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International survey of actuarial issues and practices

A report on the International Actuarial Association Health Section (IAAHS)
survey on actuarial work issues and practices



Research completed on behalf of the
International Actuarial Association Health Section



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EXECUTIVE SUMMARY

Most insurance and medical professionals believe they know what is meant by the term “healthcare actuary.” In fact, definitions of the term appear to vary widely around the world.

This research evaluated what actuaries have in common globally in terms of their work, and how they differ.

On behalf of the International Actuarial Association Health Section (IAAHS), Milliman recently undertook a long-term project examining what a healthcare actuary is and does. This research evaluated what actuaries have in common globally in terms of their work, and how they differ. As well, this study looked at actuarial *practices*, which are defined as the tasks actuaries perform, and actuarial *issues*, which are defined as problems and barriers that actuaries confront.

We hope that the results of this study can serve as the start of a dialogue among international actuaries. These results are based on information from a relatively small sample of actuaries, and we would welcome additional feedback and comments on these topics, especially if your experience is different from or complementary to the information contained in this report.

Methodology

The methodology for this first-of-its-kind effort was composed of two phases. We used the resources of 31 volunteers in 14 countries in the course of this project. In Phase 1, we worked with our volunteers to identify the common practices of actuaries and typical issues that they face. Then we cast a wide net using a high-level survey designed to find which of these are the most frequently encountered.

The Phase 1 survey was conducted via e-mail by the IAAHS Secretariat in January 2007; all current IAAHS members were approached (almost 300). (The complete Phase 1 survey is in Appendix A.) IAAHS members then responded to this survey with their most common practices, issues, and other open-ended remarks.

The results provided a focused framework for proceeding to Phase 2, where our research team developed a list of most common practices and issues along with a series of 11 specific question areas. The first portion of the Phase 2 survey asked actuaries to provide additional detail about six specific common practices. The second portion asked actuaries to provide detail for five common issues. (The complete Phase 2 survey is in Appendix B.) We asked our volunteers to contact members of the international actuarial community individually to ask them the survey questions. The IAAHS Secretariat also sent the set of Phase 2 survey questions to all IAAHS members in March 2007.

Our research team collected the responses from the Phase 2 survey and compiled them to form the primary basis of this report.

Findings

We found much in common and much that was different among actuaries worldwide. For example, a significant majority reported that they performed detailed data analysis and product design in their work, but, in both cases, 18% indicated that they did not. Some regions have used reserving for decades; others are barely familiar with the concept. Only 30% reported issues with high medical inflation.

The actuarial practices researched in greater detail are (showing percentage affected among those surveyed in Phase 1):

Actuarial practices (% of actuaries who perform these tasks)

- Detailed data analysis (82%)
- Monitoring claims (79%)
- Product design (82%)
- Calculation of premium rates (79%)
- Reserving – Incurred but not reported liability (IBNR) (76%)
- Financial forecasting (73%)

We queried actuaries on what steps they follow to complete these tasks.

The actuarial issues researched in greater detail are:

Actuarial issues (% of actuaries who face these issues)

- Data quality and integrity issues (61%)
- Regulatory constraints on pricing and benefit design (39%)
- High medical inflation (30%)
- Lack of clarity of the domain of the actuary (42%)
- Willingness of clients to pay actuarial fees versus cheaper resources (30%)

We probed actuaries for full descriptions of their current situation regarding these issues, the steps they take to solve or mitigate the issue, and an assessment of their success.

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INTRODUCTION

The definition of the term “healthcare actuary” varies widely around the world. In some areas, it’s barely an entry-level position for college graduates, secondary to statisticians, economists, or accountants. In others, it’s a high-ranking, sophisticated position that works closely with marketing and medical-expense policy groups to provide guidance and judgment.

As members of the International Actuarial Association Health Section (IAAHS), Milliman consultants recently began a long-term project examining what a healthcare actuary is and does. We wanted to look at what healthcare actuaries have in common globally as well as begin to identify the many differences. Our hope with these initial steps has been to encourage ongoing explorations of the different kinds of actuarial work that exist (as well as perceptions of it) and begin to open dialogues between and among international actuaries. We see this discussion as key to creating greater efficiencies and standards for the professional field as a whole.

This effort was composed of two distinct steps:

In Phase 1, we cast a wide net using a high-level survey designed to elicit information about common tasks and the issues encountered in performing those tasks. In this part of the study we wanted to be careful to get past any of our own presumptions and bias that might exist—to know more about what we didn’t know. Indeed, we identified many issues in Phase 1 that we hadn’t anticipated.

Use of claims data for detailed analysis was more common internationally than we had expected. It is common practice for actuaries to work on detailed data analyses, and to be involved in the data collection process. As well, there was much less clarity for the domain of the actuary than we had expected. While the actuary’s role is more clearly defined in Western countries, in other emerging markets the roles are much less well defined.

Appendix C contains the results of all of the detailed practices and issues we surveyed. For each of the practices, we asked respondents to identify tasks that health actuaries are expected to perform. For each of the issues, we asked respondents to identify which issues they encounter in the course of their work. From these responses, we selected the top six most common practices, and the top five most common issues to investigate further as part of Phase 2. We combined “data quality and integrity” and “inadequate coding of claims data” into a single question topic for Phase 2.

The practices and issues we covered are:

Actuarial practices:

- Detailed data analysis
- Advice on product design
- Monitoring of claims experience
- Calculation of premium rates
- Reserving – Incurred but not reported (IBNR)
- Financial forecasting

Actuarial issues:

- Data quality and integrity
- Lack of clarity of the domain of the actuary
- Regulatory constraints (pricing and benefits)
- Willingness of clients to pay actuarial fees
- High medical inflation

The results of Phase 1 provided a focused framework for proceeding to Phase 2, where our research team, including 31 volunteers in 14 countries, further investigated and surveyed on the tasks and issues that most actuaries have in common. Phase 2 work involved 36 in-depth interviews that examined the top 11 tasks and issues identified in the first part of the study.

We see this discussion as key to creating greater efficiencies and standards for the professional field as a whole.

We wanted to know:

- About actuarial practices:
 - What tasks do you perform?
 - What are the major steps you follow to complete the task?
 - Are you willing to share work product?

- About actuarial issues:
 - Do you face a specific issue?
 - What is the full description of the current situation?
 - What are the common steps to solve or mitigate the issue?
 - How successful has this been?

This study is intended as an opening to a dialogue between and among international actuaries. Our hope is that, by sharing best practices and the unique solutions to common problems we have uncovered, actuaries everywhere can benefit and will be encouraged to contribute to a worldwide move toward sharing, supporting, and understanding in this field.

Some direct quotes from the survey results have been translated to English or modified for clarity. All identifying characteristics have been removed from direct quotes.

ISSUE: DATA QUALITY AND INTEGRITY

Phase 2 survey results: *Do you face this issue?*

Yes:	83%
No/rarely:	17%

It's hardly surprising that a sizable majority of actuaries encounter issues with data quality and integrity, including limitations in data capture, data entry errors, bad data (e.g., pregnant males), and inconsistent coding. Many of these data problems tend to arise because individuals creating the data set do not recognize the need for consistent data.

It's not uncommon, for example, to see a complete lack of standardization in claims coding. Many systems are simply not designed to collect the necessary data, as a result of many different factors:

- Outdated legacy data-collection systems
- Low priority assigned to data collection
- Lack of understanding of the necessity for data collection
- Data segments coded differently from the rest
- Less than ideal administrative checking of data
- Difficulties in receiving data in the format desired (e.g., per member rather than per admit)
- Computer file and vendor support issues
- Human error
- Lack of regulatory requirements

Another common problem in this area is the typical disconnect between those entering data and the actuaries examining it.

Another common problem in this area is the typical disconnect between those entering data and the actuaries examining it. Many times, the people who enter the data are simply not concerned about accuracy. This may be related to the relatively minimal skill set of the employee pool available for data entry; it could also be related to the structure of an organization (or multiple organizations) and the influence that actuaries can bring to bear on data entry procedures.

Frequently, only data for the amount agreed to be paid is captured in the system. In such cases, it is very difficult to identify the impact of deductibles or member coparticipation in costs. Some other kinds of policy-level information, such as waiting periods or excluded claims, are printed in the policy wording but not captured in the database.

Addressing these issues

While there did not seem to be any clear solutions to solve this problem, we did hear about a number of general mitigation techniques:

- Perform additional training for claims processors or others working with the data when the data has enough difficulties that it is warranted
- Establish data validation systems to identify claims that have clear validity problems
- Request system improvements to improve the ease with which data can be accessed
- Reconcile the data with audited numbers
- Take a conservative approach to relying upon the data if there are known problems or if the data cannot be confidently validated
- Review data monthly for patterns of errors and coordinate with operations to address
- Use data from the United States, with adjustments for the local country
- Select data samples to review and audit in detail
- Analyze “suspicious” registers in detail

Some specific mitigation techniques are available as well:

- Validate data by operator/data entry clerk to identify substandard work
- Use market information or, in some cases, international experience
- Use ratio estimates to complete missing information
- Return to the source policy document for correct information
- Require clients to certify in writing that the data is correct (used by actuaries in consultant roles)

Success of addressing these issues

In general, these mitigation techniques have been successful, but they are almost always painful. For some respondents, detailed checking by the actuarial staff has eliminated all major and, over time, most minor discrepancies. Nearly all respondents say their efforts have helped, but there are still minor integrity matters or other issues in the data.

The following quotes are from respondents who faced the issue of data quality and integrity:

“Reconciliation can be done to a fairly good extent, and has helped verify that data downloaded is complete. These steps taken have helped identify situations where we had got wrong/incomplete data, and therefore we were able to take corrective action.”

“Proven to be successful, especially when in-house data are sufficient and adequate. Also, if benefit features are not price-sensitive, conservative approaches will be just fine.”

“Success of each step highly depends on the time that you’ve allotted to doing these steps.”

In the United States, the American Academy of Actuaries’ Actuarial Standards Board has published Actuarial Standards of Practice #23 about data quality. At the time of this report’s printing, this publication was available at: www.actuarialstandardsboard.org/pdf/asops/asop023_097.pdf.

PRACTICE: DETAILED DATA ANALYSIS

Phase 2 survey results: *Do you perform this task?*

Yes:	92%
No/rarely:	8%

Again, it does not come as a surprise that an overwhelming majority of actuaries are involved with detailed data analysis. This was one area where there were clearly more similarities than differences. Most actuaries analyze health utilization and cost trends. In some cases, other functional areas complete

that work and actuaries peer review it. In most cases, healthcare actuaries followed similar procedures of extracting data, validating and repairing it, and then analyzing and reporting it.

In extracting data, four respondents said a data warehouse provided the source. The rest reported other sources, including acquiring data from a client. In some cases, data was combined from different sources when necessary. Most respondents had access to data directly via querying tools or software, rather than requesting extracts from another department.

Some specific techniques used in data analysis include:

- Spending time to understand the major parameters involved in pricing and claims management
- Combining data from different sources when necessary
- Summarizing healthcare expenditures by injury year and by type of claim (drug, hospital, etc.)
- Comparing the claims data to the budgeted amounts for those categories and prior analysis

To validate and repair the data, most respondents mentioned checking it against either internal or external sources and inspecting it for reliability. They said that understanding the context of the data is also important.

The following quotes are some sophisticated or otherwise noteworthy responses from respondents who performed the task of detailed data analysis:

“My analysis commences with time series analysis of obvious ratios, the intention being to ascertain trends. I use graphical output with confidence limits.”

“We analyze the trend/pattern underlying the data, with a view to understanding and explaining them; these could involve ratios year on year, percent mix, ratios of relevant data items, etc.”

“Data is effectively extracted from the company’s data warehouse. This is then checked for completeness/errors. This is done on a monthly basis. Once we are satisfied that the data is clean, we then carry out the necessary analysis on the data.”

PRACTICE: MONITORING OF CLAIMS EXPERIENCE

Phase 2 survey results: Do you perform this task?

Yes:	81%
No/rarely:	19%

In the United States and many countries in Asia, a good deal of energy goes into monitoring claims. By contrast, four respondents in Europe along with those in many other regions don’t do it at all or seemed unfamiliar with it. Many of the countries we surveyed had already upgraded to the more robust International Classification of Diseases-10 (ICD-10), whereas the United States is still using ICD-9, at least for the time being.

In regions where actuaries monitor claims, the actuaries have developed systematic approaches to monitoring. In some cases, in-depth cost analyses are performed on a regular basis—for example, monthly, annually, or every four years. Respondents in Asia reported using procedures that compare expected and actual figures with processes that address significant discrepancies as they arise. Assumptions about the claims data are then reviewed and updated as necessary. Nearly all respondents include management and financial reporting as part of the claims monitoring.

The primary steps reported include:

1. Data mining or collection
2. Summary of data in a consistent framework

3. Comparison of results to internal benchmarks
4. Analysis of unexpected results
5. Discussion of results with internal parties
6. Follow-up studies of changes applied

Many of the responses for the monitoring of claims experience question parallel those in the detailed data analysis section.

ISSUE: REGULATORY CONSTRAINTS ON PRICING AND BENEFIT DESIGN

Phase 2 survey results: *Do you face this issue?*

Yes:	53%
No/rarely:	47%

Regulatory restrictions often control the actions an insurer may take in product design, pricing, and other areas of insurance business. These controls on occasion cause difficulties for insurers or lead to less-than-ideal business decisions. Respondents were evenly divided here: Less than half did not see it as an issue they face. Those who do face this issue often come from countries where private insurers have relatively more presence, compared with countries whose public sector provides most of the healthcare.

In general, by its very nature, health is a public good; health insurance is more likely to receive regulatory pressure than other types of insurance (such as life or property/general insurance). Even in countries where healthcare is largely privatized, most health insurance is underwritten to complement public health programs. As public programs evolve, it becomes necessary for insurers to adapt. For example, U.S. programs such as Medicare (Social Security for the elderly population), as well as individual state governments, often have significant input into pricing and design.

Other restrictions that were mentioned include mandates for low increases and a flat age slope—or no age slope. Political pressure on these issues is a fact of life in many regions, particularly when a federal election is approaching. It is often necessary to plan years in advance to mitigate the pressures of election cycles.

Here are more comments from respondents illustrating the nature of other restrictions:

“Certain states such as New York have community rating laws that limit pricing (or underwriting), and many states have minimum benefit requirements.”

“In Brazil, individual business may not be medically underwritten and cannot be canceled by the insurer, rates must be flat after age 60, and rate increases are limited.”

“Usually product design and calculation in Germany are free of permission by the regulators, but the supervisory authority has the right to check all the products for misuse. (Nobody knows exactly when they detect misuse.) That makes it necessary to check carefully the design and the calculations. Otherwise, the company faces the problem of removing a product from the market. This is bad for its reputation, especially when the company has relationships with many brokers.”

“We community rate in Australia. At various times there is a lot of political pressure to keep rate increases low. These particularly occur before federal elections, so it is necessary to plan years ahead in order to accommodate the pressures when they are applied.”

In addition, other regulatory constraints exist beyond pricing. These include Health Insurance Portability and Accountability Act (HIPAA)-related issues in the United States pertaining to who must be covered in group plans and how much they can be required to pay. In Hong Kong, by contrast, the regulations

Solutions to common regulatory issues often develop in one place and spread quickly elsewhere.

are significantly less strict. Insurers are free to decline individual members within a group and adjust their premiums to specific individuals. Health coverage in some countries is secondary coverage added to life coverage, and because the health markets are not as developed, the regulations are also more sparse.

Addressing these issues

A number of factors come into play with these issues. In markets like Germany and Mexico, some regulators operate with strong directives, dictating terms that the insurer has limited or no choice but to comply with. In other areas, such as the United States and Canada, actuaries develop more collaborative relationships with regulators that enable them to discuss various issues and the efficacy of proposed changes with them.

One interesting trend is that solutions to common regulatory issues often develop in one place and spread quickly elsewhere. For example, changes in Brazil and Canada are currently under way based on recent developments in the United States. Many respondents said their goal is that, while some groups may be overpriced and some underpriced, the revenue targets are achieved in total. In addition, when possible, the relationships with regulators are important as a means of predicting and affecting the behavior of the regulators.

Sharing successful results in these areas seems to be fairly common, and good ideas frequently motivate others to follow suit with similar changes. Although regulations often cause additional challenges, many respondents acknowledged their importance to ensuring individual company solvency and market stability.

PRACTICE: ADVICE ON PRODUCT DESIGN

Phase 2 survey results: *Do you perform this task?*

Yes:	94%
No/rarely:	6%

Input on product design is another area that is common to healthcare actuaries everywhere, as the overwhelming number of respondents who said they perform this task indicates. In fact, many people likely consider this set of tasks a core element of what defines actuarial work.

In practice, providing advice on product design generally breaks down into three steps:

1. Compare to competitors' products and pricing

Analysis of competitor products is a critical step in the review of existing products. Actuaries in most parts of the world report similar responsibilities and experiences.

Here are some representative comments from respondents about the major steps performed as part of looking at competitors and market products and pricing:

"Research for new coverages offered in the market."

"Check regulatory requirements, market practice, and data availability."

"Identification of target market and primary competitors and competing products. Determination of planned distribution channel. Articulation of product design guidelines, e.g., competitive pricing benchmarks, channel compensation benchmarks, profitability metric and target levels."

2. Discuss design and pricing of various options with others

Once actuaries have received input from stakeholders and analyzed competitor products, regulatory constraints, and other factors, they typically begin to work out the design and pricing of the product. Again, this is a highly collaborative area and, at this point in the design of a product, actuaries are often engaged in bringing their expertise to bear on coordinating and balancing the interests of many others.

Here are some points respondents made about this part of the process:

“Once a year, I receive inputs from the product management and medical area about the need to update several coverages. I evaluate the request in terms of cost and frequency. If I have experience of the company, I get data from it. If we don't have data, the medical area obtains data from the population and I adapt it to the company's portfolio. If we need to increase the premium risk rates, I submit the final decision to the executive board.”

“I get involved as early as possible and preferably attend steering committee meetings. Thus I know the rationale behind the product design and can give broad advice early in the piece. (I am amazed at the ability of marketing types to calculate approximate but always too low rates, and then rationalize why they are right and I am wrong.)”

“We used a feasibility study, assessing profit potential with costs of IT system management. This represents a major issue, since the new product must be properly handled by the IT system.”

“A brainstorming session helps us find unique selling propositions for a first product draft with the main coverages.”

3. Combine market-driven and internally focused traditional product design

The last step of advising on product design represents still another point where actuaries must perform a delicate balancing act, taking into account details of the design relative to the product's specific market, the individual company's internally driven financial goals, targets, and other requirements, and the fit for consumers or other end users of the product.

Some respondents provided the following details:

“Look out for product risks, such as anti-selection, churning, etc., and suggest mitigation solutions.”

“Ensure product design will not create strain to administration and hence incur higher expenses than necessary.”

It's noteworthy that there is actually very little variation in this overall process from country to country. Actuaries appear to be very involved in product design in most places globally.

PRACTICE: CALCULATION OF PREMIUM RATES

Phase 2 survey results: *Do you perform this task?*

Yes:	94%
No/rarely:	6%

This is another area where the role of the actuary seems to have little discrepancy around the world. A practically undisputed role of actuaries is to calculate premium rates.

But if the role is viewed similarly everywhere, the process associated with it can diverge from one region to the next. It appears there are two general methods used to develop premium rates:

- Detailed development of costs
- Loss ratio calculation methods

In Australia, most of Europe, the United States, Mexico, and elsewhere, historical claim costs are reviewed by group to project future claim costs. Then those projected claim costs are adjusted for other costs, such as administrative, claims processing, and profit, to arrive at the final premium rate. In Europe, sometimes additional statistical methods are employed to examine deviations and try to correct the premiums based on that.

In countries such as Hong Kong, however, premium calculation is often driven simply by loss ratios rather than by detailed claims. It's also not uncommon for smaller insurers there to rely on reinsurers for help.

Respondents using either of these approaches reported using credibility weighting of results by group as an important final step.

Still another variation is usually seen in Brazil (although it is not obligatory), where premium rates are modified if, in six out of 12 months, actual claim costs exceed the premium. That will trigger an increase, though it doesn't seem to allow much latitude for random statistical volatility, which can happen.

The rigor applied to developing premiums varies by country, and appears to be directly correlated with 1) the level of detailed data available, and 2) the size of the private healthcare market. Many countries have published standards of practice that support actuarial pricing work, developed by local actuarial associations.

We received some interesting details about this process:

"Actuarial is responsible for the calculation of manual rates, but Underwriting is responsible for the calculation of case rates (blending experience and manual rates)."

"Usually the most important product is rated solely on its experience and claims trends (grouped for less significant items). The less important products are also rated on this basis, but rates are adjusted to allow for relativities with the most important product. Ultimately, the whole portfolio is modeled to ensure future bottom-line results are appropriate and solvency/capital adequacy issues are addressed."

"We don't use complex statistical/stochastic methods. Basically, we analyze the information based on our own experience, and we try to project the evolution of the results in advance of the expected changes of average costs and frequencies for each one of the processes in which we have split the coverage. In case of positive or negative results of losses, we analyze the results, identify the origin of the deviation, and correct the premium, trying to determine if the deviation is momentary or indicative of a change of trend."

PRACTICE: RESERVING – INCURRED BUT NOT REPORTED LIABILITY (IBNR)

Phase 2 survey results: *Do you perform this task?*

Yes:	78%
No/rarely:	22%

Reserving for incurred but not reported (IBNR) claims is an actuarial responsibility that is handled differently around the world. Although many different kinds of actuarial reserves exist, this survey question focused specifically on the calculation of IBNR reserves.

In the United States, actuaries have been required by law to perform reserve estimates for some 50 years, whereas much of Latin America is relatively new at making such calculations. In Brazil, this reserving became obligatory in January 2008 for all health plan companies. It is commonly done in Australia, Europe, and Mexico, but not consistently in Germany. When a specific method for calculating IBNR was offered by respondents, it was the lag/development method. Some other interesting adjustments included different holidays and celebrations (Christmas, Ramadan).

When the lag/development method is used, the method appears very consistent:

1. Query claims data by paid and incurred months.
2. Develop a "lag triangle" of data to look at claims by paid/incurred month.
3. Identify data anomalies, including asking other parts of the company for details about changes in claim processing, network information, and other factors that affect claim inventory.
4. Adjust for the anomalies and develop final completion factors.
5. Calculate best estimate of claim liabilities, either in aggregate or on a per-claim or per-member basis.
6. Perform sensitivity analysis.

These methods appear with the U.S. Actuarial Standards of Practice (ASOP) #5.

Some noteworthy specific inclusions in this process include:

"Add a margin for adverse deviation to achieve a 75% confidence interval."

"Comparison of results for multiple methods used, and normally choose the one which produces the most conservative IBNR estimate."

"Reasonableness checks by looking at the movement of IBNR over the last few years."

"For early months in the triangle, usually rely on past averages of completion factors to set the completion factor for any particular month, but we smooth the results. For months in which we find the completion factor not to be fully credible, we also review projections of PMPMs [per-member per-month costs] from prior months. For these months, we make a PMPM projection using observed trend (combined with judgment), and review whether there is any seasonality. The final completion factor is chosen by judgment using all of this information (both the historic completion factor and the projected PMPM)."

"Obtain estimates of incurred claims by claim type. Program allows for adjustments to be made for claims in recent months. Outstanding claims is a simple calculation once incurred claims are established. An expense component is added. A sufficiency margin is added. Reinsurance allowances are also included."

"We calculate a historical series, defined by law. It takes into account medium cost and number of claims of the last three years to obtain a medium cost of IBNR claims for next year."

In the United States, the American Academy of Actuaries' Actuarial Standards Board has published Actuarial Standards of Practice #5 for Incurred Health and Disability Claims. At time of this report's printing, this publication was available at: www.actuarialstandardsboard.org/pdf/asops/asop005_076.pdf.

ISSUE: HIGH MEDICAL INFLATION

Phase 2 survey results: *Do you face this issue?*

Yes:	50%
No/rarely:	50%

In general, medical trend exceeds medical inflation, which in turn exceeds general inflation. Medical trend in this context refers to increases in overall medical costs from changes in cost per service and utilization. Regulators and consumers don't expect rates to increase by this amount. This particular survey question prompted split answers from respondents: 50-50 between those experiencing high inflation and those reporting none or only minimal levels. The primary reasons respondents did not consider high medical inflation an issue are that the products are indemnity or cash products, or they are offering products whose costs are closely controlled by regulation.

Australia, which reported little inflationary impact, has adopted a policy that strongly encourages bargaining to force efficiencies in hospital systems as a counter to inflation. Asia respondents said

inflation is not a problem because private insurers sell mostly daily cash benefits or indemnity products. They are insulated from inflation because their plans have fixed pay-out provisions. If you get cancer, for example, the plan may simply pay out something like \$500 a day, as opposed to taking risk for the actual medical claim costs.

Germany doesn't have any capability for utilization and disease management programs because of strict privacy laws that preclude the insurer from receiving detailed claims data.

Germany doesn't have any capability for utilization and disease management programs because of strict privacy laws that preclude the insurer from receiving detailed claims data. Because of this, German insurers are experiencing high rates of inflation currently. In Germany, they have no approval process for people going to the doctor and thus they have no way to control or manage patient behavior.

Many respondents noted that high medical inflation is a major issue. High medical trend has been a well-documented issue in the United States. In several markets, the media have helped spread the impression that insurance premiums should not rise, which causes additional market pressure. Some key causes cited for high medical inflation include:

- Physician and hospital demands for higher tariffs for their services, using a combination of economics and politics to justify their demands
- New and expensive emerging technology
- Increased consumerism
- Aging of the population
- Monopolies in place by pharmacies and providers
- Increases in consumer fraud

Here are some examples of how respondents described the issue:

“Inflation is often confused with increased utilization, changing unit costs, or changes in consumption mix.”

“[The] medical area is having a lot of problems negotiating new tariffs with the health system.”

“There is an international marketplace for nurses now. In the long term, economically advanced countries are going to have to make nursing and medicine more attractive for workers. This means high medical inflation for some years.”

Addressing this issue

Although cash and indemnity products do effectively remove insurer risk for high medical inflation, they are not long-term solutions as consumers demand higher coverage levels. In markets where the insurers are accepting risk for medical inflation, there are many primary approaches being used to control costs:

- Create product design and controls at the consumer and provider levels
- Monitor and analyze key inflation trends on a regular basis
- Compare results with external benchmarks to identify cost drivers
- Build in automatic cost indexing to match market trends
- Take a stronger bargaining position with hospitals and physicians to counter increased costs
- Provide education programs for insureds at large
- Exclude some treatment options from insurance coverage
- Intensify review and scrutiny of claims
- Make greater use of utilization management for claims
- Scrutinize medical “pipeline” for new drugs and technology
- Increase insured cost-sharing provisions
- Set limits to benefits
- Use company surplus to permanently reduce premiums
- Charge very high premiums

How successful has this been?

The overall conclusions of the responses were that either the marketplace understands and accepts that medical trend is higher than general inflation, or it does not. In the first case, there is less of a problem

because the additional costs are appropriately built into premiums. In the second, it is an ongoing problem that likely only additional education can fix.

Responses varied, but most actions (other than including in pricing) seem to work only at the margins. One respondent in North America, for example, described efforts toward product design and controls at the consumer and provider level as “successful but risky.”

European respondents saw only limited success. “When increases to fees become a must after we’ve done our best to freeze costs, we factor in the increase in the actuarial indications and we recommend premium be adjusted,” said one, adding that management often adopted their recommendations only gradually.

Another European respondent says, “Utilization management is very poor here and not well developed. Providers have a lot of market power and so case rates are not always allowed by the providers. The member ends up sharing more of the cost generally.”

In an Asian country, by contrast, healthcare coverage is a niche product, and is sold mainly to a more affluent population. At present, medical inflation is typically not as severe an issue because of the structure of the benefits.

Some Latin American health insurers face the challenge of providers’ monopolies, because they have supplemental or “double coverage” healthcare systems where a public system provides basic coverage and additional coverage may be purchased. This additional coverage allows people with private health insurance to push to get access to expensive, monopolistic facilities, where it is difficult for insurers to negotiate meaningful discounts.

PRACTICE: FINANCIAL FORECASTING

Phase 2 survey results: *Do you perform this task?*

Yes:	67%
No/rarely:	33%

Financial forecasting is less common in Canada and the United States and more common in Asia or even Mexico. Many of those surveyed in Phase 1 didn’t respond to this section at all, which may mean that they don’t do it, or that the question confused them. We expect that in those cases in which the actuary is not involved, the task is completed by another department. Financial forecasting is more common in Asia because most actuaries are involved in medical insurance coverage that exists as a rider for life insurance, for which these forecasts are commonplace.

The level of actuarial sophistication in financial reporting appeared to vary greatly as well. The primary factors included in financial forecasts include:

- Premium and membership levels
- Claim cost levels
- Reserve run-off estimates
- Expense forecasts, and varying levels of detail
- Trend projections
- Investment interest-rate projections
- Sales targets from the marketing department
- Sensitivity and scenario testing for market or other events
- Estimation of taxes
- Estimation of solvency margins and other capital costs

Some respondents reported performing asset-liability management (ALM) or European embedded value (EEV). A variety of software applications is used for these models, ranging from Microsoft Excel to highly sophisticated, proprietary software.

There was some variety in items included by respondents for forecasting:

“Obtain sales targets for various products from marketing. Set the assumptions for claims, persistency, reinsurance ratio, and reinsurance recovery ratio. These assumptions are set based on pricing assumptions or actual experience, sales numbers, assumptions, and in-force data. We input this information into the model, run the model, and then check results.”

“Projections are being conducted through a very rough approach. A more refined methodology will be introduced in due course—that is, projections will be conducted by classes of risk and will be showing number of insureds, number of claims, premium and average claim cost, etc.”

“Verify past data to credibility, compare new data with results of last forecast. Was the result within the tolerances of model? If not, identify the reasons: erroneous model, false assumptions, data outlier, others.”

ISSUE: LACK OF CLARITY OF THE DOMAIN OF THE ACTUARY

Phase 2 survey results: *Do you face this issue?*

Yes:	53%
No/rarely:	47%

In some markets, actuaries have been leading professionals for decades. In others, the actuary is a relatively new professional.

In some markets, actuaries have been leading professionals for decades. In others, the actuary is a relatively new professional. In these emerging markets, actuaries face a particularly large struggle to define their roles, communicate their value, and be fully appreciated.

Results in this section varied widely. Economists, statisticians, and accountants are the three groups who most often appear to take on tasks more typically associated with actuaries elsewhere. Some people who have no training in any of those areas may end up with responsibility for some actuarial tasks.

European actuaries tend to have more narrowly defined responsibilities, whereas Australians have a wider scope, although in Europe over the past five years there has been a significant increase in the range and understanding of what actuaries do.

In Singapore, the scope of the actuary is specifically dictated by law. A respondent in Singapore said the work is very difficult because of all of the other things put on his plate.

In Brazil, where lack of clarity may be among the greatest, actuaries can have diminished roles; responsibilities normally associated with actuaries are handed off to accountants, economists, or statisticians.

In Mexico, actuaries are well respected professionals and have a wide range of responsibilities including some that are stated by the regulatory framework, such as development of premium rates, reserves methodologies, and solvency or dynamic capital adequacy tests. Because of their background, actuaries are found in most areas within an insurance company, from underwriters to general directors and including IT and sales managers.

In the United States, actuaries are policy-makers and price-setters; they also work with marketing departments and regulators.

Here are comments from respondents on common themes that emerged around this issue:

Others often attempt to take on actuarial roles:

- North America: “Other areas unaware of expertise/value actuaries can bring in a variety of areas due to their lack of understanding of the complexity of insurance products.”
- North America: “Certain people believe they can interpret data without use of actuarial, e.g., paid claims versus incurred claims for long-term disability coverage.”
- Europe: “Actuaries are mainly seen as experts in the life insurance field only.”

Some actuaries look outside to define the domain:

- Asia: “The scope of the actuary is not clear. Underwriting, claims processing, and other operational areas are passed on to the actuary to decide sometimes. Sometimes the actuary has to make decisions without necessary information or control of the situation. Management doesn't make it very clear whose responsibility it is to make some of these decisions and there is a lack of accountability to the decisions made.”
- Asia: “In Singapore, the domain for actuary is well-defined. There are regulations on the role of the appointed actuary, and the roles of actuary on actuarial functions and risk management disciplines are quite clear.”
- Asia: “Actuaries are not many in Malaysia and thus work is confined to traditional roles such as valuation and pricing.”

Other constraints limit the actuary's role:

- Europe: “When actuarial skills are used in the health insurance field, they are asked to limit their role in premium and reserves calculation.”
- Europe: “There are new international developments which are sometimes difficult to implement because of the national situation.”

Addressing these issues

Two primary strategies were cited by respondents for dealing with this issue.

Some look to demonstrate a broader role:

- North America: “We foster discussion, communication, education–leadership within the company.”
- Europe: “I provide lots of explanations and try to make the actuary a real person.”

Others are careful to limit the domain:

- Asia: “Try to limit your tasks to the ones that are closest to 'actuarial' (e.g., premium calculation, valuation, etc.). Provide suggestions and advice on other 'non-actuarial' issues. People will appreciate suggestions and advice from an actuary. Prioritize work. Define scope of actuarial work in the company.”
- Asia: “During the course of the project, whenever there is confusion about roles, the proposal becomes our reference. What is critical, though, is that protocols with respect to roles and activities are followed throughout the engagement.”

How successful has this been?

Defining the actuarial role from place to place remains an open and often difficult issue. One respondent said that the prospect of educating others within his company about the role and value of the actuary is “reasonably successful but painfully tiring.” Another respondent said that her efforts are “rarely successful, depending on the clients' intention.” In general, actuaries communicated that they needed to take initiative to help educate others and perform well in a companywide setting to increase the role of the actuary.

One respondent wrote, “It is important to show insurance companies that actuaries can really help in the whole process, i.e., product design, rating, underwriting, claims, and reporting. The best way to achieve this is to be heavily involved in a software solution development.”

It appears that the growth of the actuarial profession in emerging markets is critical, and is based on stronger competency, education within the company, and continued enhancement of the role and value of the actuary.

Defining the actuarial role from place to place remains an open and often difficult issue.

Another challenge the actuarial profession faces is to increase the number of countries with formal actuarial training. There are still many countries in the world that do not offer such formal education programs for actuaries in general, and even less for healthcare actuaries.

ISSUE: WILLINGNESS OF CLIENTS TO PAY ACTUARIAL FEES VERSUS CHEAPER RESOURCES

Phase 2 survey results: *Do you face this issue?*

Yes:	28%
No/rarely:	72%

In some markets, the actuary is viewed as nearly being in a compliance role, there to help the insurance company satisfy regulatory requirements.

In some markets, particularly those where the value of the actuary is not fully appreciated, it is difficult for actuarial consultants to negotiate higher rates, or to find insurance companies willing to pay higher salaries for actuaries. In areas affected by this issue, such as Brazil, competition most frequently comes from academics, in-house actuaries, reinsurers, third-party administrators (TPAs), and “less than professional” actuaries; in some cases, there is also a general ignorance of the need for actuaries. As a result, actuarial fees can appear shockingly low in affected regions, even taking into account adjustments for market-cost system differences. In Europe, on the other hand, actuarial consultants charge quite a lot more than in the United States—as much as 30% more, adjusting for differences.

In some markets, the actuary is viewed as nearly being in a compliance role, there to help the insurance company satisfy regulatory requirements. In these markets, the actuary is viewed as a mandatory requirement, not as a strategic partner who adds value.

Actuaries are highly skilled, qualified professionals, but the willingness and ability for markets around the world to bear higher costs for them varies greatly. The greater the perceived value and understanding of the role of the actuary, the greater the willingness to pay higher fees/costs.

Addressing this issue

The survey respondents offered a variety of methods they have used to solve this issue:

Some solutions are basic sales techniques:

- Asia: “At first contact, we determine what the client requires and is willing to pay. We provide a ballpark figure up front. If they seem hesitant, we will decline to send a proposal.”
- Asia: “The choice of primary consultant seems to be important. No matter how high the quality of the calculations and the report, much of the client’s appreciation of the project rests on the meetings with the primary consultant—especially the initiating meeting and the final presentation meeting.”
- Asia: “It helps to have a good relationship with key decision-makers.”

Other solutions relate to alternative arrangements:

- Europe: “Work directly with third-party administrators instead of working with insurance companies.”
- North America: “We do combinations of fixed fee and contingency arrangements.”

How successful has this been?

Despite frustration, a number of consulting actuaries answered the question about the willingness of clients to pay actuarial fees—demonstrating that they maintain a livelihood. Some comments we received:

- Europe: “We haven’t solved it yet!”
- Europe: “Promotion is still in its early stage and thus its impact cannot be properly measured yet.”
- Asia: “We have been reasonably successful. It really depends on our ability to accurately screen prospects. Also, our ability to match the consultant with the client is important. We need to consider personal styles and chemistry.”

APPENDIX A: PHASE 1 SURVEY REQUEST (ACTUAL SURVEY ADMINISTERED)

SUBJECT: IAAHS Survey: Phase 1: Important Issues in Your Country - Your input requested
DATE: January 23, 2007

Fellow IAAHS Members:

For actuaries working in the medical expense (or health plan) area, we would like your input in compiling and ranking a list of the most important tasks, issues, and obstacles actuaries are facing in your country. This is Phase 1 of our survey effort. We will then use the information from your responses to refine a list of common issues, for which we will request additional information.

We would like your input about which items are key tasks, issues, or obstacles in your country. Please respond by **Thursday, Feb. 1**, with your responses, to Mary van der Heijde at mary.vanderheijde@milliman.com.

Phase 1 Survey:

What is your country? _____

Who is your employer? _____

(Note only general type, such as insurer or consultant.)

1. In your country, what are the tasks which health actuaries are expected to perform?

Please indicate which items are tasks actuaries are expected to perform, either by bolding or highlighting those tasks, or deleting those items that are not important to you. Also, please add any important items not included on the list.

- Data collation
- Detailed data analysis
- Processes/Workflow for non-actuarial items
- Development of systems reporting on items needed in rating

- Experience analysis/rating for larger groups on behalf of insurers
- Annual contribution rate review for larger groups on behalf of groups
- Monitoring of claims experience
- Calculation of appropriate risk margins
- Calculation of premium rates
- Reserving – active life reserves
- Reserving – incurred but not reported liability

- Advice on product design
- Advice on underwriting
- Classification of risk level of population
- Demographic assessment of membership
- Statutory signoff on actuarial filings
- Preparation of statutory reports
- Analysis of impact of new regulation

- Asset liability management
- Reinsurance placement
- Financial forecasting
- Business plans, other than financial items
- Mergers and acquisitions

- Direct communication with regulators
- Reporting to board/audit committee
- Marketing assistance
- Forensic auditing

- Provider reimbursement analysis
- Cost/benefit analysis of disease management
- Consulting to employer groups
- Member/trustee education
- Consulting to healthcare professionals (e.g., doctors)
- Advising companies on impact of HIV/AIDS

Please add other items if you wish, and any comments you would like to share.

2. What issues and obstacles do you encounter when trying to perform these tasks? *Please indicate which issues you encounter, either by bolding, highlighting, or deleting those items that are not important to you. Also, please add other items which are not on the list.*

- Resistance from insurers to involve actuaries
- Regulatory support of use of actuaries
- Lack of clarity of domain of the actuary (as opposed to others)
- Lack of clarity of to whom the actuary should report
- Willingness of clients to pay actuarial fees versus cheaper resources
- Actuary as part of compliance work, but not decision making
- Lack of trust of actuaries by underwriters
- Lack of awareness of role of actuaries by senior management
- Inadequate authority entrusted in actuaries
- Conflict of interest
- Broker/agent pushback
- Issues with providers (hospitals, physicians)

- Data quality and integrity issues
- Lack of standard coding conventions
- Timeliness of data
- Inadequate coding of claims data
- Insufficient data required to be captured for regulatory purposes
- Data confidentiality issues
- Lack of technical computing knowledge to manipulate large data
- Poor infrastructure, lack of IT resources

- Regulatory constraints on pricing
- Regulatory constraints on benefit design
- Regulatory constraints on risk transfer
- Non-cooperation by the regulator
- Corruption present in enforcement or creation of regulation
- Unstable marketplace
- High medical inflation
- Frequent regulatory changes affecting pricing environment
- Fear of future significant health changes (HIV/AIDS, Avian flu)
- Public facilities hurt/alter pricing for private facilities
- Small percentage of population can afford private health coverage

- Inadequate pooling of risk
- Lack of analytical support (actuarial students or analysts)
- Highly seasonal work
- Lack of resources/infrastructure for actuarial education

Please add other items if you wish, and any comments you would like to share.

Please let Mary van der Heijde know if you have any questions (mary.vanderheijde@milliman.com).

Thank you again for your assistance with this survey!

Sincerely,

Jon Shreve
jon.shreve@milliman.com

APPENDIX B: PHASE 2 SURVEY REQUEST (ACTUAL SURVEY ADMINISTERED)

SUBJECT: IAAHS Survey: Phase 2: Important issues in your country - Your help requested
DATE: March 16, 2007

Fellow IAAHS Members:

We are in the process of performing an IAAHS sponsored survey of international actuarial issues. We have completed Phase 1 of this survey effort, and need your help for Phase 2.

For Phase 1, we sent out a survey in January to all IAAHS members, asking for information about two questions:

1. In your country, what are the tasks which health actuaries are expected to perform?
2. What issues and obstacles do you encounter when trying to perform these tasks?

We received the results of this survey in early February. We give a special thank you to all of you who sent us responses. Using the responses from the Phase 1 survey, we were able to summarize leading issues that affect actuaries internationally.

Phase 2 of the survey is the more important part of this project, where we are asking our volunteers to perform interviews and gather information from other actuaries about several key questions. Our goal is to get as complete an understanding of how actuarial science is practiced in different parts of the world as possible. For each item, this could involve questions which get at certain details, or could involve asking for copies of actual work. This information will form the primary basis of IAAHS's international report.

We have included the questions from Phase 2, and welcome all members to submit responses and information to us directly, or personally contact one of our volunteers to share your information with them. We have included a list of our volunteers, and their email addresses. Our goal is to gather information from 60 actuaries, ideally with at least 10 from each continent (North America, South America, Australia, Europe, Asia, and Africa).

We would like the results of your surveys by Monday, April 9. Please send your responses to Mary van der Heijde at mary.vanderheijde@milliman.com.

Please let Mary or me know if you have any questions. The organizers of this survey and IAAHS thank you for your assistance with this survey!

Jon Shreve
jon.shreve@milliman.com

IAAHS SURVEY: PHASE 2: IMPORTANT ISSUES IN YOUR COUNTRY - YOUR HELP REQUESTED

For Phase 1, we sent out a survey in January to all IAAHS members, asking two questions:

1. In your country, what are the tasks which health actuaries are expected to perform?
2. What issues and obstacles do you encounter when trying to perform these tasks?

We received the results of this survey in early February, from which we were able to summarize leading issues that affect actuaries internationally.

Phase 2 of the survey is the most important part of this project, where we will gather information from other actuaries about several key questions. Our goal is to get as complete an understanding of how actuarial science is practiced in different parts of the world as possible. This information will form the primary basis of IAAHS's international report.

We would like the results of your interviews by **Monday, April 9th**.

Phase 2 Survey:

What is your country? _____

Who is your employer? _____

(Note only general type, such as insurer or consultant.)

The first six questions focus on the most common actuarial tasks, according to the Phase 1 Survey. For each one, the goal is to be able to compare the approaches in different parts of the world. Please answer:

- a. If you complete this task
 - b. What are the major steps you follow in completing this task
 - c. If you would be willing to share a copy of a work product involving this task (with assurances of confidentiality, or you certainly may disguise any identity or identifying information before submitting)
1. Detailed data analysis
 - a. Do you complete this task?
 - b. What are the major steps you follow in completing this task? Describe.
 - c. Are you willing to share a copy of a work product involving this task?
 2. Advice on product design
 - a. Do you complete this task?
 - b. What are the major steps you follow in completing this task? Describe.
 - c. Are you willing to share a copy of a work product involving this task?
 3. Monitoring of claims experience
 - a. Do you complete this task?
 - b. What are the major steps you follow in completing this task? Describe.
 - c. Are you willing to share a copy of a work product involving this task?
 4. Calculation of premium rates
 - a. Do you complete this task?
 - b. What are the major steps you follow in completing this task? Describe.
 - c. Are you willing to share a copy of a work product involving this task?

5. Reserving – Incurred but not reported liability
 - a. Do you complete this task?
 - b. What are the major steps you follow in completing this task? Describe.
 - c. Are you willing to share a copy of a work product involving this task?
6. Financial forecasting
 - a. Do you complete this task?
 - b. What are the major steps you follow in completing this task? Describe.
 - c. Are you willing to share a copy of a work product involving this task?

The next five questions list issues which actuaries regularly face in completing their work. For each item, please answer:

- a. Whether you face this issue
 - b. If so, to more fully describe the issue in your situation
 - c. What are the most common steps which you use to help solve or mitigate the issue
 - d. How successful those steps have been
7. Data-quality and integrity issues
 - a. Do you face this issue?
 - b. If so, please fully describe the issue in your situation.
 - c. What are the most common steps which you use to help solve or mitigate this issue?
 - d. How successful have those steps been?
8. Lack of clarity of domain of the actuary
 - a. Do you face this issue?
 - b. If so, please fully describe the issue in your situation.
 - c. What are the most common steps which you use to help solve or mitigate this issue?
 - d. How successful have those steps been?
9. Regulatory constraints on pricing and benefit design
 - a. Do you face this issue?
 - b. If so, please fully describe the issue in your situation.
 - c. What are the most common steps which you use to help solve or mitigate this issue?
 - d. How successful have those steps been?
10. Willingness of clients to pay actuarial fees versus cheaper resources
 - a. Do you face this issue?
 - b. If so, please fully describe the issue in your situation.
 - c. What are the most common steps which you use to help solve or mitigate this issue?
 - d. How successful have those steps been?
11. High medical inflation
 - a. Do you face this issue?
 - b. If so, please fully describe the issue in your situation.
 - c. What are the most common steps which you use to help solve or mitigate this issue?
 - d. How successful have those steps been?

Please add other items if you wish, and any comments you would like to share.

Please let Mary van der Heijde know if you have any questions: (mary.vanderheijde@milliman.com).

Thank you again for your assistance with this survey!

Sincerely,

Jon Shreve
jon.shreve@milliman.com

APPENDIX C: PHASE 1 RESPONSE RATES

The following table contains all of the items we queried in the Phase 1 Survey, and the percentage of respondents that confirmed that the practices or issues were relevant to their work.

NOTE: Different respondents answered Phase 1 and Phase 2, so for the questions that were repeated in Phase 2, the percentage of performing the practices or facing the issues may differ.

PHASE 1: ACTUARIAL PRACTICES		
IN YOUR COUNTRY, WHAT ARE THE TASKS WHICH HEALTH ACTUARIES ARE EXPECTED TO PERFORM?		INCLUDED AS DETAILED QUESTION TOPIC IN PHASE 2
DETAILED DATA ANALYSIS	82%	X
ADVICE ON PRODUCT DESIGN	82%	X
MONITOR CLAIMS EXPERIENCE	79%	X
CALCULATION OF PREMIUM RATES	79%	X
RESERVING – IBNR	76%	X
FINANCIAL FORECASTING	73%	X
CALCULATION OF APPROPRIATE RISK MARGINS	70%	
FINANCIAL FORECASTING	70%	
ACTIVE LIFE RESERVES	67%	
STATUTORY SIGNOFF ON ACTUARIAL FILINGS	67%	
ADVICE ON UNDERWRITING	61%	
REPORTING TO BOARD/AUDIT COMMITTEE	58%	
DIRECT COMMUNICATION WITH REGULATORS	52%	
COST-BENEFIT ANALYSIS OF DISEASE MANAGEMENT	52%	
PROVIDER REIMBURSEMENT ANALYSIS	48%	
DEVELOPMENT OF SYSTEMS REPORTING	48%	
ASSET LIABILITY MATCHING	48%	

Percentages based on 31 credible responses.

PHASE 1: ISSUES AND OBSTACLES ENCOUNTERED BY ACTUARIES		
WHAT ISSUES AND OBSTACLES DO YOU ENCOUNTER WHEN TRYING TO PERFORM THESE TASKS?		INCLUDED AS DETAILED QUESTION TOPIC IN PHASE 2
DATA QUALITY AND INTEGRITY	61%	X
LACK OF CLARITY OF DOMAIN OF ACTUARY	42%	X
INADEQUATE CODING OF CLAIMS DATA	42%	
REGULATORY CONSTRAINTS (PRICING AND BENEFITS)	39%	X
RESISTANCE FROM INSURERS TO INVOLVE ACTUARIES	36%	
WILLINGNESS OF CLIENTS TO PAY ACTUARIAL FEES	30%	X
HIGH MEDICAL INFLATION	30%	X
SMALL PERCENTAGE OF POPULATION AFFORDS INSURANCE	30%	
LACK OF TECHNICAL COMPUTING SKILLS TO MANIPULATE LARGE DATA SETS	27%	
"LACK OF ANALYTICAL SUPPORT (ANALYSTS, STUDENTS)"	27%	
"ACTUARY AS PART OF COMPLIANCE WORK, BUT NOT DECISION MAKING"	21%	
LACK OF RESOURCES/INFRASTRUCTURE FOR ACTUARIAL EDUCATION	9%	

Percentages based on 31 credible responses.



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