RECORD,Volume 25, No. 3*

San Francisco Annual Meeting
October 17–20, 1999

Session 83PD
It's 11 O'clock, Do You Know Where Your Data Is?

Track: Reinsurance
Key Words: Reinsurance

Moderator: MICHAEL W. PADO
Panelists: JOHN P. CARROLL†
STEVEN A. FINCH‡
ALICE B. GOLDSTEIN
NATHANIEL B. WALLMAN§
Recorder: MICHAEL W. PADO

Summary: Historically, margins were such that careful management of assumed business was not required to make a profit. With the current competitive marketplace, it is crucial to understand what you have and what it means. Analysis of your data can be split into three components:

- *Are you getting the quality and timely data?*
- *Are you able to process it?*
- *Are you able to use the information?*

Panelists discuss these issues, review their companies' activities, and conclude with their view of the future direction of data management.

Mr. Michael W. Pado: I'm from AXA Re Life. We are fortunate to have four speakers from the reinsurance industry who will discuss various aspects of data collection, data access, and data security, all from the perspective of enabling you to measure, monitor, and manage your assumed and ceded reinsurance.

Let me introduce our panelists in the order in which they are presenting. First, we have John Carroll. John has been president of TAI for the last 10 years and has been in the reinsurance and insurance industry for more than 25 years. John will provide us with an historical perspective on reinsurance administration and discuss

†Mr. Carroll, not a member of the sponsoring organizations, is President of TAI Inc., in Orland Park, IL.

‡Mr. Finch, not a member of the sponsoring organizations, is an Actuary at Milliman & Robertson Inc., in Denver, CO.

§Mr. Wallman,, not a member of the sponsoring organizations, is Consulting Principle with Computer Sciences Corporation in Stamford, CT.

Note: The charts referred to in the text can be found at the end of the manuscript.

changes in the direct marketplace along with their impact upon reinsurance administration and data in terms of what to ask and what to do with it once you get it.

Our second speaker will be Alice Goldstein. Alice is currently an actuarial consultant for AXA Re Life, where she is collecting, processing, and analyzing seriatim data for both traditional and nontraditional business. Prior to joining AXA Re as a consultant, Alice spent nearly 37 years working with Swiss Re Life and Health in many areas, including corporate actuarial and nontraditional products. Alice feels extremely fortunate to have had the opportunity to work closely with both John Woody of the SOA and Harry Markowitz of Efficient Frontier. She will be speaking about data collection and monitoring issues relating particularly to guaranteed minimum death benefits (GMDB) and living benefits, as well as auditing and augmenting the data—a primer on problem solving.

Our third speaker will be Steve Finch. Steve is an FSA from Manulife Financial in Toronto. He has been with Manulife since 1992 and has experience in valuation, reinsurance pricing, and marketing, as well as financial reinsurance. Steve is moving away from reinsurance to the direct side as the assistant vice president of product management, effective November 1999. He will be speaking about current capacity and retention management issues, providing a retrocessionaire's perspective on other risk-management issues and the implications on reaching informed business decisions.

Last, we have Nate Wallman, a consulting principal with Computer Sciences Corp. in Stamford, Connecticut. Nate has an extensive reinsurance, product development, valuation, law, compliance systems, and finance background. He is a licensed attorney with more than 20 years of experience, having spent 16 years at the Cologne, where he directed the development and implementation of reinsurance systems applications and interface for various clients. More recently, Nate joined Computer Services Corp. to direct the development and implementation of SICS/nt, a life reinsurance system. He will be covering distributed object processing, accessing data via the Web, and what to do with all of the data in terms of storage retrieval and reuse issues.

Mr. John P. Carroll: When Mike first asked me to participate in this panel, my first question was, "Is this another Y2K discussion?" I figured by mid-October of this year that those people who still had problems wouldn't be here at this meeting. They would be back at their offices solving them. Actually, I think, as an industry, the insurance business is in pretty good shape. Most companies that I've worked with and talked to over the last four or five years have had committees working to make their systems compliant. While there may be a few surprises come January 1, I think it's going to be a nonevent for most companies.

My comments, as Mike mentioned, are going to focus on life reinsurance from the ceding company's point of view. Those of you who are responsible for reinsurance administration cannot accuse us administrators of not creating paper and lots of data—whether it's the right data or accurate data may be open to some question.

Traditionally, reinsurance was done on an individual cession basis. A clerk at a ceding company would copy information from the policy administration system or some kind of transmittal that would come from that system and put it onto a cession form and ship it to the reinsurer. Somebody at the reinsurance company would data-enter the information into another system, so there were at least two opportunities for error in that type of reporting.

With the introduction of competitively priced term products in the 1970s and universal life, interest sensitive, whole life, and variable life in the 1980s, that form of reporting became obsolete because premiums were indeterminate and net amounts at risk could fluctuate substantially. Many companies then began doing what we call self-reporting or self-administration. Most of the administration at that time was done on spreadsheets or home-grown systems that had no link to the policy administration system. So, at best, certain transactions may have been missed and often they were not reported in a timely manner.

Of course, in the last five to ten years, every desk in every company has a computer on it, so the ability to be able to transmit data electronically has become more feasible for companies. Companies now are reporting information to the reinsurer via tape and diskette. Some companies are even using CDs. Also, many of you are familiar with electronic data interchange (EDI), the ANCI Group, and the EDIFACT message for transmitting reinsurance data. This medium will not only be used for reporting reinsurance billing information, but also for submitting facultative underwriting papers.

We're also seeing companies that are exploring new avenues, such as value-added networks, which are outside of the Internet, and virtual private networks that use the Internet, but use encryption for transmitting data to various mediums. Again, it's important not only that we can report data on a timely basis, but also that we have the information we need in a usable format for the reinsurer.

Those of you who have been involved in the reinsurance process know that it's transaction-driven. You have automatic new business, renewals, and terminations. You have all kinds of policy changes. Anything that affects the premium or the death benefit has reinsurance implications and needs to be reported to the reinsurers. This includes risk classification changes, mortality, smoking class changes, and nonforfeiture options.

But we're getting into other areas now, because so much of the business is being reinsured. We also are looking to report information to the general ledger and to other reporting systems within the company, such as valuation. This is not only what we want to report to the reinsurer, but also what we want to carry as reserves on our books.

And, with the introduction of the first-dollar, quota-share business, claims are becoming a very important part of reinsurance reporting. When everything was reinsured on an excess basis, usually there were only a few claims during the

course of the year. But now, with almost all new business being reinsured, we have claims implications on just about all policies.

Then there are certain features that are indigenous to reinsurance itself, which are outside the normal life company processing. The first of these is continuations; that is, when a policy converts from one form of coverage to another. If there is no new underwriting, there isn't a new contestable clause and first-year commissions are not paid. The reinsurer has a right to participate in that risk under the new coverage. The reinsurance system has to have the ability to track who the original reinsurer was and provide that business to them, either on an attained-age basis or at original age as provided in the reinsurance agreement.

There is also a facility in reinsurance called recapture. It's the ability of the ceding company to take back the business after the reinsurer has an opportunity to earn its profits on that business, provided that the ceding company has kept its full retention when the policy was issued, has raised its retention, and is willing to recapture all eligible policies.

In the last ten years, there has been a lot of emphasis on retention management, whereby the ceding company wants to track the retention on a life basis rather than on a per-policy basis. And, where there are multiple issues on the same life, it is necessary to link these policies, particularly if there is a claim and an insured has a combination of both retained and reinsured policies at the time of the death.

And, finally, there is what we call retrocession. With all the merger and acquisition activity going on in the industry, we often see ceding between companies within a family of a large group of companies where we have a subsidiary company ceding to a parent company, and that parent company retroceding an excess over its retention to outside reinsurers. Steve Finch will talk more about retrocession from the reinsurer's point of view.

What is really causing the recent growth and demand for better reporting? Obviously, it's the first-dollar, quota-share business. We're seeing more and more companies that are reinsuring a piece of everything that they issue. They're retaining 10% of the risk and ceding 90% to 4, 5, or 6 companies. Instead of having one transaction for every policy issued, there may be up to six transactions. We have a number of companies that are looking to reinsure in-force blocks of business as well, and they're reinsuring these by blocks. In fact, I've worked with some companies that have reinsured more than one in-force block of business to free up surplus and allow them to get into new markets.

And, of course, the merger and acquisition (M&A) activity is paramount among companies today. We find that, in some of these situations, companies that had small amounts of reinsurance were able to do the administration manually, but as they became involved with the M&As, they no longer could handle the volume. Along with the acquisition, they often don't get the information or the people from that company. Typically, the clerks from the originating company are either not offered or not willing to relocate and what the acquiring company receives is

reinsurance in a box. As the acquirer, there are boxes of paper to go through, and often you even inherit a policy administration system that you are not familiar with, so obtaining data is not easy or readily available.

Next, we see a lot of activity with mutual companies. Traditionally, mutual companies did reinsurance on a facultative basis to accommodate their agency force. Many of these companies are now into first-dollar, quota-share arrangements on term products to minimize lapse and mortality fluctuations. Some of these companies are actually lowering their retention and creating more reinsurance than they ever had done in the past to generate surplus when they demutualize.

And, finally, we have good old XXX, which is going to revolutionize the term market. Because so many companies have been involved in the Y2K issues and surplus considerations, many companies are now turning to their reinsurers for product development and surplus relief. The reinsurers, in their turn, for their assistance are looking for a substantial piece of the business. All of these factors combined are working to create a more dynamic reinsurance marketplace.

There has been about a 33% increase in reinsurance from 1993 to 1998over those years. Life new business sales have been flat or with minimal growth, but the percentage of reinsurance continues to grow each year.

The relative growth of the new reinsurance business is up to about 50% right now, compared with the growth of the in–force business, which has been steadily growing. It was relatively flat until 1997. Then there was a huge blip, and this trend seems to be continuing.

Finally, when you think the growth of reinsurance has pretty much peaked, you realize that only about a quarter of the in-force business today is reinsured. There is still a way to go in terms of increased volume of reinsurance over the next several years.

There's an absolute growth in the volume of reinsurance. I think it's more important than ever that companies report data accurately. Many companies are making the hard choices today and investing in systems, software, and internal reorganizations to support their reinsurance business.

Reinsurance companies and ceding companies are getting away from the manual processes that they utilized in the past. It's important that they report information accurately and in a timely basis. Many of the products that these companies are introducing today are being drafted and sold based on reinsurance considerations. The financial strength not only of their own companies but also of their reinsurers is equally important to them in putting together their reinsurance arrangements. Reinsurers are investing in systems to analyze their data and to do this in a more timely fashion. All the new deals are megadeals, the profit margins are very thin,

and the reinsurers and ceding companies can't afford to make mistakes or get left behind in today's turbulent marketplace.

From my position and what I've seen in the industry, the trends that have come about in the last five years are going to continue over the next three to five years. I believe we're going to continue to see more M&As and, with them, the need for reinsurance is going to continue to grow. The good news is that both the ceding and reinsurance companies are making those hard choices and investing in solutions that are going to help them to manage their business.

Ms. Alice B. Goldstein: The *raison d'être* of insurance or reinsurance is the recognition, evaluation, and management of risk. There is a long history of dealing with risks connected with traditional insurance, but only a few years of experience associated with nontraditional products, especially those involving asset-based risk (ABR).

ABR refers to insurance liabilities whose amount and rate of change are a function of underlying account values of equity-linked life and annuity products. As we all know, the capital markets have been extremely volatile these past few years and days, making evaluation and management of ABR very difficult. One of the most important tools used to better understand these risks is the analysis of data. But first we need to collect credible and relevant information, and that's no easy task. We must determine what information is relevant and then use a system, be it homegrown, purchased, or outsourced, that will store the required facts and allow easy access for analysis.

The insurance industry has been concerned with asset/liability matching for many years, but its importance has recently been brought home to us yet again. Nowhere is it of greater significance than with ABR. It is vital to understand both the types and the magnitude of our exposure to risk.

Two of the products we are currently reinsuring, GMDB and variable immediate payout annuity (VIPA), can produce claims immediately. Although guaranteed minimum income benefit (GMIB) and guaranteed minimum accumulation benefit (GMAB) don't incur claims for a number of years by design, both categories must be carefully analyzed and protected.

When considering GMDB, a one-year ratchet is of greater concern than a five-year ratchet, which is riskier than a five-year reset. Depending on the interest rate, a roll-up could range from minor concern in a growing marketplace to tremendous importance in a flat or decreasing environment. As a reinsurer, we are certainly covering the variable risk; that is, when the account value, which fluctuates with marketplace performance, is less than the GMDB. We would also be covering surrender charge risk, which is usually a declining percentage of deposits paid to the direct writer; therefore, basically, independent of the capital markets. The surrender charge risk acts as a stabilizing factor in the total mortality risk.

Chart 1 shows the one-month variable annuity returns, average surrender charge risk, and average variable net amount-at-risk. This demonstrates the strong inverse relationship between returns and the variable risk, as well as the relative independence of the surrender charge risk. Without credible data, this graph would have looked quite different.

After many months of submitting credible data, one of our larger ceding companies, all of a sudden, sent us thousands of records, but not all the records, with zeros in the cash-value field. Since surrender charge is approximated by account value minus cash value, the average surrender charge risk was in the tens of thousands. The direct writer was in the midst of changing its systems and could not rerun or correct the files. But, because most of the policies had no change in their total deposits, we were able to pull off surrender charges from a prior month's file and match up by a unique identifier. Of course, new deposits had first-year rates applied. We were left with very reasonable average surrender charge risks. If we had had only summary information, it would have been extremely difficult to track down the problem and, perhaps, impossible to correct it. You can imagine what the graph would have looked like in that case.

On another occasion, even though the market returns had been quite favorable relative to the guarantee, the data we received showed the variable risk was very deeply in the money, which just didn't make sense. By looking at a few records and comparing them with the prior month's data, it was obvious that partial withdrawals had been deducted from the account value but not from the GMDB. Again, we were able to make sensible adjustments. These problems could have dramatically changed the perception of our liability and would probably have resulted in many sleepless nights. Moreover, the reinsurance premium could well have been affected.

Reinsurance claims for GMDB occur only in the case of death, when the contract is in the money; that is, when there is a positive net amount-at-risk. Depending upon the terms of the contract, death benefits could be triggered by death of the annuitant, the owner, or, in the case of joint annuitants, the first or the last death. This is all information that we must have in order to be able to protect our policies.

When we are notified of death claims, we check the last reported account value and GMDB to determine the reasonableness of the claim. We did find several instances where contracts had been so far out of the money that, even with today's volatile marketplace, shortfalls were very unlikely and, in fact, errors had been made. Just another example of the value of data!

Let's look at VIPAs. At issue, a benchmark payment is calculated using the initial deposit and the direct writer's pricing assumptions. Units, which will be used to evaluate the future periodic payments, are then purchased in selected funding vehicles. A floor payment is determined, which could be a flat percentage of the benchmark payment, a ratchet, a roll-up, or some other innovative design. The amount of the periodic payment varies based on actual performance of the

underlying investment funds relative to the assumed interest rate, but is never less than the guaranteed floor payment.

Claims can occur any time the experience of the funding vehicles produces a payment which is less than the floor. Reinsurers are very interested in the claim cost profile, which is generally a function of timing, frequency, and the amount of claims. For each contract, we plan to track claims and, wherever possible, the changes in the unit value of the underlying investment funds. Since VIPA reinsurance premiums are repriced for new business by set time intervals and are initially based on assumptions agreed to by the direct writer, it is vital to have data to track actual experience for possible use in the next set of premiums. Also, any significant differences between the assumptions and the actual experience may result in earlier repricing. Here significant differences are defined in the treaty.

Next, we have GMIB. Reinsurance claims are paid as of the date of annuitization, which occurs at the option of the annuitant, any time after the waiting period of seven to ten years. Reinsurance claims occur only if the present value of the annuity arrived at by using account value annuity assumptions defined in the treaty is less than the present value calculated using income benefit base annuitization assumptions also defined in the treaty.

Finally, let's consider maturity benefits and Canadian segregation funds, a.k.a. GMAB. For this product, claims are paid by the reinsurer if the GMAB is less than the account value on the date of maturity—typically 8 to 12 years down the road. The account holder is not required to take any action to trigger a reinsurance claim.

Another very important use of data deals with reinsurance premiums. Reinsurers often incorporate a window of coverage for new business into their treaties. Assumptions as to age, sex, tax status, and funding distributions are used in the calculation of the initial premium schedule, which is guaranteed throughout the new business window. If renewal of the reinsurance facility is requested, then premiums for subsequent new issues will be repriced using distributions based on actual experience.

Some direct writers prefer to pay one premium rate regardless of age. To arrive at the appropriate flat rate, assumptions are made with respect to anticipated age profiles, and age bands are agreed upon. Rates are calculated for each age band and a weighted average produces the flat rate. At the end of preset intervals, new weights are determined based on actual age profiles, and a new flat premium is calculated. This true-up premium will be used retroactively and will be the basis for prospective premiums that will be in-force until the next true update. None of this would be possible without credible data.

While using seriatim data to test reinsurance premiums, we found that one ceding company had programmed its age bands incorrectly. Instead of applying the lowest premium rate to issue ages 0–49, it was using ages to 50. Consequently, all of the age bands were off by one year, and the premiums the company was paying us were too low. In another instance, we used data to back into the

reinsurance premiums and found that the rates a different company was applying were too high, so it does work in both ways.

A vital aspect of matching assets and liabilities is being able to answer questions dealing with, "What if?" One way is to test our portfolio by modeling in-force files produced from seriatim data. Deterministic and/or stochastic scenarios may be used to measure changes in the value of our portfolio. Sensitivity testing is the analysis of change because of underwriting risk factors. What is the effect on each product design of increased or decreased lapses, increases or decreases in mortality experience, and changes in assumed volatility?

Annuitants may invest in any one or several of the funding vehicles offered by the seller. The available funds often run the gamut from risky aggressive growth to fairly safe government bonds. Generally, the annuitant has the right to shift money from one fund or funding category to another.

How is an annuitant influenced by aging and/or approaching retirement? I can give you some firsthand input on that one. To what extent does market volatility affect movement between types of funds? How do overall economic trends induce rebalancing?

Then there is stress testing, which analyzes changes because of abnormal market conditions. What happens if the Standard & Poor's (S&P) drops by, say, 5%, which would not be an improbable occurrence? Older contracts with longer ratchet and reset designs might still be out of the money. Funding vehicles don't all react in parallel to the S&P. You should consider the beta of the portfolios being tested. And what would our liability look like under NIKKEI or some other depression scenarios?

Once liabilities have been recognized, evaluated, and timed as much as possible, the next task is to protect and manage the assets. From a reinsurer's point of view, retrocession provides the ultimate protection, but could be too costly. Going into the capital marketplace to buy puts and/or calls adds a new dimension to asset management. Data is necessary to determine notional amounts, track changes in notionals, test the effects of various shocks to the marketplace, and test ways to aggregate risk. Some combination of these approaches is probably the way to go.

Of course, these areas of investigation and the many questions they present cannot be studied or answered quickly or easily. But with timely, credible seriatim data, tracking and studies can provide invaluable information necessary to maintain a profitable line of very interesting and exciting new products.

Mr. Steven A. Finch: We've heard about changes in the reinsurance market and how data is managed. There have also been significant changes in the retro market, which I will touch on as well. The changes mean that companies have to think about how they're going to manage their risk going forward and make explicit decisions about this in terms of how they manage their business.

At the center of all this are the questions: What data is needed and how is it going to be shared, stored, and analyzed in order to manage risk appropriately and make good business decisions? I'm going to touch on each of these agenda items very quickly, talk about risk-management issues, and then go into a system that Manulife Reinsurance has developed to make better business decisions. I will also discuss some of the challenges that we've had, because it's not easy.

John showed us the growth in the reinsurance market. Chart 2 shows the growth of the retrocession market, which clearly is growing at a much slower rate than the reinsurance market. Which would you rather be? This shows that the reinsurers are writing much more business and retaining much more risk.

It is interesting to look at how expenses have grown relative to premium and growth in business. I didn't have any 1998 data, but Chart 3 shows that expenses are growing at only about 10% per year. One could read into this that expenses are only growing at a rate to keep up with the salaries of the people who are writing all this business. I don't believe that it has been spent on managing the business any better or on systems. However, now we are seeing companies start to spend more on systems. The ratio of expenses as a percentage of premium has also been declining dramatically. The market is so competitive that companies are really trying to drive their expenses down.

We will now get into risk-management issues in the reinsurance market. I will talk about retention management and then about risk assessment. In the past, and John touched on this, there was a individual cessionaire reporting to the reinsurers. Each policy went on their retention management system. There was paper exchanged with policy details. That was fine in the past, but with the increase in the volume of business, this just isn't working anymore, and we are seeing problems.

The biggest problem for the retrocessionaire is that we are the last to get the data, and it can take a long time to get the data. The average lag now for data to transfer from the direct writer to the reinsurer can be anywhere from two to three months. In some cases it can take up to a year, so companies are assuming risk without knowing what the risks are.

Once the reinsurers get the data, there can still be delays in getting it to the retrocessionaires. It can take 6 to 12 months for the retrocessionaires to have business reported to them. Now, this isn't a universal problem, but some companies are having difficulty implementing new systems, and, let's face it, who wants to spend money on sending business out the door? Everyone wants to bring business in. Of course, we have companies trying to reduce expenses. Ceded business is not the first priority.

What does this mean in terms of retention management? I'll talk about some new ways that reinsurers can deal with expense issues or the way that they manage their risks.

One way would be to increase retention. We've seen some companies do this. The surplus in the industry is much larger than it was a few years ago, so companies can just retain more risk. They can cut down the expenses by not ceding out as much business.

Another way would be to increase blind limits. What I mean by this is that cessions over a certain size would get put on a company's ceded system. We looked at this at Manulife. If we increased our blind limit and only put cessions over $500,000 on our retention management system, we could cut down on 50% of the policies that we have to process. This is, unfortunately, a highly manual process, so there are some real potential expense savings. It does mean more risk, of course.

Another way of managing risk is through something called a "clash" cover. This cover can be purchased from a retrocessionaire or a reinsurer to provide protection against accumulation of risk over a company's retention limit. It's a short-term cover. It won't match the duration of your liabilities, but it can provide some protection, and you usually get one or two renewals allowed before the cover must be renegotiated. If you keep making claims, the premiums will go up, of course.

There has been some talk about holistic risk management. This is managing multiple risks under one cover with the idea being that getting a cover for a diversified portfolio of risks is less costly than purchasing individual risk coverages.

One reinsurer in Europe has taken this approach. They purchased an aggregate excess of loss cover on their portfolio of life reinsurance business. They don't have to process individual cessions. They manage everything with basically accounting reports. They pay a bit more for their retrocession, but the extra cost is offset by expense savings.

If a company is comfortable with the risks that they are taking on but they don't want to absorb short-term volatility of earnings, they could purchase a finite risk-type product, which is very common in the property and casualty (P&C) world. What this cover does is transfer less risk to the retrocessionaire, also less premium. And, under expected scenarios, it will cost less than traditional risk-type covers. Under an adverse scenario—that is, the occurrence of a significant loss—the earnings impact of this loss will be spread over three to five years so that the company's earnings volatility is reduced and it is transferring less premium and less risk. Again, you don't have to share individual policy details to buy this type of cover.

I will also mention the capital markets as a source for risk-management capacity. Again, the P&C world has been a pioneer in terms of accessing the capital markets. The life reinsurance market has not accessed the capital markets yet for large policy capacity. It has been done for cash financing. Just because it hasn't been done, it doesn't mean it can't be done. My clients always talk about not being able to place the $200–300 million cases. Perhaps these risks could be transferred to the capital markets. I haven't figured out how to do it yet. With the changing market, reinsurers need to look at their risk-management practices and make

some explicit decisions on where they are going to spend their money and how they want to manage their business. They don't have to just keep doing things the way they have been done.

As we discussed earlier, we are seeing the volume of reinsurance business increase dramatically while expenses are under tight controls, resulting in less data and information being transferred. We are getting bulk reporting on claims, premiums, and so on. We have seen in John's presentation that the reinsurers have assumed the mortality risk for 50% of the new business market and for 25% of the in-force market. The reinsurers are really the industry's mortality risk managers. The mortality risk is ending up in the hands of a few very large companies, but not getting individual claim information and other data means that they don't have all the information that they need to assess whether the risk selection process is appropriate.

The mortality risk managers don't have the right information. How can they be expected to make the appropriate decisions? I'll talk a bit about what reinsurers are doing to respond to this. One way of getting at the data is to rely on industry studies. Obviously, this provides no competitive advantage and probably the information is not as timely as getting the information from your own book of business. The reinsurers that I think will be successful are the ones spending money on research, looking at improvements in medical technology, working with universities, and studying aging and longevity.

One company has set up a mortality research center, and it is spending money investing in people who understand the risks that they're taking on. I think the combination of this and investing in the data collection, processing, and analysis of information is going to be crucial for the reinsurers to be profitable. The companies that can understand their data, make decisions on it, and implement those decisions are going to be profitable in the long term.

I'll talk about business management issues and what we have attempted to do at Manulife. A couple of years ago, we started looking at our business and asking questions such as: which accounts are our most profitable, which transactions have been better than we expected and worse than we expected, and which of our customers are the most profitable? These sound like pretty basic questions, but the data to get at this information wasn't always easy to obtain, and we wanted to feed these results back into our decision-making process.

We have designed a system to do this. It's called the "Smart" system. It's a good name. Originally, we wanted the system to be able to measure and monitor our financial results, our customer profitability and satisfaction, internal business processes, organizational effectiveness, and a number of other things, but we realized it would take about ten years to design that system, so we focused on our financial results and customer profitability.

We found that the information we needed resided in many different places that we had built. I guess you'd call it a centralized data warehouse that extracts

information from a number of different systems on a quarterly or monthly basis. It's all pulled together in one centralized data warehouse. End users, the business managers, have access to this information through their PCs. On a regular, current basis, they can look at the health of their business and make decisions based on that. On the financial reporting side, it was very helpful for our accountants. It allows them to spend a whole lot more time analyzing results than preparing them, so we can better understand what is going right or wrong with the data that we are getting.

Table 1 is split between financial results and customer profitability. Reports can be run on a monthly basis or a quarterly basis.

TABLE 1
1999 SECOND QUARTER REPORTS

Financial	**Portfolio Analysis**	
Statement of Earnings Report	**Profitability:**	Current Quarter Report
Net Policy Liabilities Report		Year-to-Date Report
Statutory Return on Capital Report		Full Year Report
Balance Sheet Report		
Ad Hoc Financial Report	**Line of Business:**	Life Report
		A & H Report
Customer Profitability		Financial Report
Top 10 by Income Report		P & C Report
Top 10 by Claims Report		
YTD Income Report	**All Lines:**	Current Quarter Report
Customer Income Statement Report		Year-to-Date Report
IF/NB Face Amounts Report		Full Year Report
Ad Hoc Customer Report		

It was not easy to implement the system and we certainly had some challenges. One of the challenges was expenses. The system is obviously not free. As actuaries, we want to be able to quantify exactly how much money this system is going to save us or how much extra revenue will be generated by making better business decisions. On the financial side, it's relatively easy. We were able to quantify how much work was saved through spending less time preparing financial results. But on the customer profitability side, how do you quantify making better business decisions? Can you say that, because of this system, we are going to make $1 million more this year? That's something that we have been trying to come to grips with, and if anyone has comments on how we could do that, I would appreciate it.

Another challenge is to change the way the work flow is done with the system. How do we put it into our everyday practices? And, finally, the toughest challenge has been how to change the decision-making process. We have all this information and we can access it, but if we still make the same old decisions, then there's really no value in the system. That is another challenge that we are working through—

trying to manage how we make better decisions based on the information we have.

We are not all the way there yet, but I think this is the right approach. Companies that can understand where their profits are coming from are the ones that have the best chance of succeeding and making money, and that is what we are trying to do.

Mr. Nathaniel B. Wallman: I'm going to talk about computer architecture that's used in the life reinsurance industry. I will cover several different methods that are fairly common. I think most of you have seen at least a few of these. In actuality, most companies use combinations of architecture rather than individual pieces of architecture. These combinations are used to cover their applications so that they can run properly and meet user-community needs.

I'm also going to talk about the use of the Internet. Many people think there's this big explosion coming with the use of the Internet, particularly within life reinsurance, which really hasn't used the Internet as much as some of the other financial industries. A keg of dynamite with a long, slow fuse on the explosion neatly depicts where we are right now. At any time, the explosion could rapidly approach, and I think we'll have a lot of change coming soon.

The computer architecture most of you are familiar with is a large central mainframe processing multiple transactions. Usually, these transactions are fairly predictable in nature and a series of people input information into the system. These systems are used a lot for investments and general ledger.

Another type of architecture is a mainframe that holds both a database and applications. It has a well-developed memory, speed, and resources. These are the powerful tools we have used for more than 20 years to process our back-office business.

At the same time, we utilize, in many cases, dummy terminals attached within the architecture where prepared information is input into the mainframe. As John was saying earlier, a lot of individual cession business had been processed on this type of system for many, many years. I think this works well for those controlled environments. How many members of the audience have worked on mainframe systems like this over your careers? It looks like about half of the audience. And how many still work on those same types of systems today? Not too many, maybe 5% of the audience.

One of the downfalls of this type of architecture is that today's users are required to react very quickly and to be very flexible, given changing market and investment conditions. These mainframe systems have been in place for such a long time and have such a wealth of application development, it's very hard for the reinsurance information technology (IT) groups to react quickly enough to satisfy the users and meet the front-office needs of their distribution channels.

Frequently, what happens is that a company will say, "We have a bunch of disenchanted users; let's go get them the tools they need so they can do their job." A company may go out and buy a lot of PCs, but you still have PCs separated from the mainframe, and people are doing their jobs on the PCs, while the same mainframe systems are processing business as usual. Often this happens because companies have put so much money into their mainframe systems, it's difficult to leave them behind and go to a whole new structure.

This fits into the scenario that Steve was talking about where you may have, let's say, bordereau reports or perhaps a box of paper that arrives at your office and it has to be processed. Assuming that the information is not in the right format to go into the mainframe, you may need a staging area where people get together, look at the box and try to figure out what's involved. In this case, a company may use a series of PCs to make certain decisions about the information and to find out what is useful and how to get this into the format needed for processing. Then certain reports would be produced from the PCs, usually to get that information into a format that's useful for the people who are still working on the old powerhouse mainframe systems. Then it goes in the usual method, but, in addition, you end up with somebody on the back end deciding to check and see that what went into the system is the right stuff, and you have this reconciliation process going on. For one work-around or two work-arounds this may be OK, but after you do this 10–15 times and still don't have these processes inside the mainframe, it becomes untenable. You have this spiderweb of all these different processes running around the mainframe.

Many companies have moved on to client-server architecture. The advantage with client-server is that you have the same kind of large database with all the power that's needed to process business, but the individual clients have strong applications available to them. This way, they can continue to work within the network and within their administration system, but also process business with a lot of flexibility. This is great for team-based operations where there are a lot of users with applications who may not need to have a lot of transactional information processed at any one time.

Unfortunately, as these applications start to build and to run up against expense limitations, the applications begin to accumulate transactional information that needs to be processed, typically through a mainframe operation. This becomes very expensive and, again, I wonder how many people here currently work on a format like this in a client-server environment? Not many. How about people who used to work in an environment like this but no longer do? Again, not many.

This two-tiered architecture has been under attack for a long time because of the expenses associated with maintaining all of those fat clients with tons of applications in them. One of the ways that people have tried to correct the situation is to create a terminal application server, which allows the use of thin clients. The thin clients are attached to the terminal server, but it doesn't hold the applications. However, the applications can be invoked from the terminal server, which increases the speed that the ultimate end-user experiences because they're

basically working inside that application server. Also, separating out the database from the application in this setup allows for greater speed because there will be less traffic back and forth, in comparison with that of the fat clients.

This has become very popular and works very well in large organizations, where there may be, let's say, a central company and a few subsidiaries or branch offices that have a lot of people working through those terminal servers. I think this is a fairly popular, although expensive, solution to the more expensive fat-client solution. Is there anyone here in the room who's working in this type of a scenario? I see two. And, are there any people here who are moving towards this type of a scenario now to your knowledge? None.

The remaining problem is that you still have to maintain the database server and the application server, which means you have an IT staff on hand working on your applications, updating for new releases, and working on the database to maintain optimal performance. Again, this results in high expenses.

Another way to try to solve some of those problems is to have a third party, either a vendor or, perhaps, a business partner, that will maintain some of the application work on a separate server off to the side, which can be updated into your terminal server through the Web. In this way, you don't have to have as many people working on that application all the time. Also, the people running this application server can work on smoothing out new releases to ensure that they are compliant with the prior applications that you've implemented.

To take that another step, you can actually have a bunch of thin clients signing onto the Web using this master application server, with research and development doing its business on new releases and using a master database server off to the side.

Now we've pulled the application and a database out of the company. It may be an international company where there's one location, perhaps in the headquarters of that organization, and all of these thin clients are spread all over the world. They could be spread out by function or by region. One of the advantages of this is that you can start to develop help, information, and systems training in this centralized area. It's a much more efficient way to handle these things because you don't have as much of an expense in replicating all of those new releases at every client site where you're going to use the application.

Another thing that happens is that, if you have new releases in this format, they can be tested for compliance against the current application to make sure that any changes in coding don't affect current processing or currently processed business. It keeps the cost down and gives you a seamless way to introduce new applications into your organization. Is there anyone here who works under this type of a scenario? Is there anyone here who hires outside services for his or her company on this format? We only have one person in the audience who is part of a three-tiered architecture.

If you look at it in a different format, you can think of these multiple databases as being off to the side handling all the databases and all of your applications with many different standards because you may have branches that are on old releases and others that are moving into new releases. Then you can have, simultaneously, all of these various functions generating from different locations through the Web. You may have product development and pricing happening in one location and treaty and compliance handled, perhaps, by an outside party somewhere else. Brokers can sign on underwriters and retrocessionaire can all sign on through their own connections. If they're business partners, they may only pay for the time that they actually use the application, and this reduces the cost to everyone. It's a way to share a lower cost. Corporate finance and claims can sign on as well and have their applications completed. Of course, this raises a lot of questions about security when you're dealing with all these different partners, and people are worried about access to their information. That's one of the areas that we talk a lot about these days in working with the Web.

Also, concerning data storage and retrieval, how is it that you're able to save money if, in fact, everybody is going to want to store and retrieve data on his or her own? All of the different partners inside this organization will have to maintain standards for the information they're going to use when they make financial reports and decisions on how to proceed. When you're working on the Web, you're not going to pull across the entire application every time you want to look up one little piece of information or perform a small function. You use an applet to pull a little piece of information, then make a decision based on that and send it back into the database. If everybody employs high-quality standards for what that information is and how he or she uses it, it's a lot more frugal, ultimately, for everyone to work on the same basis because it reduces errors in communication.

Over the last few years, the transactional speed of the Web has increased incredibly, and it continues to increase much faster than the use of the Web by most reinsurers and insurance companies. One of the scary things is that we don't know how long that can continue. At some point, the speed of the Web may not be sufficient if we all start to use applications like this on a daily basis.

I should mention a few of the things that people are doing to tighten up their transactional security on the Web. The use of encrypted passwords at every level of entry is mandatory. There's a lot of access coding going on, where different branch offices will have access to only certain portions or partitions of a database. Also, domain restrictions are used to control what users can actually do once they're inside. These can be maintained at a regional office level. Another feature that is very common in Web security is to determine through system administration the use cases that each member who signs on is allowed to have.

Finally, there is the question of reusing system resources. All of these parties working together through the Web will reuse the same application, and one question may be, how can they have their own little database at any time? Companies may set up a document agent server to create the limited databases on an automatic basis, say a snapshot once a week. I think there are ways to use

the Web to reduce the ultimate costs and improve the profitability, which can then be passed on through pricing.

Mr. Pado: Nate, you talked about tuning your database earlier and I've heard that phrase before, but I'm not exactly sure what that means. Would you care to comment about that?

Mr. Wallman: Each database has a structure within it—many different levels of references and matrices of how you want to report some of your information. For financial reporting, you may collapse all of those levels and just pull out the information directly at the level you want. However, if we're doing calculations, say, of retention control, you can build all those indices and matrix those relationships back up. I'm not actually changing the data, but changing the relations. We can improve the speed for that particular function that we wanted to use. Another thing you could do is maintain enough space so that you're not running over your server capacity by item services.

Mr. Robert J. Tiessen: Several of the speakers have talked about different aspects of getting this information. Alice talked about quality of data, and Nate talked about ways of obtaining the data and processing it. From my experience, it seems that the quality of the data currently presents larger problems than the speed of obtaining the data. I'd like to get the panelists' impressions of where the problems are.

Ms. Goldstein: Probably the most important thing is to deal directly with the people who are going to be submitting the data, getting some test files, and analyzing what they are setting up. They're very happy to work with us because they need to know this information as well. Just about everyone I've dealt with has been willing to make some change in their systems in order to give themselves and us valid data. We try to get data once a month, as quickly after the end of the month as possible, to analyze the data and see if there's anything that pops up as being obviously wrong. We try to work with them to produce clean accurate data.

Mr. Wallman: I'll make a comment validating Bob's comment that timeliness and quality are both crucial. Sometimes it's the timing and sometimes it's the quality, but, you're right, there are problems at both ends. If you look at the growth in the demands on reinsurance reporting, it's certainly not easy.

Mr. Carroll: Also, the problem I find most frequently is the time it takes for a system conversion from one policy administration to another, or when you've installed a new reinsurance administration system. We turn up a lot of inaccuracies. If you have a system that's going to report data to the reinsurer that's basically stand-alone, you're going to run into problems. There has to be some kind of a link or feed from the policy administration system, which is going to feed your reinsurance system, which then is going to feed a database at the reinsurance company. That needs to be updated on a fairly frequent basis, either daily or monthly, depending on the transactions. You have to have timely data that's in sync with your policy administration system.

Most times, as I've worked with companies to convert data over to a system, I will see reinsurance in-force where policies have been terminated or there have been reductions in face amount that have not been reported. You might find, in some cases, a ceded amount greater than the face amount of the policy at that particular point in time. This is where the data is out of sync. It's really important to have it reported. Reinsurance activity should be a reflection of what happens on the policy administration system. Even if the data on the policy administration system is incorrect, at least you have consistency in your reporting.

Mr. Wallman: The only thing I'd like to add is that it's very important that the quality be understood by all partners in the reinsurance scheme. For example, although the information that's transmitted may mean one thing to the ceding partner, the reinsurer may understand it to be completely different. Or, in the age of M&As, you may have companies throughout the world working together for the same organization but using a different syntax. This happens all the time and takes some time to make sure that the quality of understanding your information is there, so that everybody uses the same process and communicates efficiently.

Ms. Mary Ann Broesch: I think one of the biggest challenges we have is the timeliness and the quality of the data. Those are very important issues and challenges. But the other challenge we face is something that Nate was alluding to—that all of the data comes in a different format and each client is unique. I'm just curious if there's any move toward trying to get some of this data in a standard format. Would it meet the challenges of timeliness and quality to have all the companies put the data into an industry format?

Mr. Carroll: Initially the SOA drafted a document on electronic reporting that was a step in that direction. The ANCI and the EDIFACT message had been developed to facilitate and standardize the transaction. I know some systems now can accept that message. Are there any companies here that are actually reporting and using the ANCI format now? There was a lot of effort to put that together, but ceding companies have to invest in translation software to transmit the data. For reporting billing information, many companies do not feel it is time-critical information that has to be reported on the last day of the month, when most reinsurance agreements provide for 15–20 days after the end of the month or after the end of the quarter for reporting purposes. For the company, the translation software is a big investment unless it can be used by other departments within the company.

But, you're right, there isn't one format. That's one of the things reinsurers find very difficult to deal with, because you're receiving multiple formats from multiple companies. Moreover, just because a company reports information electronically, that doesn't make it accurate. It depends on what is behind it and where that data is coming from. It is really a reflection of what's being reported on the administration system, or whether somebody is data-entering information from a worksheet that may not be accurate or timely.

Ms. Goldstein: One of the things we do when we get a new treaty or proposal is to submit a format to the client. We've developed a layout including all the information that we would like to receive. I found that some companies will adhere to the letter, while others give us the skimpiest version of data. Frankly, I'm ready to work with anything they give us. We use conversion programs to get data into a format I can work with. As long as we receive the information that we really need in order to know what we are covering and how our risk is changing, we won't complain.

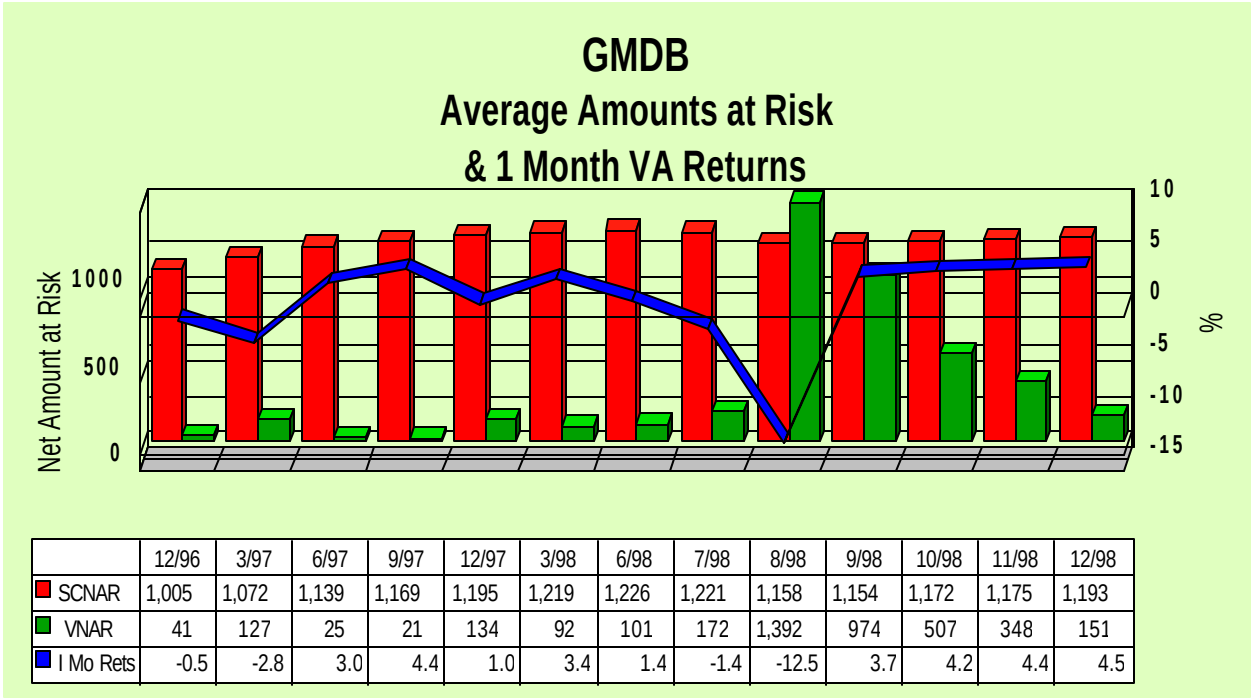
Mr. Pado: As part of assessing data quality, I've long been a proponent of actually analyzing the incoming data by developing some standard of reasonableness ratios. You find your average premium, assess the profile of business by finding your average age, the percent of non-smoking and smoking, the percent rated, and all that. But if you try to find data that would, upon dividing through, give you some comfort that there is some quality associated with the data that you're receiving, it's interesting that every now and then you'll see a ratio that blows through the roof and you know something's gone wrong. It's like a standard operating procedure, but one that is typically not done within the reinsurance administration process. At least I've not witnessed it all that often. But if you embed that procedure as part of your process, I think you'll all be able to assess the quality of the data.

From the floor: I've worked on data-warehouse-type projects. My questions are for Steven. In the work that we've done, we noticed a significant change in the way people work together. Because they're sharing the same data and different disciplines, they are working off the same data. A problem that's initiated by actuarial is something that people will work together more to solve.

The first part of my question is something that you've seen with data warehouse initiatives. Does that go a long way towards solving a lot of the problems of data quality, as I have found? And, seeing the last presentation on architecture, are there any initiatives to move those applets out to direct reinsurers to get a shared ownership of data quality?

Mr. Finch: We are early in the process, so at this point it is hard to say whether we are getting that cooperation or not. A measure of success should be whether we get the kind of cooperation that you are talking about.

CHART 1
GMDB AVERAGE AMOUNTS AT RISK
AND 1-MONTH VA RETURNS



	12/96	3/97	6/97	9/97	12/97	3/98	6/98	7/98	8/98	9/98	10/98	11/98	12/98
SCNAR	1,005	1,072	1,139	1,169	1,195	1,219	1,226	1,221	1,158	1,154	1,172	1,175	1,193
VNAR	41	127	25	21	134	92	101	172	1,392	974	507	348	151
I Mo Rets	-0.5	-2.8	3.0	4.4	1.0	3.4	1.4	-1.4	-12.5	3.7	4.2	4.4	4.5

CHART 2
REINSURANCE PREMIUM/EXPENSE GROWTH
($U.S. MILLIONS)

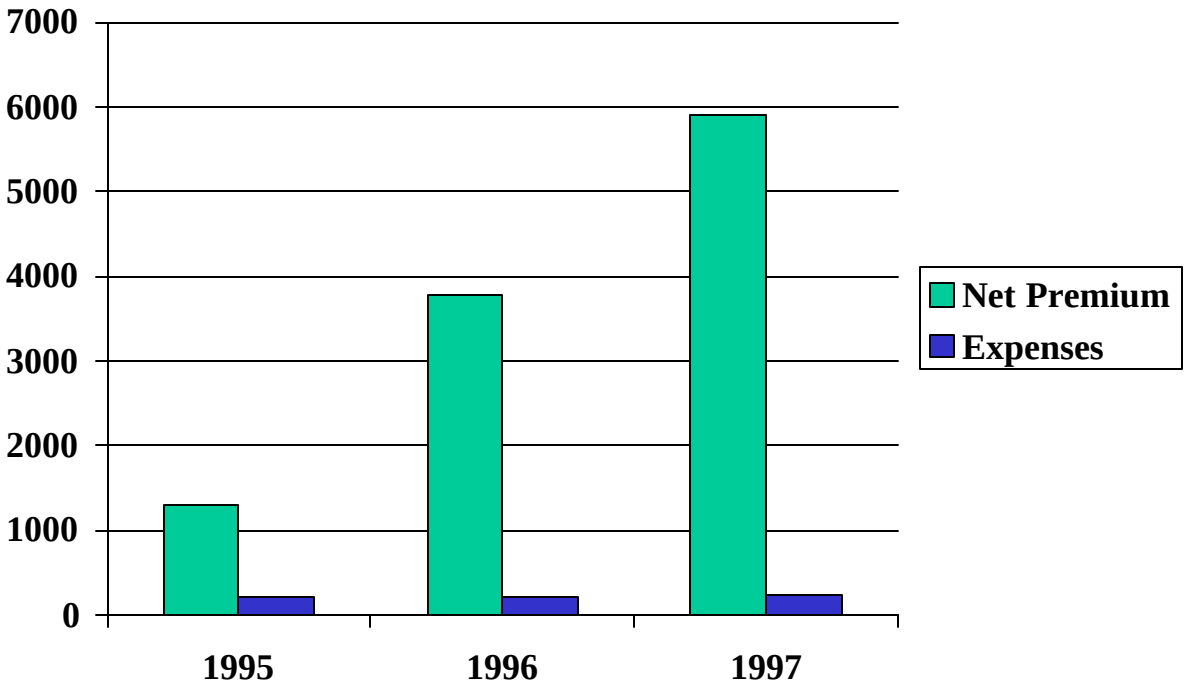


CHART 3
REINSURANCE/RETRO NEW BUSINESS
($U.S. MILLIONS)