HEALTH SECTION NEWS

"For Professional Recognition of the Health Actuary"

Chairperson's Corner

by Bernie Rabinowitz

The entire Health Section Council, including myself as the incoming chair, look forward to serving you this year. First, welcome to our newly elected Council members: Tony Wittmann, Bob McGee, Dan Skwire and Mary Ratelle; and also welcome to our other new team members: Jeff Miller, newsletter editor, and Darrell Spell, annual meeting program coordinator.

The major challenge facing our profession is to provide the actuary with the technical skills, professional

APCs - They'll Change Outpatient Hospital Contracting

by Pat Dunks & Nick Ortner

Medicare's Ambulatory Payment Classification (APC) system could become the reference standard for the majority of non-capitated outpatient hospital contracts, much like RBRVS has for physician contracts. Numerous parallels between the planned APC implementation and RBRVS's implementation exist.

Medicare requires use for reimbursement under the original Medicare fee-for-service program. Providers nearly always know what Medicare pays them for a given service and readily understand reimbursement that is a multiple of Medicare reimbursement.

Prior to APCs and RBRVS, providers in the same geographic area often received different reimbursement for the same service. Health plans had difficulty in comparing providers using Medicare reimbursement as a reference, because Medicare reimbursement could differ for each of their providers.

In This Issue

Editor's Column

by Jeff Miller

Welcome to the March 2000 edition of the *Health Section News*. We haven't sent out a newsletter for a while because we figured that health actuaries had enough material to read these days! However, we're now starting a new millennium, and *Health Section News* will take a new approach to keeping our members informed and entertained.

Bernie Rabinowitz, chair of the Health Section Council, asked me to take this job for the next year. I have been a health actuary for more than 20 years. My father was a health actuary for 30 years before that. Thus, if I seem a bit strange, you all know the reason.

When I started out as a health actuary 20 years ago under the tutelage of Howard Bolnick, we were dealing with run-away trends and a crisis in the small-group market. Somehow, things don't seem to have changed that much. Fortunately, the positive aspects of our profession haven't changed much either. Health actuaries deal with a wide variety of challenges when we go to work each day. We do the best we can, and then deal with a new set of challenges the next day. We may not have solved all of the problems of the health care system, but we have certainly made significant contributions, and we seem to make a good living in the process.

This issue of *Health Section News* includes many excellent contributions. Expect to see even more in June and September. You'll find some technical material, such as "Credibility" by James Robinson, some thought-provoking material such as "The Simple Logic of Health Care Inflation" by Gerry

The Health Section proudly introduces its newest editor, Jeff Miller, from Overland Park, Kansas. Welcome aboard Jeff!

Smedinghoff, and some current events, such as "APC's …" by Pat Dunks and Nick Ortner. I think you'll find all of the other articles to be worth your while as well.

Have a great spring, and I hope to see many of you in Las Vegas in May.

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Chairperson's Corner

development, and continuing education necessary to thrive in tomorrow's world.

For, example, the health care industry is evolving from merely insuring medical expenses to that of managing the delivery of health care. There are new players managing and accepting risk and many don't fully understand what actuaries are capable of doing. Other professionals are becoming involved in the evaluation of some of the financial risk aspects of health care delivery; so it is critical that we carefully study industry shifts and find ways of expanding our areas of expertise accordingly.

Your Council is working with the SOA health practice area committee on these challenges. But we need your help. To succeed we need to communicate with each other, understand our mutual needs, and share knowledge and experience. I therefore urge you to sign up for the Health Section's list serve, if you have not already done so. Don't be left out of the discussion.

Let me now report on our ongoing activities and goals for 2000.

Spring and Annual Meetings

At time of writing, your Council is working on the program content and the recruiting of moderators and speakers for the Las Vegas spring meeting, May 22 to May 24. Bob McGee is the program coordinator for the 33 healthcare sessions and Dan Skwire is handling the six disability income sessions. I look forward to meeting many of you at the Health Section buffet luncheon where Council

members (including myself) will take a few moments to introduce ourselves and will be available for your feedback.

We have also begun work on the program for the annual meeting in Chicago, October 16 – 18. Darrell Spell and Dan Skwire are the healthcare and disability program coordinators respectively.

Newsletter

We are planning to publish three (but preferably four) issues of the newsletter this year. We had a good response to the blast e-mail calling for articles for the June issue. We have made it easier to write articles by offering assistance to contributors. The good news for those of you who have writer's block is that we can use a lot more short articles of 300 to 500 words that express maybe just one thought or observation.

Assisting our editor Jeff Miller is an editorial board consisting of Tony Wittmann, Leigh Wachenheim, and me.

Web Page

For those of you who have not visited our Web page, you can find it on the *www.soa.org* Web site. Click on "Special Interest Sections" and then click on "Health."

We plan on using the Web page to promote our goal of two-way communication with the membership. The page now contains a "Health Resource List" that was put together by the Joint SOA/ Academy Committee for Communication on Health Issues (JCCHI). But this is just a beginning. Tony Wittmann is working

with JCCHI to develop the technology and expand the content of the Web page. We are also looking into including non-SOA resources such as a bibliography (books and journal articles) and links to other Web sites, together with a summary of content.

Communications with the Section Members

We will be exploring ways of using e-mail and our Web page for conducting surveys, soliciting opinions, and creating discussion forums so that we will always be ready for the challenges of tomorrow.

On behalf of the Council I would like to thank retiring Council members Tom Wildsmith (past chair), Lee Launer, and Dale Yamamoto for their contributions over the past three years. Also thank you, John Heins (past annual meeting program representative) and Leigh Wachenheim (past newsletter editor). Finally, thanks from all of us to the SOA staff for their continual assistance and for making things happen.

If you have any thoughts, issues, comments or ideas on the above or other matters, please contact me by e-mail at *BRabinowitz@RadixHealth.com.*

Bernie Rabinowitz, FIA, ASA, MAAA, is executive vice-president and chief actuary of Radix Health Connection LLC in Chicago.

Me? An Expert?

If you are a health actuary who has been working in a particular field for more than a year, chances are that you are at least close to being an expert! Few health actuaries do things the same way, or have even had the same experiences.

Have you learned some lessons the hard way that other health actuaries could learn the easy way? If so, then you are definitely an expert.

The Health Section News would like to help you share your expertise. Please volunteer to write an article by e-mailing me at *Jdmfsa@aol.com* or Bernie Rabinowitz at *BRabinowitz@RadixHealth.com*. Send us your name, phone number, subject, and estimated completion date. We are planning issues for June 2000 and September 2000.

Thank you for your continuing support of the Health Section.

The Simple Logic of Health Care Inflation

by Gerry G. Smedinghoff

Health care inflation is picking up again. The persistent preoccupation among actuaries, economists, policy wonks, and politicians is the perplexing problem of why health care inflation has consistently exceeded the Consumer Price Index (CPI) for several decades. Counting the number of angels that can dance on the head of a pin is a no-brainer compared to the divine mystery of health care inflation. Actually, the answer to the health care inflation puzzle is a simple matter of doing the math.

Consider the decision facing a growing company of how to distribute the fruits of its incremental success. Does it give each employee a $5,000 raise, or should it buy health care benefits for them? If it increases salaries by $5,000:

- 15%, or $750, will go to pay Social Security and Medicare taxes.
- 28%, or $1,400, will go to pay federal income tax.
- 7%, or $350 (and often more), will go to pay state and local income taxes.

This leaves employees with an after-tax raise of $2,500, or half the initial amount.

But, if the employer decides to buy health care benefits instead, none of these taxes has to be paid. Essentially, the employer has two options: (1) allocate profits in cash as salary, half of which will be taxed away, or (2) allocate profits as employer-sponsored health care benefits, and the employees get to keep it all.

The choice between 50 cents in cash after taxes, or an entire dollar in tax-exempt health care, is one of those offers that most people can't refuse. The ultimate effect of this economic perversion is that "health care dollars" are nominally worth twice as much as "taxable income dollars." But, since there are artificially twice as many health care dollars, they're worth half as much.

To see why, imagine this scenario: tonight the IRS seizes the assets of an insolvent shopping mall. The IRS reopens the mall tomorrow morning as the "IRS Mall" with two new rules that separate it from all the other malls and stores.

The first rule states that the IRS will double the amount of money in the wallets of shoppers entering the mall. If you show up at the mall tomorrow morning with $500, the IRS will give you $500 more. So you now have $1,000. The second rule states that the IRS will confiscate half of the cash left in your wallet as you leave the mall. So if you buy $900 worth of goods, the IRS confiscates $50 of the $100 you have left, leaving you with $900 worth of goods and $50 in cash. The net result of your shopping trip is that you are able to buy $900 worth of goods for only $450 of the money you left home with.

Sounds like a great deal, doesn't it? If this actually happened, wouldn't you like to shop at the IRS mall? Do you think some other people wouldn't also like to shop there? As the trickle of new customers turns into a torrent, and then a flood — as the IRS pumps mountains of cash into its new mall — what do you think will happen to the prices of the goods at this mall? If you owned a business, wouldn't you like to set up shop there? So what do you think will happen to the cost of retail space at the mall and the cost of doing business at the mall?

Before you jump to the answers to these questions, here's a hint. What does health care have in common with single-family homes and higher education? Just like the goods at the new IRS mall, all three are subsidized via the Internal Revenue Code (IRC); all three have experienced inflation far in excess of the CPI.

This inflationary subsidy is what I refer to as "Gold's Law" (named in honor of Jeremy Gold, an actuary, to explain the gross inefficiencies of the insurance industry), which states that 95% of a legally mandated cost advantage will end up as waste. If the government grants an industry a 100% cost advantage, the industry will become about 5% more efficient and squander the rest (Note: this is not the case in the private sector. Microsoft and Intel drastically cut the prices of their products and pass on efficiencies to their customers before competitive pressures force them to do so). In other words, by doubling health care spending with the 100% IRS subsidy, insured employees get about 5% more health care at greatly inflated prices, with the uninsured foregoing significantly more, resulting in a net loss of total health care overall.

Gold's Law is the reason why, on average, single-family homes appreciate in value far in excess of the CPI — caused by the additional money pumped into the housing market due to the mortgage interest deduction. It's also the reason why parents have to take out a second mortgage on their home just to put their kids through college — caused by all the tax-subsidized school loans and government scholarships. And it's why we have a "health care crisis" and an "education crisis," but not a "furniture crisis" or a "clothing crisis."

In essence, the IRS Mall is the "Health Care Shopping Mall" (HCSM). You pick up your paycheck — without having to pay any taxes — in the HCSM. And you can spend as much of your paycheck in the mall as you please. The problem is, the only thing you can buy is health care. As you try to exit the mall to buy what you really want (food, clothing

and housing) the IRS lightens your load by half. The only way to avoid the IRS is to buy as much health care as you can — even if it's much more than you want or need. By doubling your money when you enter the HCSM, the IRC fuels

> **"The real problem is not inflation, but the fact that tax exemptions for health care, housing, and education have the opposite effect from the original intention."**

health care inflation. And by confiscating half of your income when you exit the HCSM, the IRC promotes unnecessary use of health care among those insured through their employer.

If you work for a company with health benefits, the 5% net subsidy of the HCSM dictated by Gold's Law is hardly worth the bother. But if you don't, if you're one of the uninsured and on your own in the HCSM, without the 100% IRS nominal subsidy, it doubles the cost of buying health care. The unintended effect of Section 105 of the IRC is to create a "Jim Crow" market for health care, with a privileged class that has access to the tax subsidy and a disenfranchised class which does not. Those in the disenfranchised class are allowed to shop in the HCSM, but the IRS will not double their money when they enter. Hence they must effectively pay twice as much for health care.

The privileged class is generally composed of higher income, with employment stability, salaried, skilled, professional and unionized labor. They purchase health care through their employer on an all-or-nothing basis. Either they buy the full array of health care services (typically costing $5,000 a year or more for family coverage) with the benefit of the tax subsidy, or they buy none at all. Given these two options, most who might represent a $50,000 expense to an employer, prefer to receive a $45,000

taxable salary with $5,000 in tax-exempt health benefits.

The disenfranchised class, on the other hand, is mostly composed of lower in-come, hourly, variable, unskilled, manual labor and the unemployed. They

cannot purchase health care through their employer because to be eligible for the employer subsidy, health care must be purchased on an all-or-nothing basis. And the price of the full array of health care services does not change to accommodate their lower incomes. They are faced with the choice of, say, a $17,000 salary, or $12,000 in taxable income and $5,000 in tax-free health benefits. Since most of these people have very little discretionary income, they prefer to have as much of their pay in cash and are forced to take their chances with their future health care needs. But their individual preferences are ignored anyway, because their employer makes this *fait accompli* decision for them.

In any economic market, wealthy people have two immutable advantages over poor people. First, because they have more money, they are able to buy more than the poor, and in select cases, outbid them for scarce items. Second, because a greater share of their income is discretionary, they have greater negotiating leverage in the marketplace. They can get a lower price via volume discounts. And they have better access to information about the best price available.

The IRC Section 105 tax-exemption gives the wealthy an unnatural third advantage over the poor. It prices the poor out of the health care market in a two-step process. First, it raises the ante

by reducing the tax-exempt purchase of health care to an "all-or-nothing" option with a price tag of $5,000. Then it penalizes the poor locked-out of the employer-sponsored health care market by effectively charging them twice as much when they attempt to purchase health care on an after-tax incremental basis in the HCSM.

So relax. Health care inflation can be explained by the laws of economics as easily as falling apples can be explained by the laws of gravity. The real problem is not inflation, but the fact that tax exemptions for health care, housing and education have the opposite effect from the original intention. They only take resources from one group (generally poorer) and redistribute it to another (generally wealthier), resulting in less health care, housing and education for everyone.

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Credibility Theory for the Health Actuary: The Need for an Inter-Company Experience Study

by James M. Robinson

As health actuaries, we must frequently assess the credibility of data upon which we base pricing, valuation, and other product management decisions. The importance of evaluating data credibility is clearly indicated in Standard of Practice 25 as well as several insurance laws and regulations relating to the use of company-specific claims experience. While there is extensive literature relating to modern credibility theory and methodology, we too often resort to unnecessarily simplistic or arbitrary methods in assigning weight to a block's distinguishing characteristics and observed experience.

The Society of Actuaries Credibility for Health Coverages Task Force has taken steps to provide health actuaries with the tools to properly apply modern credibility theory, including (1) a two-day seminar to present and demonstrate credibility formulas and (2) efforts to specify the inter-company experience data needed to calibrate those formulas. This article summarizes key aspects of both of these steps, especially the need for industry-wide claims data to properly apply credibility theory.

Competing Estimators
Modern credibility theory seeks to assess the relative reliabilities of two or more sources of information relating to a parameter of interest, such as next year's expected per-member-per-month (PMPM) claim cost (pure premium) for a particular insured group. While older approaches to credibility theory might ask, "Is this data source credible?" we now ask, "Which data source is more credible?" or "How can we combine estimates from two or more sources to maximize the reliability of the resulting blended estimate?" Answering these questions requires that we consider the sources of estimation error associated with each data source.

Suppose we are interested in estimating Group A's true underlying PMPM claim rate, hereafter denoted as μ_A. This estimate of μ_A might be used in an experience return calculation for Group A or, after inflation-adjustment, as the basis for rerating Group A. We consider two reasonable estimators. One estimator is taken from a hypothetical industry claim table which, after considering Group A's age/sex distribution, benefit structure and underwriting method, yields a PMPM estimate of $M_A = \$234.44$. The second estimator is Group A's average PMPM claims, $X_A = \$278.14$, observed during the most recent accounting period.

Modern credibility theory suggests an optimal weighted average of M_A and X_A,

$$Y_A = Z_A X_A + (1 - Z_A) M_A,$$

where Z_A, Group A's credibility factor, is determined to minimize the mean squared error (MSE) in using Y_A to estimate μ_A. This optimal credibility factor is inversely proportional to the MSE in using X_A alone relative to the MSE in using M_A alone. That is,

$$Z_A = MSE_X^{-1} / (MSE_X^{-1} + MSE_M^{-1}).$$

How much more reliable is Y_A than X_A or M_A as an estimate of Group A's true PMPM claim rate? It is easily shown that the MSE in using Y, MSE_Y, is given by the equation:

$$MSE_Y = 1 / (MSE_X^{-1} + MSE_M^{-1}) = Z_A MSE_X = (1 - Z_A) MSE_M.$$

Since Z_A and $1 - Z_A$ are fractions, we know MSE_Y is smaller than both MSE_X and MSE_M. Note also that this result implies that MSE_Y is no less than half the lesser of MSE_X and MSE_Y. That is, we cannot expect this simple blending to reduce estimation error by more than 50%. Y_A will not produce results that are an order of magnitude better than are available from X_A or M_A separately.

To compute Z_A we must first estimate MSE_X and MSE_M. MSE_X arises from the variation of the average of individual claims within Group A about μ_A. MSE_M arises from two sources, the variation of inter-company tabulated rates from the true industry-wide PMPM rates, and, the variation of Group A's true PMPM rate, μ_A, from the true industry-wide rate. For convenience, let's call the underlying true industry-wide PMPM rate as it relates to Group A as α_A. Quantifying these sources of error requires that we formulate and fit a statistical model to the underlying claim process.

Mixed Effect Models
The previous example represents the simplest application of credibility modeling. More complex situations involve multiple sources of information regarding a group's expected claim experience. For example, the group-specific variation about an industry-wide risk-adjusted average might be composed of insurer-level effects, group-level effects, and insured-level effects. If we again let X_A denote Group A's observed average claim rate from recent experience, then the previous example assumes a model of the form,

$$X_A = \text{"fixed effect"} + \text{"group effect"} + \text{"sampling error"}$$
$$= \alpha_A + (\mu_A - \alpha_A) + \varepsilon_A.$$

A more elaborate model might look like,

$$X_A = \text{"fixed effect"} + \text{"insurer effect"} + \text{"group effect"} + \text{"insured effect"} + \text{"sampling error"}$$

The "fixed effect" represents the impact of observed risk factors, such as age, sex, benefit type and underwriting, on the tabular PMPM estimate obtained from the inter-company study. In other words, α_A is the true industry-wide PMPM rate for groups sharing Group A's observed risk profile. The myriad of other factors (observed and unobserved) that influence Group A's true PMPM claim rate are grouped by source in the remaining "random effect" components.

The "insurer effect" represents the impact on the expected group claim rate

of factors associated with the insurer (e.g., marketing strategy, underwriting expertise and methodology), that are not completely reflected in the risk-adjusted "fixed effect." All groups within a specific insurer would share the same "insurer effect" value. This value would vary from insurer to insurer throughout the industry, with the average effect being zero.

The "group effect" represents the impact of characteristics of the group, such as geographic location and industry type that are not reflected in the "fixed effect" or the "insurer effect." The "group effect" is shared by all insureds within the same group. The effect varies from group to group, but has an average value of zero.

The "insured effect" represents the impact of aspects of the individuals within a group not already reflected in fixed or the other random effects, such as athletic habits and generic disposition. This effect would be unique to each insured in the group. New entrants to the group would share the same insurer and group effects, but would introduce new insured-level effects to the group's expected claim rate. Repeated observations over time from the same insured would share the same "insured effect."

The "sampling error" is associated with random fluctuation of actual average claims rate about the true PMPM value for Group A.

Fitting these "mixed effect" models involves estimating fixed effect parameters and the variances of the random effect components. This requires individual insured claim data from several companies and groups. Fixed effect parameter estimation is similar to conventional regression analysis. Such analysis provides best estimates of the parameters, as well as assessments of the reliability of the parameter estimates. Our focus with the random effect components is on variance estimates. Temporary estimates of the random effects for each contributing company, group and individual are employed to impute the variances of the random effect terms. Absent modern computing technology, the volume of calculations would be prohibitive. Luckily, the computing hardware and software (e.g., the SAS MIXED procedure) exist to allow the authors of industry tables to fit these mixed effect models to inter-company claim data. In fact, the task force was able to fit such a model to data provided by one of its members. While the results were encouraging, it was clear that a much larger volume of claim data was needed to reasonably estimate the random effect variances.

Once fit, these models can be used by actuaries at large to estimate the unobserved random effects (insurer, group and individual), which are used as adjustments to M_A, the fixed effect estimate. This process involves blending industry-wide, insurer-level, group-level and insured-level claim rate observations. The mathematics expands from a simple weighted average of M_A and X_A, to a matrix weighted average of vectors of candidate estimators, but remains within the reach of a company actuary with access to spreadsheet software.

Use of Hypothetical Inter-Company Results

In this section, we demonstrate how the results of a hypothetical inter-company study might be employed by a health actuary to blend industry-wide, company-wide, and group-specific data to estimate the true PMPM claim costs for Group A. To simplify the presentation, we assume only a few fixed effects (underwriting / benefit type, age group and sex) and only two random effects, an insurer effect and a group effect. So, the model form is:

$$X_A = \alpha_A + \beta_C + \gamma_A + \varepsilon_A, \text{ where,}$$

α_A denotes the true average fixed effect for Group A,

β_C is the realized value of the insurer effect for Company C, the insurer of Group A,

γ_A is the realized value of the group effect for Group A, and,
ε_A is the sampling error for Group A.

We wish to estimate the realized value of $\mu_A = \alpha_A + \beta_C + \gamma_A$; i.e., the true PMPM claim rate for Group A. In this example, assume that we have four observed values that can be used to estimate μ_A:

X_A, the observed PMPM average claim rate for Group A

M_A, the inter-company table estimate of α_A, derived as the sum of the tabular PMPM claim cost values for each member of Group A

X_C, the observed PMPM company-wide average claim rate for Company C, and

M_C, the inter-company table estimate of α_C, the company-wide fixed effect for Company C, derived as the sum of the tabular PMPM claim cost values for each member covered by Company C.

From these observed values, we can construct three reasonable estimators of μ_A:

X_A, since X_A varies about μ_A,

M_A, since μ_A varies about α_A and M_A is an estimator of α_A, and,

$X_C - M_C + M_A$, since μ_A varies about $\alpha_A + \beta_C$, M_A is an estimator of α_A, and $X_C - M_C$ is an estimator of β_C.

We consider a linear blend of these estimates,

$$Y_A = Z_A X_A + Z_C (X_C + M_A - M_C) + (1 - Z_A - Z_C) M_A.$$

The weights, Z_A and Z_C, are computed to minimize MSE_Y, the mean squared in using Y_A to estimate μ_A. MSE_Y is a quadratic function of Z_A and Z_C in which the coefficients are functions of the variances and covariances of M_A, M_C, and the random effect terms of the model. The quadratic function can be differentiated with respect to Z_A and Z_C to obtain z-values that minimize MSE_Y.

Credibility Theory for the Health Actuary:
The Need for an Inter-Company Experience Study

Assume that our inter-company table includes estimates of the random effect variances, i.e. $\text{Var}(\beta) = 20^2$, $\text{Var}(\gamma) = 30^2$, and $\text{Var}(\varepsilon) = 2,000^2$. In the following table, fixed effect M-values and standard deviations are shown for 48 combinations of underwriting / benefit type, sex, and age group. Starting with these tabulated values, the health actuary can derive a credibility-adjusted estimate of Group A's expected monthly claim cost. The table below shows several of the necessary intermediate calculations.

For each of the 48 fixed effect cells, company-wide and Group A insured counts are shown, along with weighted average fixed effect estimates of $M_C = 197.34$ and $M_A = 234.44$, respectively. The corresponding variances are $\text{Var}(M_C) = 11.08$ and $\text{Var}(M_A) = 27.62$ and the covariance is $\text{Cov}(M_A, M_C) = 11.08$.

The observed company-wide and Group A average PMPM claim costs are $X_C = 221.52$ and $X_A = 278.14$, both somewhat greater than the tabular fixed effect estimates. X_A alone is a reasonable estimate of Group A's expected average claim cost. We need to adjust the company-wide average, however, to reflect the difference between company-wide and Group A fixed effect factors. A reasonable adjusted value is $X_C + M_A - M_C = 258.63$. Finally, the tabular estimate of Group A's fixed effect, $M_A = 234.44$, is a third reasonable estimate of Group A's expected average monthly claim cost.

There are $n = 36,096$ company-wide insureds and $n_A = 1,000$ Group A insureds. We also see that there are 20 insured groups comprising the company-wide data.

Fixed Effects					Company		Group A	
UW/Benefit	Sex	Age Grp	Average	Std. Dev.	#	%	#	%
A	M	<25	100	20.0	1,000	2.8%	55	5.5%
A	M	25-34	130	14.1	2,000	5.5%	105	10.5%
A	M	35-44	185	12.6	2,500	6.9%	160	16.0%
A	M	45-54	260	14.1	2,000	5.5%	150	15.0%
A	M	55-64	375	16.3	1,500	4.2%	110	11.0%
A	M	65+	515	31.6	400	1.1%	45	4.5%
A	F	<25	90	25.8	600	1.7%	33	3.3%
A	F	25-34	117	18.3	1,200	3.3%	63	6.3%
A	F	35-44	167	16.3	1,500	4.2%	96	9.6%
A	F	45-54	234	18.3	1,200	3.3%	90	9.0%
A	F	55-64	338	21.1	900	2.5%	66	6.6%
A	F	65+	464	40.8	240	0.7%	27	2.7%
B	M	<25	85	16.9	1,400	3.9%	0	0.0%
B	M	25-34	111	12.0	2,800	7.8%	0	0.0%
B	M	35-44	157	10.7	3,500	9.7%	0	0.0%
B	M	45-54	221	12.0	2,800	7.8%	0	0.0%
B	M	55-64	319	13.8	2,100	5.8%	0	0.0%
B	M	65+	438	26.7	560	1.6%	0	0.0%
B	F	<25	77	21.8	840	2.3%	0	0.0%
B	F	25-34	99	15.4	1,680	4.7%	0	0.0%
B	F	35-44	142	13.8	2,100	5.8%	0	0.0%
B	F	45-54	199	15.4	1,680	4.7%	0	0.0%
B	F	55-64	287	17.8	1,260	3.5%	0	0.0%
B	F	65+	394	34.5	336	0.9%	0	0.0%
Total			197.34		36,096	100.0%	1,000	100.0%
Fixed Effect Estimates					197.34		234.44	
Estimate Variances					11.08		27.62	
Estimate Covariance					11.08			
Observed Average Claims					221.52		278.14	
Number of Groups in Company					20			

The actuary is now ready to compute Z_A and Z_C. The two-by-two system of equations resulting from setting the derivatives of MSE_Y with respect to Z_A and Z_C equal to zero is summarized as:

$$\begin{bmatrix} 566.90 & 546.83 \\ 546.83 & 5327.62 \end{bmatrix} \cdot \begin{bmatrix} Z_C \\ Z_A \end{bmatrix} = \begin{bmatrix} 436.02 \\ 1327.62 \end{bmatrix} \Rightarrow \begin{bmatrix} Z_C \\ Z_A \end{bmatrix} = \begin{bmatrix} 566.90 & 546.83 \\ 546.83 & 5327.62 \end{bmatrix}^{-1} \begin{bmatrix} 436.02 \\ 1327.62 \end{bmatrix} = \begin{bmatrix} 58.7\% \\ 18.9\% \end{bmatrix}$$

So, the optimal weighting of the three estimates is 18.9% of the Group A average, 58.7% of the company-wide adjusted average, and 22.4% of the inter-company fixed estimate for Group A. The following table shows the results of applying these weights.

Source	Estimate	weight	Stdev
Tabular Estimate for Group A	234.44	22.4%	36.44
Observed Group A	278.14	18.9%	63.25
Observed Company (adjusted)	258.63	58.7%	31.98
Blended	256.89	100.0%	28.65

Also shown in the previous table are the standard deviations of each of the separate estimators, as well as the optimal blended estimator. You can see that the blended estimate is more reliable than any of the separate estimators.

The actuary can also extract the optimal value of Z_A subject to $Z_C = 0$ and the optimal value of Z_C subject to $Z_A = 0$ by setting the off-diagonal entries in the matrix to zero and resolving the system. This produces values of 24.9% and 76.9% of Z_A and Z_C, respectively. Application of these restricted cases is shown in the following tables.

Using Only Group A Average Observation

Source	Estimate	weight	Stdev
Tabular Estimate for Group A	234.44	75.1%	36.44
Observed Group A	278.14	24.9%	63.25
Blended	245.33	100.0%	31.57

Using Only Company-Wide Average Observation

Source	Estimate	weight	Stdev
Tabular Estimate for Group A	234.44	23.1%	36.44
Observed Company (adjusted)	258.63	76.9%	31.98
Blended	253.04	100.0%	31.50

So, if only the inter-company tabular estimates and the Group A average are employed (the original situation in the original example), most of the weight (75.1%) should be given to the inter-company estimate. If only the inter-company study and the company-wide claim cost estimate are employed, then most of the weight (76.9%) is applied to the company-wide estimate.

While purely hypothetical, the previous example shows how an actuary can use inter-company estimates of fixed effect parameters and random effect variances to determine appropriate weighting factors. No elaborate statistical analysis package is needed. All that is required is an understanding of the methodology and a spreadsheet-level computational assistance.

Conclusions

Computational technology has advanced to the point that it is now practical to apply modern credibility methods to everyday problems faced by health actuaries. The Task Force has demonstrated the feasibility of these calculations in several seminar case studies, including the analysis of a large block of medical expense insurance data. In this process, it has become clear that an inter-company experience study is needed to reliably estimate the variance and covariance parameters of the medical expense claim process.

- How much variation is there in expected claim costs from insurer to insurer throughout the industry?
- How much variation exists between expected claim costs from group to group for a given insurer?
- How much variation is there from insured to insured within a group?
- For a specific insured, what is the variance of actual claims about the insured's expected claims for a period?
- How are these variations correlated within a given time period and across time periods?
- What characteristics of the insured, the group, the insurer, and the industry influence these variances and covariances?

These "parameters" are the last critical pieces needed to compute optimal blending weights when combining claim cost estimates from multiple sources, such as group-specific, company-wide, or industry-wide average claim costs, allowing the actuary to make the most effective use of available data and, equally important, to assess the reliability of the resulting estimates.

The SOA distributed a recent survey to Chief Actuaries of all health insurance companies asking for their capacity and interest in contributing data to build the first ever industry table of major medical rates as discussed in this article. Certainly, the pragmatic value of this article is only measured by the success of making such a table available. We don't want the efforts by the SOA's Credibility for Health Coverages Task Force to simply end with just another academic discussion. We need a large contribution to bring real value to our profession in this area of health insurance education for the actuary. It was identified as the number one need by actuaries practicing in health insurance. If you haven't seen the request, ask your chief actuary if you work in a health insurance company or plan. Encourage him/her to respond favorably.

(The above article was edited by Thomas J. Stoiber, FSA, MAAA).

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How Significantly Can Health Care Costs Really Be Impacted with Today's Approaches to Disease Management?

by John E. Ragan

Recently I have been reviewing programs related to the treatment of health plan members with various illnesses or diseases. Examples include Disease Management (DM) programs for handling members with diabetes, chronic obstructive pulmonary disease, coronary artery disease, end-stage renal disease, cancer and congestive heart failure, to name a few. Other programs are also being reviewed to handle services instead of particular illnesses. They include services such as for emergency room, radiology, prescription drug and mental health.

All of these programs attempt to reduce the payout that would otherwise result if they were not initiated. If the program works well, then it can very well control the costs of a particular member or service. Some of the major problems, however, revolve around the fact that even if it does work, there are issues related to overlap or co-morbidity. Overlap occurs when more than one program applies to a member with a given disease, and co-morbidity becomes an issue when a member has more than one disease for which there is a DM program.

Overlap would occur, for example, if you develop a provider contracting initiative and a prescription drug initiative to reduce facility and drug costs, while at the same time cover diabetics under a specific DM initiative where an outside vendor was hired to manage the diabetic member's total claims costs. If the total risk pool of diabetic members had a claim PMPM that was reduced 10% in a year's time, one would have to be careful not to credit the vendor with the full savings. This is because some of the PMPM reduction directly resulted from reduced unit costs for facility and drug claims of those members. Co-morbidity would be an issue when you have a member covered under a coronary artery disease program who is also a diabetic (and therefore eligible for the diabetic program also). As a result of this overlap and co-morbidity, projected savings of the DM programs are often double-counted and their true effectiveness is overstated. This makes it even more difficult in determining whether or not the DM program makes sense on a financial basis.

There are also issues related to incorporating these programs into a healthcare environment where health coverage is predominantly provided by employer groups and where providers are used to treating patients without oversight of an outside vendor. Many employer groups are not willing to pay for these programs unless they are guaranteed significant savings from them. Some expect this to be part of the normal course of providing managed care benefits to employees. It is easier to justify paying for treatment provided to an employee than it is to pay a vendor's fee with the hopes of avoiding the utilization of care. On the provider side, some physicians resent another party recommending how to handle their patients. Plus, often the patient gets confused as to who is managing their health: the doctor, the insurer or the vendor.

Even if the above situations can be worked out so as to not over- or under-credit a particular program as to what its impact was on claims cost of a member or service, there is a more significant problem we must address. It is related to the fact that more people are overweight, lack proper exercise and are exposed to significant levels of stress. A recent study by the American Medical Association stated that in the last 10 years, Americans went from 1 out of every 8 persons being obese to roughly 3 out of every 8. Also, we are encountering more cases related to mental illnesses, whether this is because of increased stress, lack of a family support group or just having better methods to appropriately diagnose mental illness. Thus, we would be foolish in thinking that health care costs and trend rates will be lower in the near or even distant future.

In the future, we will be forced to deal with a much higher incidence rate of the more severe types of illnesses, which have a high price tag associated with them. New forms of treatment and technology also contribute to higher claim trends. The problem is that we are "mopping up the messes" instead of stopping the incident in the first place. We offer few programs that attempts to do this. The Dr. Dean Ornish program, which focuses on members with coronary problems, is one type of program that may help reduce the incidence rates of some major heart-related illnesses.

This program incorporates proper diet, exercise and mental wellness into one program. It only makes sense that these types of preventative measures would help reduce future claim costs as compared to an existing disease management

> **"Unless members take more responsibility for their own health, especially through their lifestyle choices, and unless insurers, HMOs, and healthcare providers focus more on long-term outcomes, disease management programs will be ineffective at lowering overall healthcare costs or trend rates."**

program that handles a member after they had a major episode of care.

In contrast to an after-the-fact DM program, preventive measures such as the Dr. Ornish program can significantly

Be There or Be

Square

There is now a Health Section List serve on the Society's Web page *(www.soa.org)*. We hope to use this new communication vehicle to keep Section members informed and facilitate exchange of ideas. More than 500 health actuaries are now participating.

To join the Health Section List Serve, log on to *www.soa.org,* go to Special Interest Sections, and click on Health Section List Serve. It couldn't be easier.

See you there!

reduce or eliminate the impact of a major illness. Often a DM program reduces claim cost temporarily only to see even higher claims incurred a year or two later, especially if an unhealthy person is kept alive from year to year. They are bound to incur significant health care costs as time goes on.

Consider this example of taking care of an automobile. If you wash and wax it and change the oil, filters, and spark plugs, you are likely to get more trouble-free years out of it as compared to if you neglect these items. Once a car gets rust spots, they always come back no matter how well you think they were touched up. Also, the engine won't last as long if the oil and filters are not changed. Of course, there are always exceptions to any case.
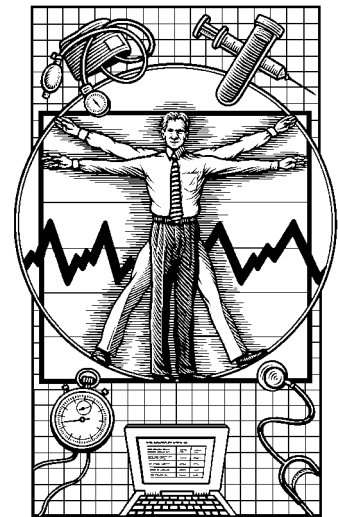
A similar philosophy should be used with health care. Although, that is easier said than done because of today's short-term needs of insurers, employers and members. An insurer cares more about its claims costs today and is less inclined to pay for preventive measures when a member may be under a competing insurer's product in the future. A good example is that many insurers will not cover a $10 flu shot, but will pay for a $45 office visit and $30 for prescriptions once a member does get sick. Many employers won't offer the flu shot as part of their benefit package but must deal with the costs associated with time off from work of an employee who gets sick from the flu.

Another problem is many members feel they can do whatever they want to

their bodies now but they better not be denied top-notch health care if they need it in the future. It would take tremendous changes in the health care environment to alter this type of thinking on the member, employer and insurer's part. It would also be difficult from a provider standpoint because they receive higher income the

more people become ill. Plus, hospitals have the incentive to fill their beds and would have a hard time covering their expenses if they saw fewer patients coming through their doors because of the incidence rate of a major disease being cut in half.

Unless members take more responsibility for their own health, especially through their lifestyle choices, and unless insurers, HMOs, and healthcare providers focus more on long-term outcomes, disease management programs will be ineffective at lowering overall healthcare costs or trend rates. Instead, these programs will be needed just to control trend rates from going even higher.

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Consumer-Driven Health Care

by Stacey Muller

The health care debate continues to consume a significant amount of time on the national political scene. The reforms proposed range from highly focused incremental changes to sweeping revisions. However, the debate often excludes one important variable to the health care equation, the consumer.

Currently, the majority of U.S. population receives health insurance coverage through an employer relationship or government programs. Of those with employer-based coverage, only a proportion has a choice of health insurance options. This results in most employees having limited choice of the type or amount of their health insurance. Chart 1 on this page depicts employment-based coverage.

A consumer-based health insurance market would place the consumer solely in charge of choosing and purchasing health insurance coverage. The type and extent of coverage purchased would be driven by consumer demand and market supply. A consumer-based market will require consumer-friendly information and competition to succeed. This approach to health care financing is shown on Chart 2 on page 13.

Such a dramatic shift in health insurance purchasing would obviously affect the roles of all participants in the health care industry. Some possible implications of consumer-based health insurance on each of the groups included in the charts are discussed briefly.
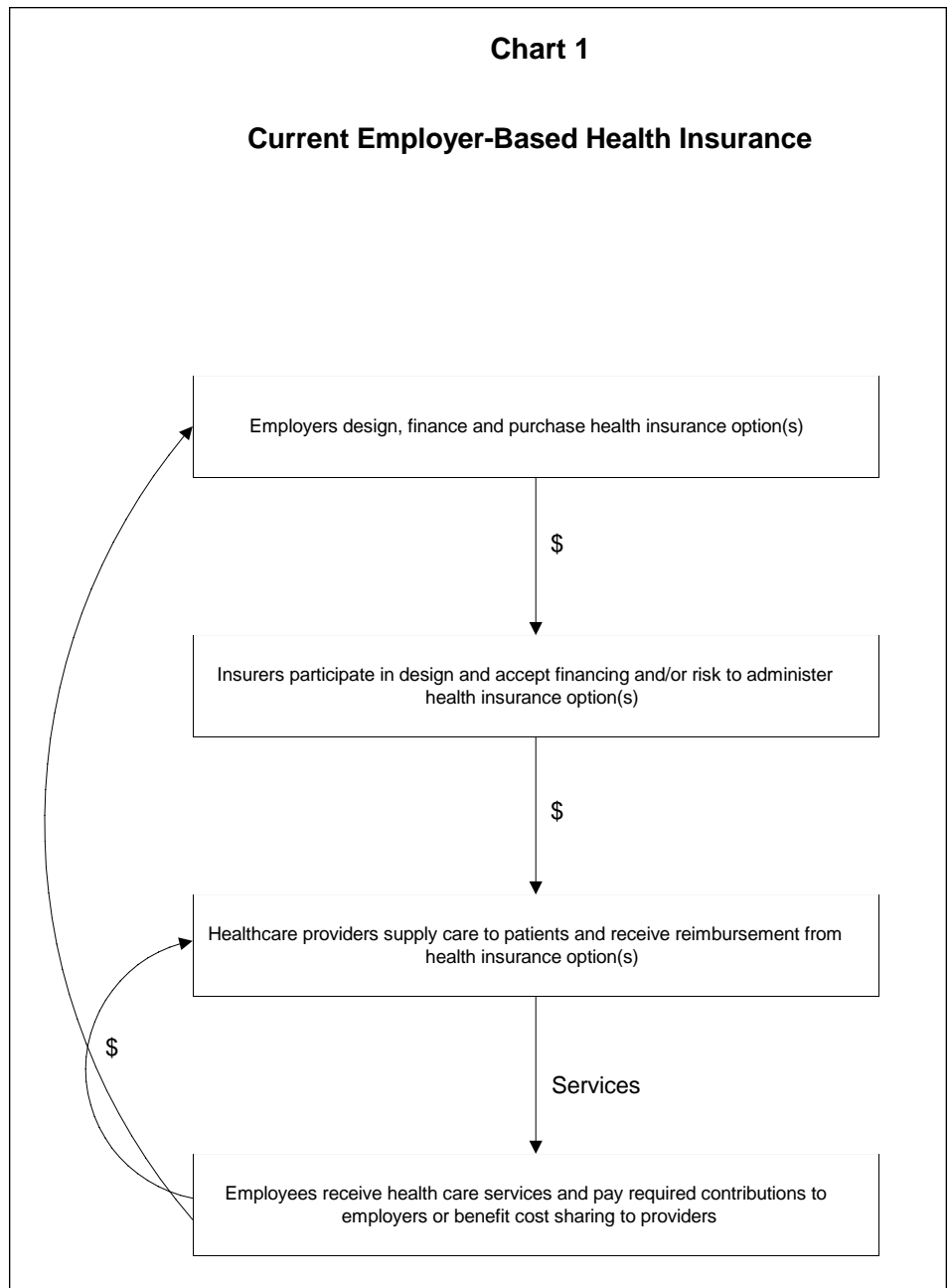
Consumers

Consumers would experience the greatest shift from relatively passive accepters of health insurance to active purchasers. Consumers will require knowledge and/or assistance in selecting and purchasing their health insurance. Their involvement in the selection of a health insurance plan will require an evaluation of the trade-offs between insurance benefits and premium levels.

Since the consumer will choose and purchase the health insurance, the insurance can remain the same regardless of employment changes. And to the extent premiums reflect various underwriting variables, consumers may be encouraged to place greater emphasis on personal responsibility for lifestyle choices. In addition, consumers may become more involved in medical decisions and the evaluation of cost/benefit tradeoffs among treatment options.

Consumers will have more choice but to encourage competition, they must be willing to "vote with their feet" and leave plans they are not satisfied with. Consumers will need to demand comparable information on insurer performance and utilize that information in their health insurance decision.

Chart 1

Current Employer-Based Health Insurance

Employers design, finance and purchase health insurance option(s)

$

Insurers participate in design and accept financing and/or risk to administer health insurance option(s)

$

Healthcare providers supply care to patients and receive reimbursement from health insurance option(s)

Services

Employees receive health care services and pay required contributions to employers or benefit cost sharing to providers

$

One key detail for consumers will be the impact of underwriting. Too much underwriting may prevent consumers with significant medical needs from acquiring adequate or affordable insurance. On the other hand, too little underwriting may encourage consumers with few medical needs to forego coverage in the short term. In either case, these uninsured consumers pose a problem to the health insurance system. Underwriting may need to encourage continuous coverage without interfering with consumers' ability to exert competitive pressure by changing plans.

The level of underwriting and pricing variables allowed in a consumer-driven market will require significant debate to strike the right balance. Whether that balance can be achieved remains to be seen. It also remains to be seen whether consumers are ready to take on the health insurance purchasing role.

Employers

Employers are the current purchasers and major financiers of health insurance for many consumers. They determine the type, level, and coverage details of the health insurance option or options to be offered to their employees and their dependents. Consumer-based health insurance would require a shift from the role of purchaser and designer to a role solely as financier.

This shift will result in a fundamental change in plan commitment from defined-benefit to defined-contribution for health insurance. Employers may welcome such a shift. However, employees will need considerable assistance to become informed health insurance purchasers. The experience with movement to defined-contribution pension plans has shown employers that not all employees make the best choices. Employers will have a responsibility to educate their employees about this new benefit approach.

A defined-contribution benefit is also more visible and easily compared from one employer to the next. Depending upon the employer's labor market, this may or may not be desirable. Certainly union negotiations will be refocused to account for the quantifiable benefit value.

Employers will also have to deal with pressure to reduce subsidies to employees with families (i.e., all employees receive equal contribution). This subsidy is often hidden by the way in which the defined-benefit plan is presented to employees. A defined-contribution approach may encourage employers to reduce their financial commitment to health insurance, however, such reductions occur now in defined-benefit plans through increased cost-sharing or contributions.

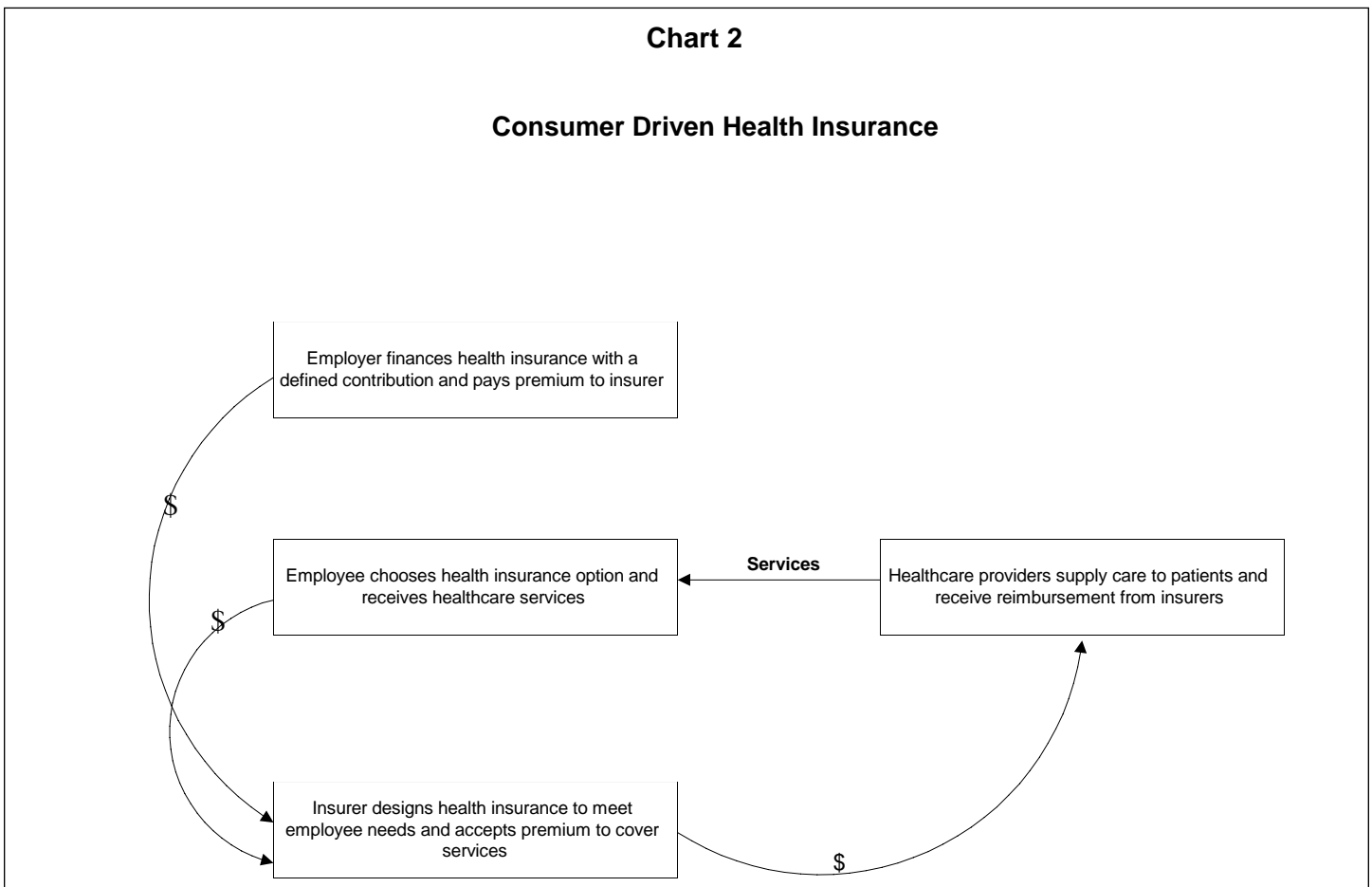## Insurers, HMOs and other Health Insurance Plans

The introduction of consumer selected and purchased health insurance will have significant impact on the entities supplying the health insurance products. Among these are:

• Need for greater capitalization to meet long term commitments

Chart 2

Consumer Driven Health Insurance

Consumer-Driven Health Care

- Product innovations needed to maintain competitiveness
- Consumer-centered culture to improve administrative systems and customer service

Health insurance may begin to take on characteristics similar to whole life policies rather than term insurance. For example, medical savings account policies could be considered cash value health insurance policies. A health insurance product might be designed with components similar to universal life. A side fund is available to hold contributions during younger ages when term premiums are lower in anticipation of higher term premiums at older ages.

Considering that consumers use their health insurance much more frequently than say life or auto insurance, competitive insurers will need superior customer service or product designs to attract and maintain market share. And as mentioned earlier, underwriting will pose a challenge to insurers.

The ultimate financial impact on health insurance affordability will be a major consideration in comparing a consumer-driven health care system with the current system or other suggested alternatives.

Health Care Providers and Delivery Systems

Health care providers often criticize managed care as interfering in the patient/physician relationship. Consumer-based health insurance may provide an opportunity to strengthen this relationship as patients may change their health care provider fewer times. However, consumers will also likely increase their scrutiny of physician's practices, especially when deciding among treatment options.

Health care providers may find a need to alter their practices to address consumer issues directly, such as:
- Greater integration across the care continuum

- Increase focus/emphasis on wellness rather than the disease treatment
- Patient-centered culture to enhance medical outcomes and patient satisfaction.

Health insurance coverage may continue to include network elements. However, consumers will have more discretion regarding provider relationships. Consumers will evaluate and choose providers more directly. Providers that present a full spectrum of care that offers convenience (all in one building) or coordinated services (shared medical records) may have an advantage. Even providers in the current environment are finding that patient-centered cultures assist in maintaining a patient base, especially for fixed facilities. To the extent consumers connect the cost of health insurance with their overall health status, consumers may prefer providers with a wellness focus.

Overall Implications

This brief discussion has outlined some of the implications of a consumer-driven health care system to specific participants. These and many other issues would need to be addressed before such a system could become a reality. However, there are perhaps two key concepts that may bring consumer-based health insurance closer to reality; for example, regulatory and income tax issues. The first is data management and the second, competition.

Efficient and effective data management would play a large part in a consumer-driven health insurance industry. New technology, especially the Internet and other online applications, has increased the amount and speed of data collection and dissemination. Consumer-based health insurance will require the ability for all health care participants to deal directly with consumers. Consumer education on health insurance alternatives and insurer performance information will need to be customized to meet each consumer's circumstances. Employers may

provide interactive education materials that assist employees to determine the health insurance option that is right for them. Insurers will require efficient means to communicate with consumers and administer their products, from enrollment to claim adjudication, to remain competitive. Health care providers can enhance medical outcomes through rapid dissemination of proven treatment options from a central database directly to providers while the patient is still in the provider's facility.

Competition will play a larger role in health insurance if consumers become the purchasers. The increased choices available to consumers will affect employers, insurers, and health care providers. Competition's role will be to balance the incentives of each group of participants. Employers may wish to lower their health insurance defined-contribution but must still attract and retain employees who will be able to easily compare among employers. Health insurance products with the lowest premiums may not achieve the greatest market share if lower premiums are achieved at the expense of less customer service. Health care providers may find consumers more interested in treatment alternatives and their costs.

The increased availability of data can foster greater competition and greater competition can, in turn, increase the demand for information. Consumer-based health insurance will rely on this cycle to encourage and support this approach to health care reform. However, only further debate and trial will determine the feasibility of this approach to health insurance.

A Message from the President-Elect...Think *NAAJ*

by Rob Brown

As the 1999-2000 president-elect, I recently chaired my first Council of Section Chairpersons. Even before this meeting, my impression of the Sections as the SOA leadership's main connection to the grassroots of this organization was that your contributions are vital to advancing the profession. And, I came away from the meeting even more impressed with the heavy lifting the Sections do. Your hand on the pulse of your practice area assures solid continuing education content for our meetings. Your focused publications and sponsorship of relevant research and other SOA projects are hitting the mark for our members.

I am especially impressed with your publications. I receive — and read — copies of all the Section newsletters, plus the commemorative monographs produced by the Sections for the 50th Anniversary. What a volume of work, pertinent to so many practicing actuaries! My immediate thought was that much of this material is worthy of going to review for the *North American Actuarial Journal (NAAJ).*

WHY THE *NAAJ?*
The *NAAJ* is the premier publication of the Society of Actuaries and its only refereed journal. Two myths about the *NAAJ* are 1) that it is only seeking scientific research done by Ph.D.s, and 2) that if an article has already appeared in another publication it can't be published in the *NAAJ*. In fact, from the beginning, the *NAAJ* has hoped to have a mix of scholarly, scientific papers, articles practical for today's practicing actuary, and wider topics that would appeal to nonactuarial readers. The "Guidelines to Authors" in the *NAAJ* states that "In general, we are looking to publish papers in the *NAAJ* that provide a springboard for the further development of education, research or improved practice." Much of what I see in the Section newsletters certainly meets that criterion, and I believe would have a good chance of being accepted by the *NAAJ.* The only truth to the second myth is that you cannot submit an article that has appeared in another refereed journal or that is copyrighted by another organization. Articles in other SOA publications are certainly eligible.

Many practicing actuaries today have limited time to write articles and may think the *NAAJ* process is too daunting. But, I've been through the process, and it is relatively painless. Why not look through what you've written for Section newsletters or *The Actuary* and consider submitting your best work to the *NAAJ?* You can find guidelines on the SOA Web site under "Publications" or you can request them from Cheryl Enderlein at 847/706-3563.

Still reluctant? Give me a call at 519/888-4567, ext. 5503, or e-mail me at *rlbrown@math.uwaterloo.ca* and we'll talk. Let the profession share your valuable insights.

What Is the Unified Valuation System (UVS) and What Are its Origins?

by Donna C. Novak

The Life and Health Actuarial Task Force (LAHTF) of the National Association of Insurance Commissioners (NAIC) asked the American Academy of Actuaries (Academy) for assistance in the development of an alternative valuation methodology to address many of the shortcomings of the current valuation system for U.S. life and health insurers. LHATF was concerned that the current valuation system does not work ideally for newer life and health insurance products and has led to the proliferation of undesirable variations in state requirements. The unified valuation system is the Academy's response to this request.

In 1997, the Academy Valuation Task Force formed a team to address the problems with the current valuation system that has met regularly since the original charge. After their initial analysis, it determined that the current system has generated a "proliferation of inconsistent requirements that do not adequately address current product design, do not reflect emerging experience, and do not appropriately address significant risks." The task force, therefore, concluded that because of these serious deficiencies in the current valuation system, a revised approach is warranted.

Next, the Valuation Task Force studied the valuation methodologies of other countries. Australia, Canada, and Singapore were studied in depth, since they all have capital adequacy standards that are more forward-looking that the current U.S. methodology. The valuation approaches used in these countries consider business plans and recognize the need for actuarial judgment.

Although the Valuation Task Force considered a number of potential methodologies that would eliminated the deficiencies of the current system, the alternative that has received the most focus is the "S-curve alternative." The S-curve is the probability curve representing the probability that the organization will be viable at some point in the future depending on some set of variables. The appointed actuary would do an analysis of organization's obligations and the assets allocated to support those obligations. If the probability that the assets are not adequate to meet the obligations at specific regulatory levels, regulatory intervention similar to the risk-based capital (RBC) regulatory action levels would be triggered.

The Valuation Task Force has demonstrated the implementation of this concept by drafting a number of tools that would be used in its implementation including a model law, samples of an appointed actuaries opinion with accompanying memorandum, and a sample of a reviewing actuary's opinion. In this paradigm, the appointed actuary's report is reviewed for completeness and compliance by an independent actuary identified as the reviewing actuary.

Because of the importance of the viability analysis to the organization, it would be required that it be presented to management and the board of directors indicating the insurer's ability to carry out its business plan. Many feel that even if the S-curve approach is not implemented as a regulatory tool, it is important for good corporate management that this type of analysis to be done.
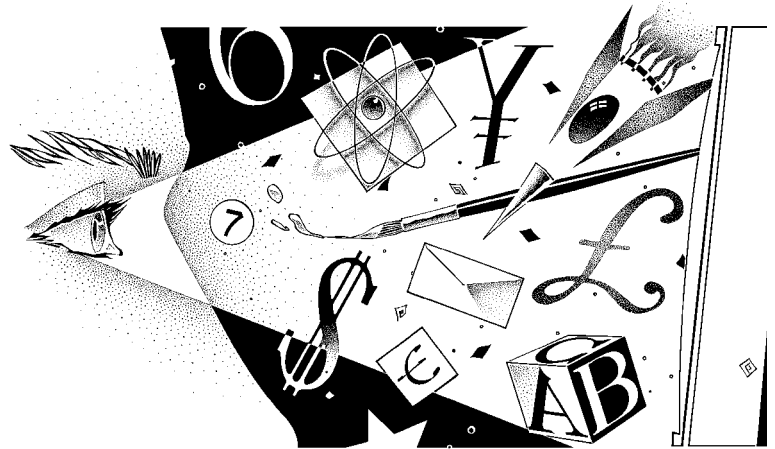
Without a forward-looking analysis of risk, organizations do not have adequate information concerning the level and makeup of current risk and the probability that the organization will not be able to cover these risks with current assets and financial strategies.

The unified valuation system approach provides holistic financial information and enables the insurance industry to find a new dynamic dimension of service and protection. It is addresses "overall asset adequacy rather than contract reserves, by testing all of the material obligations of the insurer and not just those specifically associated with insurance for the full duration of those obligations reflective of the actuary's professional judgment concerning the future viability of the insurer." In doing an analysis of the ongoing viability of the company, it is flexible, permitting the appointed actuary to recognize the company's cash flows pursuant to appropriate assumptions that would be revised over time to reflect changes in the insurer's circumstances.

Objectives of UVS

The Valuation Task Force identified three objectives of valuation that must be satisfied for any new valuation system:

1. Evaluation of the ability of a company to execute various business alternatives

2. Evaluation of the adequacy of resources relative to obligations

3. Measurement of changes in resources relative to obligations

The Valuation Task Force identified as its future work the defining of a unified valuation system that would meet all three of these objectives.

Framework of UVS

The Valuation Task Force set out the following framework for a unified valuation system:

1. Provide information to policyholders, regulators, and others to assist them in making informed judgments about insurers' financial condition.

2. Support financial analysis both at points in time and over time.

6. Balance practicality, cost, and resource effectiveness in relation to the value of the information to the audience.

7. Be consistent for all companies and among regulatory jurisdictions.

8. Be flexible; e.g., be able to accommodate unidentified future needs.

9. Utilize actuarial judgment in the development and interpretation of results in preference to prescribed methods and assumptions.

10. Accommodate materiality issues.

Year 2000 Goals for UVS

The Valuation Task Force will pursue the following three items with LHATF:

1. Requirement of a viability report

2. The best way to include High Impact Low Frequency events in the report

assumptions. Multiple lines of business will be modeled independently using common assumptions and then brought together into a company-wide model. Output will be designed to support general management decision making, as well as, the viability report.

Working with academics, the Valuation Task Force will get input from leading experts in the country on how to structure and implement an S-curve approach. This effort started the first week in January with a meeting in Chicago where leading experts in economics and statistics from the top schools met with the Valuation Task Force to discuss UVS. Further discussions will talk place during the spring and summer.

In the fall, the Valuation Task Force is planning a one-day seminar on UVS in conjunction with the SOA. At this seminar, representative academics will present their perspective on UVS. Also, the individuals responsible for creating the UVS model will describe their process. This should give participants a through understanding of the UVS approach and how to actually implement it in a complex corporate environment.

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> **"The unified valuation system approach provides holistic financial information and enables the insurance industry to find a new dynamic dimension of service and protection."**

3. Address overall solvency, not just contract reserves; in particular, address resources consistent with obligations.

4. Produce auditable and verifiable results and incorporate an actuarial "feedback loop" in which assumptions and projected results are compared to emerging experience.

5. Cover all insurance activities; it is holistic, considers the entire enterprise, rather than merely representing a sum of independent parts.

3. Use of the S-Curve approach in Risk Based Capital for new and innovative products

Additionally, the Valuation Task Force will be working with academics to refine the S-curve approach and will be creating a model that will show how this approach can be used in a multi-line company.

The model will take a stochastic approach to predict the probability of the organization being viability at specific points in time. Input to the model will include economic, mortality, morbidity, loss, expense and corporate strategy

In Search of That Most Elusive Companion to the Health Actuary . . . Data

by Richard A. Kipp

Anyone that has had the pleasure of working as a health actuary for any organization in the health care delivery or insurance industry has been faced with one or more of the following questions:

1. What will the cost be to provide a new benefit?
2. What will the future use of a particular service be?
3. How much could we reduce our costs if we change....
4. Are our members, patients, or policyholders sicker than average?

The list of course goes on, but these questions explore three primary drivers of health care cost change — cost, use and mix of services provided to patients.

To answer these questions, the actuary needs the inquiring mind of a tabloid reader and a data set that is ready for mining.

To be sure there is an enormous amount of data available to actuaries outside of what may be available from the operations of the organization for which they work.

Internal Data

Internal data sources are essential for the actuary to use in forming any opinions regarding the questions outlined above. However, there are many times when the data supply can not be used as the sole source of an analysis. Examples of such situations might be entry into a new line of business (e.g., Medicaid), an insufficient amount of data (e.g., first year of a new product's life), or benchmarking the organization against industry or market standards.

The most difficult of these situations is when an organization's own data is simply too sparse to allow one to use it without testing it for statistical credibility. Considering one's own data a statistical sample of a larger population of data is not a natural way to think for many people (especially the senior staff at your organization). To develop confidence in your analysis of such data, one should calculate some vital statistics, such as the mean and variance of the quality of interest. Once this is done, you can begin to understand how large a data set you would need to obtain a statistically sound estimate of the measure in question.

External Data

Once one decides that external data is necessary, the question becomes where to look. As most readers will have already discovered, no single source contains all the health data that an analyst may desire. The health system that produces the data is fragmented by geography and the self-interests of its participants. Having said that, there are two forces at work that at times seem to work counter to one another in moving us to a world with more detailed data access. The first is an overwhelming desire by states to assure quality care for all. The second is the privacy of that data.

The desire for advancing public health (along with other factors) has moved many states to require hospitals to report all of their inpatient discharges for all payers to a central state repository. The states then "clean" the data and use it for public health and health systems accountability purposes. Many of the states also package it for sale to interested buyers. The variables contained in these files are very detailed. Typically the file is a subset of the uniform billing (UB92) claim information that would be used to bill an insurance company or the Health Care Financing Administration (HCFA). State discharge data sets usually include patient demographics, patient status (discharge status, admit source), utilization and charge data, and diagnosis and treatment information. About 28 states collect physician identifiers, but not all of these states make this publicly available. In addition, most states include non-billing state fields with the discharge data, such as birthweight or gestational age of newborns, present on admission indicators, severity scores, and readmission indicators.

States generally prepare a record-level "public use file" that consists of de-identified or non-confidential data and a research file for public health and approved research. The public use files protect patient identity through encryption and aggregation of sensitive fields (e.g., date of birth is mapped to age grouping, date of admission to quarter of admission plus length of stay). Currently, 44 states collect inpatient discharge data. Twenty-six states are also collecting ambulatory surgical data; 13 collect ambulatory surgery data from free standing facilities. Eighteen collect emergency room data and 11 collect non-surgery, non-emergency data from hospital outpatient departments. Not all of the states allow all potential users access to all data, but the trend is in that direction. As mentioned, due to concerns about confidentiality, you cannot uniquely identify patients in the state inpatient discharge files. Therefore, analysts are limited in their ability to

HEALTH SECTION NEWS

track people across time. However, in some cases you can link re-admission to original admission and by doing so, begin to look at crude treatment outcomes, such as re-admission for infection after surgery. One can also use a field that records discharge status to make observations about the use of sub-acute care in the treatment of various illnesses and also what the mortality rates for various conditions happen to be at various facilities. The state data is being enhanced and repackaged by some organizations. One example is the HCUP, directed and supported by the Agency for Healthcare Research and Quality (AHRQ). AHRQ develops and maintains inpatient data acquired from state government data organizations and private data organizations, which are primarily state hospital associations, to create a national health data information resource for research and comparative analysis. HCUP State Inpatient Database (SID) contains all hospitals and all discharges from 22 participating states. The HCUP Nationwide Inpatient Sample (NIS) database contains a sample of hospitals selected from the SID. It includes all discharges (about 6.5 million per year) from sampled hospitals (about 900 each year). The NIS contains fewer variables than the SID. For example, the NIS does not include detailed payer codes, which vary substantially across the states. Although the sampling frame is limited to participating states, the sample of hospitals in the NIS is selected to reflect characteristics of community hospitals nationwide. The NIS comes with weights that can be used to produce national estimates, regional estimates, and state estimates for participating states.

While 1998 data is available from many states, the most current HCUP NIS and SID data is for 1996. Even though HCUP, NIS and SID data is not as current as the state data sets, it is consistent in that all states' data used for the HCUP data set is mapped into a common format.

Another possible source is the Medicare data that HCFA makes available. Files referred to as BMAD and MEDPAR contain physician and Part "A" claims data for all Medicare beneficiaries. These files do not contain unique individual

beneficiary identifiers, but do allow for analysis of many issues affecting non-HMO Medicare beneficiary costs.

HCFA also makes a data set available that includes the detailed claims data for a 5% sample of Medicare beneficiaries. This data set contains an encrypted patient identifier that allows the analyst to follow a patient's progress across time. As beneficiaries leave the Medicare rolls due to death or switching to Medicare Risk contracts, they are replaced.

The price for state inpatient data ranges from a couple of hundred dollars to approximately $30,000 depending on which state is involved. Missouri, Illinois and Pennsylvania tend to be among the more expensive. Vermont is one of the least expensive. Volume and thoroughness of cleaning tend to be the diferentiating factors. The HCUP NIS costs $160 per year. The cost of the HCFA data mentioned tends to be in the $1,500 – $10,000 range. The exact cost depends on the data sets requested.

HCFA also makes the Resource Based Relative Value Scale fee structure available. This can usually be downloaded from their site (*www.hcfa.gov*) or found published in the *Federal Register* each year after the update. A wealth of information, including the average adjusted per capita cost values used to pay the Medicare Risk Contractors, is available on HCFA's Web page.

New Data Search Project

In addition to the data available from government sources discussed above, are a host of private vendors of data provide information on both cost and utilization of health care services. To help actuaries and other analysts locate appropriate data from this multitude of sources, the Society of Actuaries (SOA) is working with the National Association of Health Data Organizations (NAHDO) to provide a Web-based resource called the National Health Information Resource Center (NHIRC).

The NHIRC was established by NAHDO in 1996 with grants from the Robert Wood Johnson Foundation and the SOA. The NHIRC provides abstracts of available data and links to a variety of

Web sites of interest to health researchers, policy analysts, and actuaries. In 1998, the Health Section Council awarded NAHDO a grant to construct a search engine that would make it easier and quicker to find appropriate data. The SOA Committee on Health Benefit Systems Research (CHBSR) tested this search engine and made it available in on the NAHDO Web site early this spring. More than 500 Web sites are now included in this search engine, including all of the government sources of data discussed previously. The engine also includes Web sites maintained by some healthcare associations. These association sites typically do not contain as much hard data as an actuary would want or need. The CHBSR has instructed NAHDO to make it obvious to the user of the engine which sites contain hard statistics and which do not. NAHDO is also adding search categories for cost and use data as well as links to some additional web sites.

To access the NHIRC search engine from the SOA home page (*www.soa.org*), click on "Links to Other Sites" under the blue "FIND" heading, then click on "Other Pages of Interest." Scroll down and click on the "National Association of Health Data Organizations," then click on "Health Web site Search Module."

In an upcoming issue of this newsletter, we will explore some of the other sources and uses of health data, as well as the privacy regulations that are soon to be enacted. Suggestions for these discussions may be sent to Tom Edwalds, senior research actuary at the Society of Actuaries, (*tedwalds@soa.org*).

(Edited by Thomas P. Edwalds, FSA, MAAA).

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New Managed Care Risk-Based Capital

by Donna C. Novak

At the end of 1998 the National Association of Insurance Commissioners (NAIC) adopted a new managed care risk-based capital formula (MCORBC) for HMOs and Blue Cross Blue Shield Plans. The new formula is designed to provide regulators with the ability to monitor the solvency of the Blues and managed care organizations in the same manner as they monitor the solvency of life and P&C insurance companies that underwrite similar risks. Prior to the new capital requirements, HMOs and certain other managed care organizations had much lower capital standards than insurance companies underwriting similar risks.

To support the new formula, the 1998 NAIC HMO annual statement blank (orange book) and Blues annual statement blank (white book) were significantly modified. Beginning in March of 2001, the NAIC is expected to change the blanks for health insurance companies to one consolidated format, which is consistent for those areas of the blank dealing with RBC.

The NAIC has published an electronic version of the MCORBC formula accompanied by a 32-page instruction document. As it stands, there are still a lot of "gray areas" as to how the inputs to the formula should be interpreted. These gray areas have caused some inconsistency in the application of the formula from company to company. For example there is confusion in the classification of assets and managed care arrangements for the formula. To add to the inconsistency many companies must estimate certain inputs to the formula until computer systems modification can be made.

To give HMOs time to react to the new capital requirements, there is a "phase-in" provision in the formula. The phase-in will involve a gradual increase in the capital requirement — a 12.5% increase in 1999 and an additional 11.1% in 2000. It is important to plan for these increases in capital requirements while determining future premium rate requirements, as well as for other planning purposes. Unfortunately, since the formula is not part of the insurance laws in many states, HMOs are not taking advantage of this phase-in period to build up capital. Once the laws are passed, the phase-in period will be over, and HMOs in these states will have to comply with the total RBC without the advantage of a phase-in.

Recent Activities

The American Academy of Actuaries MCORBC work group is working to modify the disability income (DI), long-term care (LTC) and stop loss (SL) factors. The DI and SL Work Groups are collecting company data for modeling, which will determine the 95% confidence limit for RBC factors. The LTC Sub Group has collected Annual Statement data from the Long Term Care Schedule, but is still debating on the most appropriate model to use. It is possible that the LTC or the SL Work Group could also use the new DI model to verify the results produced from other models.

All of the RBC formula are regularly updated by the NAIC to keep them as current with changing conditions as possible. It is possible that when codification of statutory accounting is implemented that the RBC formula will be adjusted for changes in asset or liability accounting. The NAIC is also reviewing the different treatment of assets and covariance in the life, P&C and health RBC formulas. It is possible that there will be recommendations for changes to the formulas to make them more consistent. The covariance for each formula is significantly different. The different covariance formulas, along with the different relativities between the different risk categories between lines of business, results in varying effects on the final RBC when identical changes are made to the RBC factors in each formula. For example, changing an asset factor by the same amount in all formulae results in different changes in the final RBC. This is because of the different covariances and in the different relative size of the asset risk compared to other risk between life versus health versus P&C companies.

The MCORBC formula assumes adequate levels of reserves. To bring more consistency to the calculation of reserves and thus the RBC ratios, the NAIC is drafting a health reserve guidance manual. The manual covers claim, contract, deficiency, and provider reserves. Companies deviating significantly from this guidance will have RBC ratios that are not consistent with the market. Therefore any analysis of RBC should verify that reserves are adequate.

Market Uses for RBC

While many states have not passed the model regulation for 1999, the NAIC annual statement blanks require the reporting of the RBC ratios, and the filing of the NAIC blank is required by most states. The RBC ratios and the underlying calculations must therefore be considered as part of financial planning. Although RBC was originally designed as a regulatory tool and the NAIC attempted to prohibited its use for other purposes, the ratio is available for the scrutiny of the public, policy holders, providers, competitors, and rating agencies as soon as an annual statement is

filed. Thus, the MCORBC has become a *de facto* standard.

Some insured groups are asking for an HMO's RBC ratios as part of the RFP process. Companies with low RBCs are eliminated from the competition. Employers are very concerned that the HMOs that they contract with will be able to provide services not only for the duration of the contract, but also for future contract years. The problems experienced in some eastern states — where HMOs have pulled out of some geographic areas resulting in employees having to change doctors — are raising general concerns nationwide. In some eastern states, companies have had to change HMOs twice in a year due to HMOs leaving the market or becoming insolvent.

Also, RBC ratios may affect a company's access to future capital. Rating agencies may look at RBC in addition to their own ratios. Some lenders may also look at RBC ratios. Now that RBC ratios are required on annual statements the rating agencies and lenders have access to this information in most states. Even if an HMO decides not to file the information, a rating agency or lender can ask for it and may become concerned when RBC is not readily available.

Company Use of RBC

Companies are finding their own strategic use for RBC. Company use includes return on capital analysis, pricing, strategic market decisions and M&A decisions. RBC has been added to the economic metrics that have to be considered by corporate management.

The MCORBC formula can be used for many strategic purposes. For example, it can be used a management tool to evaluate product-by-product operating performance as a percentage of the capital each product consumes. Companies have seen some surprising results when comparing risk-adjusted profitability. For example, comparing an ASO product to a fully insured product or a small group product to a large group product has sometimes produced results that were not obvious. Product mix decisions can be modeled by seeing if the

proposed changes will increase or decrease the MCORBC ratio. The MCORBC ratio can be combined with advanced financial forecasting tools and serve as an "early warning" indicator for management and can be used to evaluate the impact of possible changes in product or pricing strategy.

When analyzing return on capital, some companies use RBC to allocate capital and profits to different lines of business. This is not a simple analysis. Many decisions must be made when determining the appropriate capital and expenses to be allocated to a line. For example, assets must be matched to each line in order to determine the amount of asset risk a specific line of business would generate. Different types of business use different asset types and horizons and these have different RBC requirements. Additionally free capital and off-balance sheet capital must be allocated. RBC can be on item used to allocate free capital, but other factors should be taken into consideration also. For example ASO business creates very little RBC, but there are other capital investments necessary and a straight proportion of RBC may not be appropriate.

Over time, product, pricing, and operational decisions must be aligned with capital requirements. Some companies believe that by creating and managing to such an alignment, that the natural effect will be to enhance long-term return on capital. With the proper balance between market share and profitability, it is actually possible to implement such a policy.

RBC requirements must be taken into consideration when pricing. For current products, premiums should be sufficient to increase capital to target RBC levels. For new product lines, the premium should be sufficient to not only cover incurred claims cost, administrative and other expenses, but also build-up in capital required by RBC and internal return on capital targets.

When acquiring a block of business or considering a business affiliation, the effect on RBC should be considered. In an acquisition, the amount of capital needed will include the increase in RBC

resulting from the acquisition of the new block of business. The same is true in a merger situation. There have been recent examples of potential business affiliations where, due to statutory accounting rules, the combined entities would not have sufficient capital to meet RBC requirements, although the stand-alone entities were above regulatory action levels.

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Is That Your Final Answer? Face the Challenge of the Future

by Lindsay R. Resnick

So the decision's been made, you have the staying power to remain a competitor in the health insurance business. If that's your final answer, be prepared for change because it continues to be fast and furious. Survival will take extra resources, new expertise, and an incredible commitment from everyone your business depends on. For the carriers taking risk, agents selling business, TPAs managing claims, PPOs negotiating provider deals, or employers buying coverage — health insurance has changed forever.

Undeniably, the health insurance industry is undergoing radical transformation. Traditional medical carriers and managed care organizations alike are finding it increasingly difficult to compete. Tough regulatory conditions, saturated local markets and growing purchaser concern about product affordability are posing major threats to every medical carrier's business. Now, overlay class action lawsuits, risk-based capital (RBC) requirements for health plans and a fiercely competitive e-commerce market.

More than ever, health insurance decision-makers need sophisticated tools to evaluate their options and implement strategies for long-term success.

Can your customer continue to pay the bill?

- Sustained double digit premium hikes
- Escalating prescription drug costs
- Outdated high cost plan designs
- 45 million uninsured...& rising
- "Fewer workers have health insurance on the job"
- "Failure of up to 50% of HMOs not unexpected in 5-10 years"
- "Employer health costs to double in five years"

Start with Value

A practical starting point is a thorough understanding of the value of your business — dissect the underlying compon- ents of your business to uncover what's behind the organization's performance, strategic configuration, market position and financial structure.

A basic "value appraisal" means conducting internal due diligence. This can be applied organization-wide, evaluating every aspect of a business, or targeted to specific operating units and product lines. The result should reveal how the market views your business: what's working internally; what's not, and why; and most important, what will it take to sustain future value. An effective valuation will scrutinize management controls, pinpoint performance measures and inventory an organization's core competencies.

Today, the industry is in a pressure-cooker environment made up of Wall Streeters, private investors, Board members and managers of competing enterprise units looking out for their own interests. Your ultimate benchmark of a final valuation needs to convey an important message: justify future capital commitments and demonstrate your capacity to hit ROI targets.

Companies must position for the future by refining critical business focus, aligning market dynamics securing resource strength, and building on past success.

Know the Competition

Maximizing market position means knowing your competition. Beating competitors requires an ability to evaluate their best practices, understand vulnerabilities and learn from their strategies. Competitive intelligence is an integral part of an organization's strategic infrastructure. However, all too often, gathering and analyzing this information is designated as a secondary or last minute effort. Its focus becomes diluted and simplistic.

To be truly useful, market intelligence must reveal how competitors design and implement pricing, operations, and marketing/sales strategies. This means a disciplined, well-organized effort to collect, interpret, and report information. The goal is to help a company's leaders anticipate movement in the market and

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Competitive intelligence: Break down the basics

1. Rate & pricing comparison
2. Product & benefit assessment
3. Underwriting & operations standards
4. Market targets & position
5. Financial & risk indicators
6. Strategic & leadership review

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know when actions are needed to make internal changes. Results allow a company to address competitors head-on in sales situations, attain product differentiation and recast pricing assumptions. Tomorrow's health insurer will "live or die" by control over market intelligence basics: premium adequacy, managed care value, and operations management.

Don't Be Afraid to Go Outside

It takes resources and talent to survive. Changes in the health insurance and managed care business have caused a shift in the expertise and experience needed to manage effectively. Building this internally can take time and in many markets, it's just too difficult to attract the "right" set of skills.

Many industry leaders have found that external experts help them broaden market strategies and initiate programs that maximize already thin resources. Objective outside expertise helps build responsive, rather than reactive, organizations. These resources fill critical gaps by telling the truth and contributing creative ideas to drive positive change and supplement existing staff.

Health Market Competition: Remember When?

MetLife	Colonial Penn
John Hancock	United Benefit
Mass Mutual	Arbella
New York Life	(Chubb)
CNA	Anthem
Equitable	Health
Nationwide	Woodmen
Mutual Group	Central States
Boston Mutual	Pioneer
Travelers	Prudential
Washington	NWNL
National	Centennial
Pan American	(Jefferson
John Alden	Pilot,
Provident	Provident
L&A	Indemnity)

Rather than invest in recruiting and hiring staff with highly specialized training, many successful businesses use external experts to reach a new level of flexibility. They acquire "hands-on" experts to lead merger and acquisition efforts, provide technical expertise, implement new programs, and evaluate operational effectiveness. The result is a greater level of expense management, access to new business methods, and an immediate return on a smart resource investment — all factors critical to a competitive edge.

Consider All the Options

While it takes backbone and mettle and may not always seem politically correct, consider all your options. Today for example, many health insurers are laboring to identify future enterprise strategies to produce a sustainable market advantage. Sometimes the driver is several consecutive quarters of marginal results. Other times it's a debate over the financial investment needed to take to stay ahead of the game. And for many, product-lines such as small group or individual medical simply are not core businesses anymore. In the end, many discover the best long-term strategy is to divest under-performing assets and exit select markets— by state, by product line, or entirely. While a difficult strategy to put forth, it's often the most practical solution for an inevitable situation.

As pressure mounts for financial or risk turnaround, the objective quickly becomes clean-up the block of business and test market receptivity for a divestiture. The challenge, however, is obtaining the best possible price for an in-force portfolio while finding buyers able to meet proprietary needs: companies that can provide consistent, high-quality health protection for customers and distribution partners.

This means a capacity to arbitrage and manage a business transition. Creating mutually beneficial connections between buyers and sellers is only the beginning. What makes a transaction succeed are a series of customized steps that keep all parties working collaboratively throughout each phase of the process. This means coordinating and sequencing vital administrative and technical details to maximize economic return and minimize business disruption. The result can be a smooth, well-orchestrated business transition.

And that's your final answer: staying power. It will take business acumen, informed judgment and a new set of risk management tools to pull together the ability to succeed in a next generation marketplace. Too much internal focus will lead to bureaucracy, decision paralysis, and missed opportunity. Conversely, over-emphasizing external pressure will result in corporate "tunnel vision," deteriorating infrastructure, and unprepared middle management. Future staying power means the right blend of action-based solutions for businesses facing tough challenges. Your approach must be unique, because your business is unique.

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Disability Special Interest Group

The Health Section Disability Special Interest Group (DSIG) is up and running once again! The DSIG was formed several years ago as a sub-group of the Health Section to create a greater presence for disability issues at Society of Actuaries meetings, as well as to provide a forum for disability insurance actuaries to communicate with one another outside of formal industry events. Dan Skwire has recently succeeded Tom Corcoran as the chair of the DSIG.

The first priority of the DSIG is to update its mailing list, which has grown obsolete. The group recently sent out a mailing, asking for corrections and updates to its list. *If you did not receive this mailing, then you are not on the mailing list.* To sign up for future mailings, please send your name, title, company, address, phone, fax, and email to:

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Milliman & Robertson, Inc.
121 Middle Street, Suite 401
Portland, ME 04101

Phone: (207) 772-0046
FAX: (207) 772-7512
E-mail: *dan.skwire@milliman.com*

The DSIG plans to send out quarterly flyers with information on disability-related industry meetings, opportunities for speaking and writing, and miscellaneous news items and information requests. If you have any items that you would like to include in these flyers, please send them to Dan Skwire. The first flyer will be mailed this fall.

APCs — They'll Change Outpatient Hospital Contracting

Under APCs and RBRVS, providers in the same geographic area receive the same reimbursement for the same service. Health plans learn area Medicare reimbursement levels quickly and can now easily compare providers using Medicare reimbursement as a reference.

Prior to APCs and RBRVS, health plans provider contracts often based reimbursement on fee schedules (home-grown or otherwise) or discounts from billed charges. Fee schedules offered protection against billed charge inflation but were routinely criticized by providers and were expensive to implement and maintain.

Under APC- and RBRVS-based reimbursement, health plans can deflect relative value complaints from providers by pointing out that HCFA sets them and can also rely on HCFA to update the schedules for appropriate reasons (e.g., changes in technology, inflation). Medicare increases will be based on Medicare indices or other formula-driven mechanisms. Historically, Medicare fee increases have been lower than commercial group fee increases.

Because APCs, in a nutshell, form a fee schedule for most hospital outpatient services, health plans will realize APCs' relative ease of use and inflation-controlling nature. We expect many health plans will push to implement APCs as soon as possible.

What is the APC System?

The most recent version of the proposed outpatient hospital payment system consists of 345 Ambulatory Payment Classifications (APCs) that are determined by procedure code (CPT or HCPCS) and, for hospital clinic and emergency room visits, by diagnosis (ICD-9 CM). The APCs grouping procedures are comparable both clinically and with respect to resource use.

The APC system covers facility charges only and is, essentially, a fee schedule that specifies maximum allowable payments for each of the 345 APC groups. When a claim is received, each procedure code or diagnosis is mapped

into the appropriate APC group. If multiple procedures are performed during a single visit to the hospital, more than one APC may be identified, with each APC generating a payment.

While the APC system has been described as a prospective payment system (PPS), we believe that label can be misleading. On the one hand, the APC system determines payment for a given classification regardless of a specific hospital's costs and doesn't pay any more if certain packaged ancillary services are performed. On the other hand, the proposed APC system pays hospitals based on individual services performed. Except for the packaged ancillary services, a hospital will get paid more for doing more for a given patient. Certain charges such as those for operating room, recovery room, anesthesia, and various other services are packaged together.

Scope of APC Services and Providers

The APC system encompasses the majority of outpatient hospital facility services and expenses including:
- Surgery
- Diagnostic testing
- Radiology
- Certain pathology procedures
- Clinic and ER visits
- Partial hospitalization
- Psychiatric visits
- Rehab
- Chemotherapy and chemotherapy drugs

Other outpatient hospital charges will continue to be paid according to non-APC methods, including:
- Ambulance services. Paid by fee schedule, starting as soon as operationally possible after the proposed fee schedule is received (its deadline is February 15, 2000). Current payments are based on reasonable costs or charges.
- Physical and occupational therapy. Paid by fee schedule.

- Speech-language pathology. Paid by fee schedule.
- Services covered under end-stage renal disease composite rates.
- Lab services paid under the clinical diagnostic lab fee schedule.
- Mammography screening. Paid at the lesser of billed charges or a national rate.
- DME, orthotics, and prosthetics currently paid under the DMEPOS fee schedule.
- Certain APC services furnished to inpatients of skilled nursing facilities (SNFs), when covered under the inpatient PPS or the SNF PPS, and billable only by the SNF.
- Costs associated with allied health professionals training. Such costs will be covered on a cost-pass-through basis, as is done under the inpatient PPS.

The APC PPS will apply to the vast majority of hospitals, including those excluded from payment under the inpatient PPS (e.g., cancer hospitals). In addition, certain other types of providers will be included to achieve consistency in payment rates among different sites of service. Providers paid under the APC PPS will include:
- All hospitals, with these exceptions:
  - Critical Access Hospitals will continue to be paid under a reasonable cost-based system.
  - Certain hospitals in Maryland will continue to be reimbursed under the state's payment system.
- Other hospital-based providers (e.g., hospital-based clinics). The new rules define hospital-based providers for the first time.
- Certain services currently paid on a cost-based system when provided by comprehensive outpatient rehabilitation facilities (CORFs), home health agencies, hospices, and community-based mental health treatment centers.

While the APC PPS will apply to most hospitals, the Medicare, Medicaid, and Balanced Budget Refinement Act of 1999 (MMBBRA99) holds the following

categories of hospitals harmless (i.e., their payments will be at least at pre-APC levels, in aggregate):

- Rural hospitals with less than 100 beds (until 2004)
- Cancer hospitals

Payment Mechanism Explained

The proposed APC system details were published in the June 30, 1999 *Federal Register*. In general, the payment amounts for a specific claim are determined as follows:

- The claim is mapped to an APC based on its CPT or HCPCS procedure codes and ICD-9 diagnosis codes.
- National APC rates are used as the starting point.
- The national rates are adjusted based on the geographic location of the provider, using the geographic wage indices that are also used for Medicare inpatient PPS.
- Beneficiary co-payments are determined by formula but are limited to the inpatient deductible amount. For each APC, 60% of the national payment rate is adjusted for wage level variations.

Two examples are included:

- Example #1 on page 26 is relatively simple, with just two HCPCS codes generating one payment from a single APC group (see page 26)
- Example #2 on page 27 is a bit more involved, mapping four HCPCS codes into three APC groups, one of which is defined by a combination of a procedure code and diagnosis code (see page 27)

Please note that the examples do not reflect changes that will occur in response to MMBBRA99. HCFA has not yet announced the details of the expected modifications.

Expected APC System Modifications

In response to MMBBRA99, we expect several changes to the proposed APC system:

- APC implementation will be revenue neutral. In other words, the total payments to all hospitals will be the same as if APCs were not implemented. Under the current version of APCs, total Medicare outpatient hospital payments were projected to be a 5.7% reduction.
- APC implementation will be delayed until 2001 and phased in over a three-year period.
- Beneficiary coinsurance limits will be effective July 1, 2000.
- An outlier provision may be added.
- A transition mechanism for new choices, drugs, and biologicals may be added.
- APC classifications may be refined in response to congressional concerns noted in MMBBRA99.
- A mechanism may be added to update the APCs annually.

Implications and Issues

Modified Payments to Provider:
HCFA projects modifications in payments for outpatient hospital services that will vary significantly according to number of variables, including type of hospital, geographic location, case mix, and the proportion of revenue generated from inpatient versus outpatient services.

In a given geographic area, the same payment will be made for the same services; therefore, hospitals with charge levels higher than other hospitals in the same geographic area should expect a greater reduction in reimbursements.

Outpatient payments to certain types of specialty hospitals may also be significantly affected, including those of urban teaching/non-disproportionate share hospitals, rehab hospitals, psychiatric hospitals, and children's hospitals.

Beneficiary Coinsurance Limits
The coinsurance limits are effective July 1, 2000. The limits are defined by APC but the APC system won't be implemented until 2001. Will hospitals and Medicare Supplement carriers have to determine APC groupings using the most recent version or will HCFA restate the limits by HCPCS code?

Cost-Shifting Increases, Procedure-Shifting Decreases
HCFA estimates that the reduced payments to hospitals will result in a 10% "behavioral offset" by the hospitals. This offset could occur through increases in utilization or billed charge levels, both of which could potentially affect non-Medicare patients as well.

Reduced profits on outpatient procedures may also reduce a hospital's incentive to encourage the appropriate shifting of procedures from inpatient to outpatient.

Increases Indexed
Annual conversion factor updates will be made according to changes in a specified market basket index, less 1%, in each of the years 2000, 2001, and 2002, as required by the Balanced Budget Act (BBA).

Administrative Requirements
To receive full reimbursement, hospitals will need to assign HCPCS codes to all services. Under the current reimbursement system, full reimbursement can often be achieved without coding every service associated with a case. HCFA also expects to revise the UB-92 claim form so that a diagnosis code can be reported for each line item.

While hospitals may be less than enthusiastic to implement APCs unless it is financially advantageous for them, we believe pressure from non-Medicare insurance organizations, greater understanding by hospitals that the APC system does not necessarily mean reduced reimbursement levels, and expected APC system enhancements will lead to APC-based reimbursement becoming common when contracting for outpatient services.

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APCs — They'll Change Outpatient Hospital Contracting

Example #1

Case Description: Patient has outpatient arthroscopic knee surgery to repair a torn ligament.

Provider Location: Seattle, Washington

Part B Deductible Previously Paid: $40

Remaining Part B Deductible: $60

Service	HCPCS Code	APC Group
Arthroscopically aided anterior cruciate ligament repair / augmentation or reconstruction	29888	286 – Arthroscopically-aided procedure
Anesthesia for arthroscopic procedures of knee joint	01382	N/A – Packaged Service

(a)	APC Payment Rate*	$1,423.82
(b)	National Unadjusted Coinsurance Amount*	$ 791.90
(c)	National Unadjusted Coinsurance Percent [(b) / (a)]	55.62%
(d)	Program Payment Percentage [1 – (c)]	44.38%
(e)	Geographic Wage Index	1.1375
(f)	Labor-Related Portion of Expenses	60%
(g)	Area-Adjusted APC Payment Rate [(a) x (e) x (f) + (a) x (1 - (f))]	$1,541.29

Total Payment Received by Hospital

(h)	Part B Deductible Paid by Beneficiary	$ 60.00
(i)	Medicare Payment [(d) x ((g) – (h))]	$ 657.40
(j)	Beneficiary Copayment [(g) – (h) – (i)]	$ 823.89
(k)	Total Payment Received by Hospital [(h) + (i) + (j)]	$1,541.29

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*

   The APC Payment Rate and National Unadjusted Coinsurance Amount were taken from Addendum A of the June 30, 1999 *Federal Register*. For a given APC, Addenda A and B of the *Federal Register* may show slightly different dollar amounts. This is true for many of the APCs, and we expect that these discrepancies will be remedied in the final version of the APC payment system.

Example #2

Case Description:	Patient presents to hospital-based clinic with symptoms suggesting acute lower respiratory illness.
Provider Location:	Seattle, Washington
Part B Deductible Previously Paid:	$0
Remaining Part B Deductible:	$100
Diagnosis Code:	466.0 – Acute Bronchitis
MDC:	33 - Respiratory System Diseases

Service	HCPCS Code	APC Group
Office or Other Outpatient Visit	99214	91533** - High Level Clinic Visits, Respiratory System Diseases
Complete Blood Count	85022	N/A – Paid Under Laboratory Fee Schedule
ECG Recording	93270	956 – ECG Recording
Chest X-Ray	71010	700 – Chest X-Ray

		APC 91533	APC 956	APC 700	Total For All APCs
(a)	APC Payment Rate*	$74.04	$56.05	$41.14	$171.23
(b)	National Unadjusted Coinsurance Amount*	$14.81	$54.47	$22.37	$91.65
(c)	National Unadjusted Coinsurance Percent [(b) / (a)]	20.00%	97.18%	54.38%	53.52%
(d)	Program Payment Percentage [1 – (c)]	80.00%	2.82%	45.62%	46.48%
(e)	Geographic Wage Index	1.1375	1.1375	1.1375	
(f)	Labor-Related Portion of Expenses	60%	60%	60%	
(g)	Area-Adjusted APC Payment Rate [(a) x (e) x (f) + (a) x (1 – (f)]	$80.15	$60.67	$44.53	$185.35
	Total Payment Received by Hospital				
(h)	Part B Deductible Paid by Beneficiary	$80.15	$19.85	$ 0.00	$100.00
(i)	Medicare Payment [(d) x ((g) – (h))]	$ 0.00	$ 1.15	$20.31	$21.46
(j)	Beneficiary Copayment [(g) – (h) – (i)]	$ 0.00	$39.67	$24.22	$63.89
(k)	Total Payment Received by Hospital [(h) + (i) + (j)]	$80.15	$60.67	$44.53	$185.35

*

   The APC Payment Rate and National Unadjusted Coinsurance Amount were taken from Addendum A of the June 30, 1999 *Federal Register*. For a given APC, Addenda A and B of the *Federal Register* may show slightly different dollar amounts. This is true for many of the APCs, and we expect that these discrepancies will be remedied in the final version of the APC payment system.

**

   The APC group for the clinic visit is a concatenation of a three-digit APC group (915) that is defined by the HCPCS code and the two-digit MDC (33). HCFA expects to re-number the APCs in the final version of the system so that all codes will be three digits.
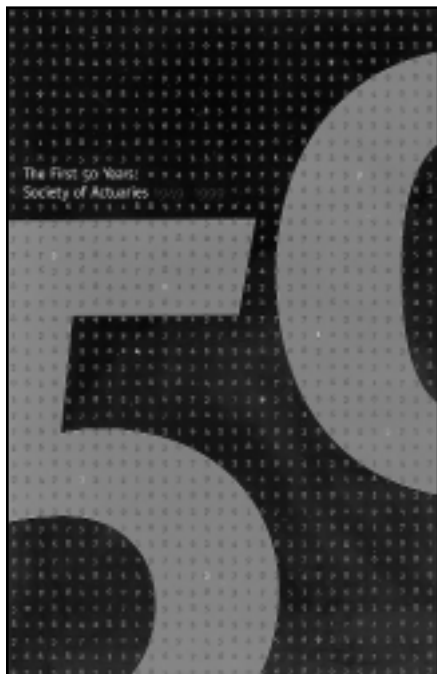
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