumptions in this simple calculation, we would have to raise all rates a minimum of 11.5% in order to make the risk ratio go to 100% in the following year, and, of course, we get a rather poor retention of business.

Note this example assumes that we originally got strong margins on the "best" business in their first year. Had this not been the case, the problem would have been increased.

Such is the real world of small group renewals. The exercise as described above is a necessity for a small group carrier in setting renewal rates. Each case must be examined and categorized by risk. The future expected claims (with consideration of regression to the mean on the better cases) and the future premium must be added up with a

weighting based on expected persistency. Leaving out these pieces can easily make a block look better than it actually will be next year.

To a certain extent, trend estimates tend to mask these rate mechanics and small employers often accept rates without "shopping the market." Even so, the real world of small group medical presents many challenges that are not obvious to the inexperienced actuary.

The above examples are based on state laws that allow some flexibility in rating. What if you operate in a state with strict community rating allowing no variation by group? Should you still be concerned with the relative mix of business within risk categories? The answer is a qualified "yes." Small employers with better than average experience can always choose a form of self-insurance instead of insurance. This can change the mixture of business in your block in a manner that loses better business and attracts worse business on a steady basis over a number of years. It's another version of an "assessment spiral." A carrier would see it as higher than expected trend. Unfortunately, "higher than expected trend" is just another way of saying "we lost money."

The small group market is a difficult market at best. Some companies have found ways to remain sufficiently profitable and sufficiently competitive to remain in the market on a long-term basis. Many companies have entered the market only to exit in a few years because of mounting financial losses. One of the reasons for the early exits is a lack of advance planning when it comes to the pricing strategy. The good news, of course, is that this is why the carriers need all those high-priced actuaries!

*William R. Lane, FSA, MAAA, is principal at Heartland Actuarial Consulting LLC in Omaha, NE. He can be reached at WmRLane@aol.com.*



# The Actuary and Health Insurance Mergers and Acquisitions

by James T. O'Connor

Over the past several years, there has been a flurry of mergers, acquisitions, IPOs, and corporate consolidation in almost every industry. The financial industry and, in particular, the health insurance sector has been no exception. The transactions that have involved health insurance companies have ranged from relatively small to very substantial blocks of business. They have included medical (HMO, PPO, and indemnity), medicare supplement, disability, and long-term care business. This activity is likely to continue in the future.

This article focuses on the actuarial appraisal for health insurance business and the role of the actuary within the merger and acquisition process.

## The Sales and Purchase Process

Any merger and acquisition transaction begins with the owner's decision to sell the business and other companies looking to buy additional business. The actuary can and often does play a key role in the decision to sell or buy a company or a block of business. Usually, the decision comes as a result of considering various options brought to light through a strategic planning process. The actuary who understands all the inter-dynamics of the health insurance operation should seek to play a key role in the strategic planning process.

### Seller/Buyer Fit

Various sales situations dictate the type of fit that a seller and buyer must have to close the transaction. Some of the circumstances that lead to a proper fit are the following:

- The business is truly profitable, but is non-core to the seller and is likely to be a core block for the buyer.
- The block of business is good intrinsically (e.g. profitable loss ratios), but the seller's administrative and marketing costs are too high for the block to meet its profit targets. The buyer believes that he can administer the

business at lower costs or may have lower profit objectives than the seller.

- The block has poor operating results due primarily to poor management of the business by the seller. Often the seller discovers that adequate rate increases have not been filed for and implemented on a timely basis, or the seller has not kept up with the latest in cost containment practices, provider discount negotiations, contract language, etc. It may also be that the seller has kept certain benefit options out in the market too long and has been a victim of adverse selection. The interested buyer believes that he can implement the proper corrective actions and restore the block to adequate profitability.
- The reputation of the seller prevents effective corrective actions. Typically, this occurs in a situation in which the business is non-core, and the seller needs to protect its reputation in order to keep its core business healthy. The corrective actions may include the implementation of higher than average rate increases or selective termination action.
- For some types of business, a win-win transaction can occur due to a reserve lock-in situation in which the seller

has conservative active life reserves established for the block and cannot or chooses not to destrengthen the reserves. The buyer is willing to pay a fair price for the business and has the opportunity to establish its own reserves on the block, which need to be adequate but not as excessively conservative as those of the seller. By means of the sale, the seller gets the benefit of the reserve release, and the buyer purchases a profitable block of business.

- Sometimes regulatory fire sales occur. Usually, but not always, the business is in need of substantial corrective action. Buying this type of business can be risky, but the buyer's negotiation leverage can often be very good.

Other elements related to the type of sale have to do with what else is included in the sale and the type of transaction involved. Often just the business itself is being sold without a company infrastructure or distribution system included. Other sales also include the company, but may or may not include the employees, the real estate, the computer systems and hardware, furniture, and other assets. Sometimes, in addition to the insurance company, other affiliated companies such as a marketing company or managed care company may be part of the sale. The situation will influence the approach to and the items needing to be considered in valuing the business that the actuary will take.

### The Sales Documents

There are a number of key documents and information packets that are needed in the sales process.

- The Offering Memorandum
- The Actuarial Appraisal
- The "Data Room"
- The Data Request
- Supplemental Information and Sensitivity Analyses



- The Purchase Agreement
- Regulatory Requests
- Reinsurance and Administrative Agreements
- The Closing Documents

The actuary can be involved in either using or creating most of this information.

### Role of the Actuary

The role of the actuary extends well beyond creating an actuarial appraisal. While the actuarial appraisal is critical to the merger and acquisition process, there are other important aspects of the process in which the actuary is a major contributor. The list may vary somewhat depending upon the actuary's relationship to the seller and buyer, whether he is an in-house actuary or a consultant. These include being an active member of the due diligence review team (before the sale, between the sale and the transaction close, and after the closing), interviewing management, interfacing with regulators, reinsurers, and investors, and acting as a general advisor to management regarding the merger and acquisition process. The remainder of this article focuses on the actuarial appraisal.

A consultant representing the seller often has a responsibility to develop the appraisal value and report. The in-house actuary of the selling company may also have the responsibility to develop an appraisal value, particularly in those cases where an actuarial consultant is not used. He also is oftentimes responsible for working with and reviewing the independent consultant's work before the latter releases a final report.

An actuary (consultant or employee) representing an interested buyer may be charged with developing an independent appraisal of the business, either by using his own models and assumptions, or having the seller's actuary run alternate sets of assumptions through his model.

### Professionalism and Avoidance of Conflicts of Interest

Both consulting actuaries and insurance company actuaries become involved in the merger and acquisition process. It is imperative for the actuary to avoid conflicts of interest and even the semblance

of such conflicts, and fulfill his responsibility to act with professional integrity and competence. He should be familiar with the Code of Professional Conduct, the Qualification Standards of the American Academy of Actuaries, as well as with Actuarial Standard of Practice (ASOP) No. 19, Actuarial Appraisals, and other related ASOPs.

Mergers, acquisitions, IPOs, and other transactions requiring the need of actuarial appraisals often involve substantial amounts of money, the need for a high level of confidentiality, heightened corporate or client pressures in terms of timing and sometimes results, and exposure to third party and regulatory scrutiny.

Actuaries who have financial or other interests contingent upon the outcome of the transaction must be careful to avoid conflict situations, deceit, and misrepresentation of information. Adherence to confidentiality agreements is paramount to the best interests of the various parties involved in the transaction, irrespective of how much the actuary trusts and respects the people with whom he is communicating.

An actuary should not perform M&A and appraisal services unless all actual and potential conflicts of interests are appropriately addressed. The Code of Professional Conduct lists three criteria that must be met:

- The Actuary's ability to act fairly is unimpaired;
- There has been disclosure of the conflict to all present and known prospective Principals whose interests would be affected by the conflict;
- All such Principals have expressly agreed to the performance of the actuarial services by the Actuary.

A *Principal* is a client or employer of the actuary. For consultants, this means

making the client aware of present or prior relationships that the actuary or his firm may have had with third parties interested in the transaction. For an employee, this involves making his employer aware of prior employment or other types of relationships that the actuary may have with interested third parties (e.g. spouse works for an interested buyer or seller, ownership of stock in one of the companies, etc.). Some consulting firms such as Milliman & Robertson are careful to avoid conflict situations through firm requirements regarding internal "need-to-know" conflict notice procedures, certain client relationship disclosures, and prohibitions against contingency-based fee structures, ownership of industry stock, and membership on the boards of directors of industry companies.

The actuary needs to be able to effectively deal with and interact with the many other professionals that can become involved in the transaction.

### The Actuarial Appraisal

A critical component of the sales process is the determination of the purchase price. There are a number of key factors that contribute to this determination, one of which is the actuarial appraisal value. The actuarial appraisal provides a range within which the economic value of the

***"Actuaries who have financial or other interest contingent upon the outcome of the transaction must be careful to avoid conflict situations, deceit, and misrepresentation of information."***

business falls under a specific set of assumptions. It is a measure of the value of the business to a particular user (seller, buyer, reinsurer, investor, etc.)

#### ➤ **Variation in Value for Different Users**

The appraisal value can certainly differ between an appraisal done for the seller and those done for specific purchasers because the circumstances, needs, and perspectives vary from one user to another. As such, a set of assumptions that is appropriate for one user may not be

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## ***The Actuary and Health Insurance Mergers and Acquisitions***

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ideal for another. This is especially true due to the different tax and risk based capital situations in which various carriers are positioned. But differences in assumptions can also be dictated by company size, the other lines of business of the company, its effectiveness in managing administrative expenses, its marketing distribution channels, its ability to negotiate and secure competitive provider reimbursement arrangements, its effectiveness in managing health care and minimizing health care claim costs, its geographical location, its experience in merging purchased blocks of business with its existing operations, and simply the strategic value of purchasing this block of business relative to that assessed by the other potential buyers.

### ➤ ***Components of an Actuarial Appraisal***

There are four key distinct components of an actuarial appraisal.

They are:

- ☞ Adjusted net worth of the business as of the valuation date;
- ☞ Value of the business in force;
- ☞ Value of future business capacity;
- ☞ Adjustment for the future cost of capital retained to support the business.

Oftentimes, the present values of earnings are presented on both a pre-tax and after-tax basis. The cost of capital may also be split between the in-force and new business components to derive a present value of distributable earnings for each. From this perspective, the actuarial value can be categorized into three basic components instead of four.

### ➤ ***Adjusted net worth of the business***

Most actuarial appraisals are presented on a statutory accounting basis, primarily because statutory accounting determines the earnings and capital available for

distribution. The statutory net worth of the business is, however, adjusted to recognize certain elements that have capital and surplus value, but are not allowed under statutory accounting or are intrinsically surplus items categorized as a statutory liability. The adjusted net worth of the business is typically comprised of the following:

- ☞ Statutory capital and surplus;
- ☞ Statutory liabilities that are intrinsically allocations of surplus, such as the Asset Valuation Reserve (AVR);
- ☞ Statutory non-admitted assets that have realizable value such as a certain amount of the Agent Debit Balance;
  - ☞ Reduction of surplus items that represent an obligation to another party;
- ☞ An adjustment to reflect the difference between the market value of the invested assets and the statutory carrying value included in the statutory capital and surplus (market-to-market adjustment);
- ☞ Adjustment (usually a reduction) in the value of certain admitted assets that the user values differently than the reported statutory value;
- ☞ Adjustment in the value of certain liabilities that the user values differently than the reported statutory value, such as the claim liability or policy reserves;
- ☞ Adjustment for any tax assets or liabilities that may not be transferable in the transaction.

It is important that the adjusted net worth items to be included are consistent and complementary with the items used in the projection of future earnings. This includes the treatment of such items as claim

liabilities and policy reserves. The projection will almost always reflect the release of these liabilities over the projection period. If it does not (e.g., the projection is presented on a paid claim basis, not on an incurred claims basis), then the net worth value needs to be adjusted to include these types of liabilities.

It is critical to note that the net worth is only as reliable as the adequacy of the assets and liabilities from which it is calculated. It is not unusual for sellers and buyers to have different perspectives about estimates for claim liabilities. The reported policy reserves may be more conservative than what a buyer may need to establish. The actuary should review the adequacy of these liabilities, discuss the amounts to reflect in the calculation of the adjusted net worth value with his management or client, and determine that the projection is made on a basis consistent with the reporting of the components of adjusted net worth.

### ➤ ***Value of the Business In Force***

The value of the business in force is calculated as the present value of future earnings over a projection period on the business in force as of the valuation date. This requires that the actuary develop a projection model, determine starting in-force values, create a specific set of assumptions that reflects reasonable expectations for the business, and process these through his projection system.

### ➤ ***Projection Model***

The detail of the projection model should be appropriate for the business being modeled, the data that will be available, the time frame in which the projection must be done, and the budget within which the actuary must operate. Models might be categorized into three types: windshield appraisal models, intermediate detail models, and full-blown appraisal models.

The windshield appraisal fits a situation in which time is very limited, data is quite scarce with perhaps only public information available, and the purpose of the appraisal is to simply determine whether the user should pursue a more detailed investigation of the business.

Intermediate detail models most often result from a lack of detailed data. The company may not have systems adequate enough to produce the type of detailed data that is desirable. As such, the model cannot be as sophisticated as the actuary might want it to be, but the information is adequate enough for producing a reasonable projection and estimate of value.

A full-blown projection model fits the situation in which detailed data is available with adequate time to create a sophisticated model. This, of course, is the preferred model to estimate a final appraisal value upon which a purchase price would be negotiated.



The model also needs to reflect the complexity of the business. A single product line can have a much simpler model than a multi-product and multi-line company.

Also, certain types of business are more complex than others. Long-term care business generally needs to use a much more sophisticated model than a traditional indemnity comprehensive medical block of business.

This is not to say that the analysis required to determine assumptions is any more or less complicated, but that the projection system should be more sophisticated. Often-times, a spreadsheet projection system can be quite adequate for a comprehensive medical block of business, where a more complex pro-grammed system might be more appropriate to project long-term duration products that carry policy reserves and have multiple decrement situations to model.

Another aspect of model development is related to the evaluation of risks that need to be done within the projection. Product benefit or rating variations may need to be modeled into separate projection cells. Model cells may need to also differentiate the business based upon underwriting differences with adherence to identifying the durational sensitivity of the business or may need to be segregated by managed care features or provider networks.

While model cell definitions may not need to be delineated by issue period or duration from issue, the ability of the model to identify the in-force business by duration is important, particularly for individual and small group business in which commissions and expenses might vary by policy duration, policy reserves vary by policy duration, and expected morbidity might also differ by duration.

Most important is that the projection model and system should be flexible enough to easily handle sensitivity testing and manageable enough to produce results that can be explained. The actuary needs to understand the inner workings and intricacies of the system to be able to adequately present the results.

#### ➤ *Starting In-Force Values*

The actuary needs to validate the model to reproduce actual premiums, policy counts, and statutory statement reserves of the business as of the starting valuation date. The results should be within a close tolerance in the aggregate. For business with widely varying types of benefits or case characteristics, it is best to validate within a close tolerance by product category. This is particularly important for business that has morbidity and/or policy reserves that vary by duration.

One issue related to starting values and initial assumptions is the need to analyze the impact of remedial actions (e.g., rate increases) that

have begun to be implemented before the valuation date, but are not fully implemented as yet, or which have only had a partial impact on the experience data being used to set starting values and assumptions. The actuary should be aware of how modal loads, rate increases being implemented, and due and unpaid premiums are reflected in the in-force premiums.

He also needs to understand what is included in or excluded from the starting claim liabilities and policy reserves, particularly in being aware of any contingency margins or deficiencies present.

The projection formulas and assumptions should be consistent with the definitions of the starting values.

#### ➤ *Assumption Development*

Most of the actuary's work in determining appraisal values is in the process of assumption development. The assumptions regarding future experience need to be reasonable, take into account actual historical and currently emerging experience of the business, adjusted to reflect known changes being planned or implemented by the company and changes and trends in the competitive environment and industry practices. Oftentimes, the carrier will not have experience studies available to support the development of certain assumptions or the data may not be of sufficient size to be credible. In these cases, the actuary will need to rely on industry experience of similar business, the experience of the interested buyer, and/or his own experience and judgment.

The assumptions should also be representative of the purpose of the appraisal. The buyer may be interested in the value using expense assumptions or provider network discount assumptions more reflective of its own operations rather than that of the seller's operations. One purpose may be to value the operation as an ongoing concern, while another may be to determine

## *The Actuary and Health Insurance Mergers and Acquisitions*

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its value as a discontinued business concern. These purposes will call for different sets of assumptions, albeit that most of the assumptions may remain the same.

Some assumptions may come per a directive of the company management (buyer or seller). Some assumptions may require an expertise or knowledge that the actuary does not have. The actuary will need to rely upon those people expert in such areas for developing the assumptions. These areas tend to be related to investment income, expense, and new business assumptions.

In all cases, the key assumptions and their sources should be well documented and disclosed in the actuarial appraisal report. Key assumptions include the following:

- Policy decrements (lapse rates including remedial action shock induced lapses and mortality rates)
- Premium: modal distribution and modal loadings (if not implicit in the starting premium); rating structure considerations (e.g.

- Claim costs (aging curve, underwriting selection wear off, claims trend, impact of managed care and provider reimbursement arrangements, benefit downgrades, and claims anti-selection due to remedial actions)
- Claim reserves and liabilities
- Unearned premium reserves
- Additional active life reserves (policy reserves)
- Commissions
- Administrative expenses
- Federal income taxes
- Investment income
- Reinsurance
- Appraisal discount rates

There are a number of issues and considerations that the actuary must explore in constructing the assumptions for each one of these items. That discussion is beyond the scope of this article.

*“The actuary should strive to assure that the assumptions he chooses are a cohesive set that reasonably reflect the future results of the operation that can realistically be achieved relative to the purpose of the projection.”*

attained age and banded age rates need an average annual age-step increase); family composition considerations (e.g., family policies eventually evolve into insured and spouse or insured only over time).

- Rate increases (amount, timing, downgrades, and applicability)

The actuary should strive to assure that the assumptions he chooses are a cohesive set that reasonably reflect the future results of the operation that can realistically be achieved relative to the purpose of the projection.

### ➤ *The Projection*

The projection itself is generated by means of a projection system.

The system has programmed formulas that apply the assumptions discussed above to the starting in-force values. The actuary should be familiar with the formulas being used by the system in order to be able to better explain the results. There are several key issues that need to be decided related to the projection:

**Valuation Date:** a valuation date needs to be set. This is often December 31st of the year just completed, but may also be the most recent quarter-end or month-end. The availability of in-force data and other data can factor into the choice of valuation date. In some cases, the valuation date could be chosen to be a future date such as the next year end or the expected effective transaction close date.

**Partial Years:** if the valuation date is not a year-end date, a partial year needs to be projected, unless rolling 12-month periods from the valuation date rather than calendar years are projected. Certain remedial actions may be implemented within a calendar year, which require special attention to their implementation. Seasonality characteristics of the business need to be considered for partial-year projections.

**Projection Period:** the length of the projection period also needs to be decided. The length should be set based upon the purpose of the projection, the type of business being projected, the level of lapsation and decrements expected for the business, and other business that is also being projected (e.g., life insurance and annuities). Long duration lines of business such as LTC and DI need longer projection periods (e.g., 20 – 30 years) than short duration business (3 – 10 years). Short duration business can certainly be projected beyond 10 years, but with the typically high lapse rates experienced by medical business, experience beyond 10 years will generally produce only small changes to the actuarial

values. It is important that residual values be determined at the end of the projection period if they are significant (e.g., release of remaining reserves or estimate of remaining profits).

**Validation of Results:** there are various types of validations. Static validations are used to show that the starting values are consistent with actual values as of the valuation date. Dynamic validations are sometimes performed to validate the predictability of the projection system and assumptions by running the model against an earlier in force (e.g. previous year) and comparing the projected to actual historical operating results. Dynamic validations can be very difficult for many types of health insurance, such as medical business, since there are so many varying forces and remedial action responses at play at any one period of time.

**Sensitivity Analysis:** The projection system needs to be able to produce sensitivity analyses on various assumptions in order to be able to communicate the potential range of reasonable risk that is being purchased. Typical sensitivity analyses are performed on the lapse rates, morbidity assumptions, expense assumptions, and investment income rates (for long duration health insurance plans). Each party will request tests for items with which it is most concerned.

➤ **Value of future business capacity**

The value of future business capacity is usually calculated as the present value of projected future after-tax earnings of new business to be issued after the valuation date. This can oftentimes be an estimate significantly differing between sellers and buyers. Usually these differences are related to the amount of business that is projected to be issued, but it is also not uncommon to see differences in the expected profitability of the future business. Sellers will often project with the expectation that corrective actions they have taken will meet with

their intentions, while buyers will usually look at the historical experience of the line as an indication of what to also expect in the future, placing less weight on the remedial actions which may be in progress.

Typically, the number of issue years included as new business will range from zero (i.e. give no value to future business capacity or estimate the value by some other means) to 10. Often the buyer is interested in what the projection for a single issue year of business will look like over its lifetime. Other issue years are often projected as just being layered on top of the first year. A single issue year projection helps provide the reader with an idea as to the expected lifetime and annual financial results expected, which provides a basis of comparison with similar product lines in the industry or with that of the buyer. The actuary is usually provided with new business volume assumptions by management. Other assumptions are usually consistent with those used for the existing business, unless there is a justified reason for changing them.

➤ **Adjustment for the future cost of capital retained to support the business**

The business being sold will need to be supported by capital and surplus. The NAIC has minimum requirements for holding risk based capital. Rating agencies also have formulas to judge capital level held by carriers. The amount of capital that needs to be held is related to the types and volumes of business written by the insurance carrier. Typically, the capital to be held is targeted to be 150% – 250% of NAIC Company Action Level risk based capital.

The cost of capital calculation includes the after-tax net investment income on the capital held, along with the annual changes in required surplus.

## The Actuarial Appraisal Report

The actuarial appraisal report is the vehicle the actuary uses to communicate

the appraisal values, the projection results, and the underlying assumptions and projection methodology used. ASOP No. 19 delineates various items that the report should disclose at a minimum. These include descriptions of the scope of the assignment and its intended use; any reliances and limitations the actuary has placed on his work product; a description of the business or entity being valued; the actuarial appraisal values; the methodology and assumptions used; the validation techniques and results; adjustments to value net worth and provisions for cost of capital; and how federal income taxes were considered.

The annual projection results showing the expected stream of earnings from which the appraisal values were determined is also usually displayed. In addition, the actuary needs to disclose any deviations from the standard and whether it is an actuarial appraisal.

### Summary

As the reader can see, the role of the actuary is very important to the merger and acquisition process. It demands a high level of expertise and dedication to meet the demands of buyers and sellers and simultaneously comply with actuarial standards of practice. It is also very satisfying work that allows the actuary to consider the entire range of actuarial, financial, and operational interactions that comprise the health insurance business.

*James T. O'Connor, FSA, MAAA, is a consulting actuary at Milliman & Robertson, Inc. in Chicago. He can be reached at jim.oconnor@milliman.com*

*Facts and opinions contained in this paper are the work of the author and should not be attributed to Milliman & Robertson, Inc. or the Society of Actuaries, its Committees, or the Health Section.*

# Critical Illness Primer

## Part Two: An Overview of Foreign Critical Illness Claims Experience

by Johan L. Lotter

**C**ritical Illness Insurance policies have been sold for over a decade in many countries. To date, there has been one published South African Experience Study, performed under the auspices of the Actuarial Society of South Africa and two major other efforts, one by a Working Party of the Society of Actuaries in Ireland and one by a British Study Group associated with the Institute of Actuaries in London.

*The South African Study.* (Actuarial Society Of South Africa,

Continuous Statistical Investigations Committee. Dread Disease Investigation 1991-1994)

The South African study was published in 1997 and was based on exposure during the years 1991-1994.

Although it is based on immature experience, the South African study appears to support the view that CI experience in that country has been substantially better than had been allowed for in product pricing.

Some key information relating to initial selection, obtained from the study, is furnished in Table A below:

Table A							
South African Critical Illness Investigation - 1997							
Policies with Critical Illness Riders. Rates are per 1,000 per annum							
Males Age Group	Duration 0			Duration 1+			Duration 0 as % of Duration 1+
	Claims	Exposure	Observed Rate	Claims	Exposure	Observed Rate	
20-24	6	49,367	0.122	15	55,676	0.269	45.1%
25-29	13	56,397	0.231	37	108,560	0.341	67.6%
30-34	16	45,222	0.354	76	117,433	0.647	54.7%
35-39	29	30,510	0.951	122	96,027	1.270	74.8%
40-44	39	18,466	2.112	168	67,498	2.489	84.9%
45-49	25	9,272	2.696	143	39,716	3.601	74.9%
50-54	14	3,493	4.008	115	18,267	6.296	63.7%
55+	6	682	8.798	56	6,188	9.050	97.2%
All	148	213,409	0.694	732	509,365	1.437	48.3%

The final column in Table A furnishes evidence that initial underwriting selection in South African portfolios was very efficient.

*Society of Actuaries in Ireland Working Party.* (“Reserving for Critical Illness Guarantees” by the Society of Actuaries in Ireland Working Party, 1994).

This important study was produced by the Irish Working Party. Their objective was to compile a valuation table for Critical Illness business written in Ireland. Tables B(M) (males) and B(F) (females) below furnish an extract from the resulting Irish Valuation Table (IC 94) and a comparison with the Dash and Grimshaw UK population Critical Illness incidence rates first published in 1990.

The columns headed “Calibration Ratio” express the IC94 Table as a percentage of the Dash & Grimshaw table. The Calibration Ratio furnishes the result that might have been obtained if one had applied a straightforward calibration to the Dash & Grimshaw population incidence rates using the Rate Calibration Formula. In reality, the Irish Working Party derived its IC94 table by calibrating an adapted version of the Dash & Grimshaw 1990 Population Incidence Rates.

**Table B(F):**  
Critical Illness Incidence Rates Per 1,000 P.A.

Females	IC94 Table	D & G	Calibration
Age	1994 Total	1990	Ratio
20	0.347	0.210	165.2%
25	0.545	0.470	116.0%
30	0.819	0.840	97.5%
35	1.245	1.250	99.6%
40	1.895	2.040	92.9%
45	2.820	3.640	77.5%
50	3.991	5.940	67.2%
55	5.465	9.010	60.7%
60	7.726	12.760	60.5%
65	11.184	17.480	64.0%
70	15.527	25.460	61.0%
75	20.485	37.360	54.8%
80	26.666	44.810	59.5%

**Table B(M):**  
Critical Illness Incidence Rates Per 1,000 P.A.

Males	IC94 Table	D & G	Calibration
Age	1994 Total	1990	Ratio
20	0.251	0.290	86.6%
25	0.317	0.430	73.7%
30	0.494	0.690	71.6%
35	0.899	1.260	71.3%
40	1.663	2.730	60.9%
45	2.889	5.620	51.4%
50	4.553	9.480	48.0%
55	6.715	14.160	47.4%
60	9.896	21.200	46.7%
65	14.602	30.540	47.8%
70	20.804	42.050	49.5%
75	28.377	56.730	50.0%
80	37.341	69.770	53.5%

Table B(M) furnishes ultimate rates for use in valuation of critical illness insurance liabilities pertaining to standard aggregate risks (smokers and non-smokers combined) in the UK. It also shows Dash & Grimshaw’s best estimates of 1990 UK population critical illness incidence rates for an epoch not very far removed from the Irish Table (IC94). Of particular interest is the sharp “notional” calibration from the population rate to the IC94 rate. At age 30, the male calibration factor is 71.6%. This means that calibration from population to insured lives (ultimate) yielded a discount of 28.4%. The discount becomes even larger at higher ages. At age 60, it is 53.3%. This is all the more remarkable, since the Dash & Grimshaw rates cover only heart attack, stroke, and cancer, while IC94 includes a number of other Critical Illness conditions.

A similar phenomenon is visible in the Female Table B(F), except at the very young ages, where it would appear that calibration from population to insured lives produces loadings, not discounts. At age 20, this loading amounts to an addition of 65.2%. This is possibly explained on the basis of the Dash & Grimshaw 1990 population cancer rates, which were based on official cancer numbers that were incorrectly compiled by the

## ***Critical Illness Primer, Part Two: An Overview of Foreign Critical Illness Claims Experience***

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authorities. It is of interest to note that almost the entire Critical Illness risk for young females emanates from cancer; heart attacks and strokes among young women are very rare indeed.

Additionally, it might be argued that cancer risks are less susceptible to elimination by underwriting and are in their nature somewhat more like accident risks in the sense that cancer incidences are seldom presaged by morbid conditions of any kind. Thus, heavy calibration from population to insured lives for young females is not to be expected.

*The UK 2000 Critical Review.* (“A Critical Review. Report of the Critical Illness Healthcare Study Group”)

This important study was published by an official Study Group associated with the Institute of Actuaries and the Staple Inn Actuarial Society in London.

The Study Group’s original purpose was to produce tables on the basis of an insured lives experience. The study group found that available data was too sparse to enable fulfillment of this objective. Thus, the Study Group’s objective was modified to one of producing a Critical Illness Base Table (CIBT93) on the basis of population experience in the U.K.

The Study Group expressed the hope that the table would be found useful by practitioners who could calibrate the rates to apply to particular business portfolios within their distribution scope.

The CIBT93 tables are much more extensive than those produced by Dash & Grimshaw in 1990. The CIBT93 working party produced population Critical Illness incidence tables not only for cancer, heart attack and stroke, but also produced age and sex-specific rates for other Critical Illness conditions including organ transplant, kidney failure, multiple sclerosis, coronary bypass surgery, aorta graft surgery, and total and permanent disability.

In Table C(M) and Table C(F) below, we furnish a comparison of the CIBT93 Tables with those of Dash & Grimshaw. Since the Dash & Grimshaw rates were in respect of cancer, heart attack, and stroke only, we have extracted only these three conditions from the CIBT93 tables.

### **Table C(M):**

**Comparison of Dash & Grimshaw Population Critical Illness Incidence Rates and CIBT93 Table. (Annual rates per 1,000 males)**

Age	Dash & Grimshaw (1990)				Critical Review 2000			
	1990 Cancer	1990 Heart	1990 Stroke	1990 Total	CIBT93 Cancer	CIBT93 Heart	CIBT93 Stroke	CIBT93 Total
20	0.190	-	0.100	0.290	0.216	0.008	0.078	0.302
25	0.240	0.030	0.160	0.430	0.308	0.027	0.113	0.448
30	0.340	0.180	0.170	0.690	0.414	0.092	0.152	0.658
35	0.460	0.580	0.220	1.260	0.566	0.322	0.251	1.139
40	0.760	1.640	0.330	2.730	0.888	0.880	0.449	2.217
45	1.340	3.740	0.540	5.620	1.498	1.604	0.597	3.699
50	2.460	6.030	0.990	9.480	2.767	2.529	1.078	6.374
55	4.550	7.820	1.790	14.160	4.784	3.875	1.647	10.306
60	7.910	9.990	3.300	21.200	8.133	5.265	2.693	16.091
65	12.150	12.610	5.780	30.540	13.568	6.605	3.544	23.717
70	17.880	13.980	10.190	42.050	20.157	7.929	4.781	32.867
75	23.870	15.180	17.680	56.730	27.086	9.706	7.473	44.265
80	29.360	15.370	25.040	69.770	34.301	11.101	9.992	55.394

**Table C(F):**  
**Comparison of Dash & Grimshaw Population Critical Illness Incidence Rates and CIBT93 Table. (Annual rates per 1,000 females)**

Age	Dash & Grimshaw (1990)				Critical Review 2000			
	1990 Cancer	1990 Heart	1990 Stroke	1990 Total	CIBT93 Cancer	CIBT93 Heart	CIBT93 Stroke	CIBT93 Total
20	0.150	-	0.060	0.210	0.210	0.002	0.097	0.309
25	0.300	0.010	0.160	0.470	0.352	0.005	0.141	0.498
30	0.600	0.060	0.180	0.840	0.651	0.021	0.187	0.859
35	0.990	0.160	0.100	1.250	1.154	0.063	0.265	1.482
40	1.580	0.370	0.090	2.040	1.873	0.125	0.431	2.429
45	2.470	0.820	0.350	3.640	2.982	0.259	0.531	3.772
50	3.550	1.610	0.780	5.940	4.525	0.475	0.801	5.801
55	5.000	2.650	1.360	9.010	6.188	0.934	1.090	8.212
60	6.570	3.760	2.430	12.760	8.285	1.692	1.666	11.643
65	8.220	4.970	4.290	17.480	10.259	2.623	2.262	15.144
70	10.220	7.230	8.010	25.460	12.401	3.731	3.148	19.280
75	12.090	9.570	15.700	37.360	14.785	5.311	5.191	25.287
80	14.140	10.610	20.060	44.810	17.133	6.804	7.866	31.803

The CIBT93 rates are generally lower than the Dash & Grimshaw rates, except for women under age 40. Problems with official cancer reporting provided to Dash & Grimshaw were alluded to earlier and may be the reason for this deviation.

Overall, it seems as if the Dash & Grimshaw Critical Illness incidence rates for men and older women may have been somewhat conservative.

The Working party that produced the CIBT93 table also found that insured experience seemed to justify a high population to insured lives calibration discount and also indicated that initial selection was a powerful force in ameliorating early Critical Illness claims experience. Table D below summarizes their findings in respect of male aggregate policies with Critical Illness Rider.

**Table D**

**UK Critical Illness Investigation 1991 - 1997**  
**Policies With Dread Disease Riders Critical Illness Claims Only**  
**Ratio of Actual Experience to CIBT93**

Aggregate Males Age Group	Duration 0 %	Duration 1 %	Duration 2+ %	All Durations %	Duration 0 as % of Duration 2+ %
Up to 30	32%	67%	63%	53%	51%
31-40	37%	48%	59%	51%	63%
41-50	27%	40%	53%	45%	51%
51-60	28%	48%	54%	48%	52%
over 60	39%	48%	54%	51%	72%
All	31%	46%	55%	48%	56%

## ***Critical Illness Primer, Part Two: An Overview of Foreign Critical Illness Claims Experience***

*continued from page 25*

The first four columns of percentages show average calibration effects for the British experience against their new population table, CIBT93. The last column shows the clear beneficial effect of initial selection, even in a portfolio where really "ultimate" risks are "practically absent."

The Critical Illness Healthcare Study Group concluded that the beneficial effects of initial selection were markedly demonstrated by the experience data, that earlier concerns about anti-selection seemed to have been exaggerated, that combined general experience had followed an improving trend against the calibrating table until 1996 with a possible slight worsening in 1997.

The Study Group noted that the ultimate experience was still in development because so much of the exposure was still immature. This lack of maturity may account for the finding that smoker/non-smoker differentials were smaller than generally found in life insurance investigations. Finally, the Study Group commented on the considerable variation in experience between insurance companies, which could be somewhat correlated with

differences in underwriting that are typical of differences in distribution channels.

### **Conclusions.**

The technical and market evolution of Critical Illness Insurance in foreign markets is continuing apace, with all-around positive developments in actual experience as compared to expected experience. The theoretical models first published by Dash & Grimshaw have held up in the market place.

In the United States, product development lags behind the rest of the developed world, hamstrung by structural factors described elsewhere in this Primer.

*Johan Lotter, FIA, ASA, MAAA, is a consulting actuary and President of Lotter Actuarial Partners Inc., 915 Broadway, New York, NY 10010. For additional information about Critical Illness Insurance, see the Lotter Actuarial Partners Web site at [www.lotteract.com](http://www.lotteract.com)*

*Johan Lotter wrote Part Two of this Primer. Alistair Cammidge, FIA of Lotter*

*Actuarial Partners Inc. reviewed it. Part One of this Primer was published in Health Section News of December 2000. Part One of this Primer can be downloaded from the Web site of Lotter Actuarial Partners Inc. at [www.lotteract.com](http://www.lotteract.com)*

### **References.**

- 1) "Dread Disease Cover — An Actuarial Perspective" by Alison Dash and David Grimshaw (1990)
- 2) "Reserving for Critical Illness Guarantees" by the Society of Actuaries in Ireland Working Party, 1994.
- 3) Actuarial Society Of South Africa, Continuous Statistical Investigations Committee. Dread Disease Investigation 1991-1994.
- 4) "A Critical Review. Report of the Critical Illness Healthcare Study Group" (Dinani et. al.) presented to the Staple Inn Actuarial Society in March, 2000.

### ***Erratum to the December 2000 Health Section News***

Please note the following correction to the article "What No One Ever Told Me About the Rate Filing Process" by Karl G. Volkmar, which appeared in the December 2000 edition of the *Health Section News*. An error occurred during the production process of the newsletter. The Health Section Council extends our apologies to our readers and to Karl Volkmar for any inconvenience this error has caused.

The section "Simplicity Versus Complexity" should read:

#### ***Simplicity Versus Complexity***

As an actuary without much practical experience, my inclination was to believe that: a) the more time I put into developing and creating a rate increase filing; b) the more thorough and complete the actuarial memo and the underlying actuarial work; and, c) the more I research and try to anticipate state-specific filing requirements, the faster the filing and approval process should be. My initial response, in retrospect, is that this is generally not true. The following outlines a couple of reasons: a) In some cases, the more information you provide (even if it's not material to the filing), the more questions are generated; and, b) The regulations for a given state can change or be applied differently year-to-year, company-to-company, etc., depending on who reviews the filing, their interpretations of the regulations, etc.

In my experience, the easier a filing is to walk through and explain, the easier the approval process will be. Obviously, we need to be thorough; however, it is usually in the company's best interest to be thorough without being unnecessarily complicated or providing unnecessary detail.

# Estimating IBNR from Authorized Bed Days

by Kevin L. Pedlow

**E**stimating IBNR from authorized days provides greater accuracy than if estimated from membership, given the "right" business environment. This gives rise to lesser restatements and greater confidence in current month expense estimates. The success of estimating from days is tied to many factors including significant membership, comprehensive models, per diem contract structures, and an IBNR effective inpatient authorization processes. This article reviews these factors.

## Statistically Significant Membership

Statistically estimating recent month reserves requires sufficient volume whether estimating from days or members. We develop inpatient reserves from six independent models with membership ranging from 75,000 to 110,000 commercial and 7,000 to 17,000 Medicare risk. These generate monthly acute days from 1,300 to 1,900 (commercial) and 800 to 2,300 (Medicare risk).

The volumes in our models are sufficient to statistically overcome the differences in cost per day of acute, sub-acute and other levels of care. Reviewing our historical inpatient costs, incurred acute days and membership, we find a higher correlation of costs to days, about 0.70, than to that of members, about 0.20. Correlation varies by model, and in no instance does the correlation to members exceed that of days. I believe that estimations can be further improved by use of days at varying levels, however, our lags do not currently separate medical expense by such levels, and the cost to change is not likely worth the benefit. A multivariate model may provide greater value.

Statistically completing open inpatient stays is possible with sufficient volume. We apply estimated continuance based on current duration. Alternatively, the utilization management department can provide estimates for each open stay (provided volume is low).

## Data Effective Inpatient Authorization Process

Much of the success of our inpatient IBNR estimation is due to strong pre-certification requirements and concurrent review of every case, whether on-site or telephonic. Every inpatient stay is entered into the referral/authorization system either prior to admission or shortly after. Daily, the utilization management department approves or denies that hospital day and enters the verdict into the referral/authorization system. This process provides a system with data that is current and does not restate significantly.

There are occasions when authorized admissions do not make their way into the system until well after month end, causing some mis-estimation. Such occurrences are not highly prevalent, and the impact is not considerable, thanks again to volume.

More frequent are hospital discharges that aren't noted in the system until late. This causes stays to be considered open that are truly not, to which we would have added continuance, unnecessarily increasing the length of the stay. These mis-estimations are common, moderate and stable, and are recognized as inherent conservatism in our models.

## Hospital Contract Structure

Our inpatient cost structures are primarily per diem, with some case rates and discounts

from billed charges. Intuitively, this cost structure is conducive to IBNR estimates based on days. I suspect that other contractual structures would provide less correlation of medical expense and days.

## Appropriate Models

Developing the best estimates for IBNR requires sound modeling. We estimate only inpatient costs based on days, recognizing lesser correlation of outpatient costs to days.

Applicable per diems are developed based on completed historical costs per day.

Consistent with the estimation method, costs include all inpatient care being estimated, and days are from the authorization system. Trends consistent with known changes to contracts and charge levels are applied to the historical rates. Choosing trend becomes another opportunity for conservatism.

These models will estimate the most recent months' incurred costs purely from the days and the more distant months' from the lags. "Transitional" month estimates will have a blend of the days and lag estimates through credibility. Transition and credibility choices are driven by many issues, including: claims processing stability, correlation of days to medical expense, and level of restatements of the days. Once transition/credibility is developed for the models, restatements should be monitored and adjustments to credibility can be made as patterns suggest.

*Kevin L. Pedlow, ASA, MAAA, is director of actuarial services at Health America in Harrisburg, Pennsylvania. He can be reached at kpedlow@cvtv.com.*

Inpatient IBNR Model	Correlation of Costs to Membership	Correlation of Costs to Bed Days
CPA HMO	0.004	0.549
WPA/OH HMO	0.299	0.498
CPA PPO.POS	0.382	0.733
WPA/OH PPO/POS	-0.035	0.160
CPA M+C	-0.053	0.838
WPA M+C	0.410	0.922



The Society of Actuaries  
475 N. Martingale Road  
Suite 800  
Schaumburg, Illinois 60173

Web site: [www.soa.org](http://www.soa.org)