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Summary: Preliminary results of the U.S. and Canadian long-term disability experience studies will be presented and compared.

Mr. G. Nicholas Smith: During this presentation we will attempt to compare the U.S. and Canadian Long-Term Disability (LTD) experience study results. It was a bit difficult to do a good job of comparing the studies due to the fact that the data are preliminary and the numbers are still in raw format.

Basically what I want to cover here is: some background information on the study; the timetable for publishing results of the U.S. LTD experience study; the results up to this point; some termination tables; and issues raised by the study. Since we have been working on this experience study for a couple of years we feel it is time to wrap up this phase and publish the results thus far. It looks like the study will be a continuous process. We are going to publish results in the form of what I have termed, partially smoothed data. This is intended to allow graphical viewing. If we use the raw data, the results cannot be viewed as well due to the "spikes."

I have both complete and partially smoothed tables. The reason I have both is because the technique I use to smooth the data can handle any real bumps, and

essentially follows the real curves of the table; however, without the partially smoothed table I would not be able to see any anomalies. So for the next month, I will work on creating a partially smoothed table, which is probably just a moving weighted average of the numbers.

Finally, we have some new data that include an incurred but not reported (IBNR) analysis and some Social Security information.

The mission of the LTD experience committee is to gather, analyze, and publish data for three audiences: the insurance regulators, insurance companies in general, and participating companies. The short-term goals and objectives of the study were to initially resurrect the 1984 Report ("Report of the Committee on Group Life and Health Insurance: Group Long-Term Disability Insurance." *Transactions, Society of Actuaries (SOA)*, 1984 Reports, Imperial Printing Company, St. Joseph, Michigan, 1988, pp. 243-300); publish some comparison data to the Commissioners Group Disability Table (CGDT); and possibly publish a modification table for the CGDT. We are trying to decide whether we will be able to publish a modification table by year-end. In addition, we aim to address acquired immune deficiency syndrome (AIDS) and maternity reserving, and split deaths and recoveries.

In the long term we want to create a new smooth valuation table. It is my hope that each year we do this study, we will publish a smooth table and one of those will become the new valuation table. Overall, the long-term goal of the LTD experience study is to make the valuation process a little more sophisticated and up-to-date, in an effort to address the current issues.

As previously mentioned, the study has been in progress in excess of two years. It started as a pilot, but has grown into the official study at this point. We have been holding meetings periodically over two years. At the SOA meeting in Vancouver in 1995, we released some preliminary results. We then proceeded to use input from that meeting to distribute more complete results at the Colorado Springs meeting. Much of what we distributed in Colorado Springs is included in this presentation along with the additional IBNR and Social Security tables. Now we are at a point where the data are complete enough to publish.

We have asked for input several times over the course of the study. We would like to publish information in a format that is useful and relatively complete. We have a lot of additional data that could be published. We need some guidance as to what information would be most useful, and what format it should appear in.

We created the diskette in part to answer some of these questions. Last winter (1995) I created what was called Table 95 and that had smooth results, but it had an

anomaly. We had split disabilities into four types: (1) maternity, (2) AIDS, (3) mental and nervous, and (4) other. These disabilities would blend into the ultimate table via a step function. Since the disabilities were not blended in Table 95, the step function created an anomaly. Now that Table 95a has blended this anomaly, it is no longer a problem; however, the blending makes the table somewhat less accurate. Table 95a was handed out in Colorado Springs and there has not been an update at this point. Table 96 will be created at year-end 1996 by a final passback through the data and by adding more data. Table 96 will be a smooth version and is intended to remedy a few of the problems of Table 95a.

Table 95 had seven company participants; Table 95a had eight company participants, and Table 96 will have 12 participants. We have data from four additional companies that we have not had a chance to analyze.

The data collection process begins with solicitation of companies. Any new participant data will be used in winter 1996 to start the next phase of the study, Table 97. Solicited data is converted to a standard format and is extensively audited. The first pass of these audits generally results in at least as many errors as there are records. Working with the participants, these errors are reconciled. This can involve changes to the program algorithm that are able to handle errors resulting from such things as conflicting fields.

Follow-up audit materials are sent to companies after the initial analysis of their data. The follow-up audit packet details the errors found in the data and makes suggestions on how to resolve them. Once we have come to agree that the data are relatively error free we will produce the table.

The study is not trying to impose a fixed format. We are simply asking for a dump of claim system data which is then processed and cleaned-up. We want companies to concentrate on resolving specific audit issues and pulling claim files, rather than worry about data processing (DP) requests or doing data conversion. In this way, the LTD experience committee has more work to do in terms of formatting data; however, the committee has received more data because of this procedure.

The experience study has the ability to handle 70 data fields. Between 20 and 45 fields were populated depending on the participant. In addition, there are currently 64 audit codes produced by routines that detect problems with submitted data such as inconsistent dates and nonexistent sexes.

The tables are created by a statistical analysis system (SAS) program. SAS uses a smoothing technique that is able to fit a very complicated series of weighted exponentials to the data. This enables us to create a formula that will reproduce the

data and interpolate, between any age, any elimination period (EP) or any other variables you may want in there. It is quite easy to add another risk variable if we want to. We are considering adding salary, and we will test this at some point, probably in Table 97. The formula also enables us to produce the diskette that we will be showing. The diskette recreates the table in any form that you want, and allows a considerably deeper number of table variations than you could possibly publish in a hard copy. This completes the history phase of the study.

Currently we are gearing up to start creating the official material that we will publish. We are seeking suggestions on anything from the content of the data to the format in which it is presented. The only input we have received since Colorado Springs concerns cause of disability. We have had two companies report that the split of the four causes of disability into AIDS, maternity, mental and nervous, and "other" does not coincide with the way they currently separate cause. Because of this, they require a system change and would like to have a merged table. Therefore, at this point, we plan to publish the four causes of disability tables, a merged table, and a table that has all but maternity combined. I have real concerns about people trying to reserve for maternity off of a regular basic table. If you build the table, people are still going to make assumptions about the benefit duration if the cause is maternity.

The experience study's goal is to deliver hard copy results to the Society by the end of 1996 so as to be included in the 1996 Reports (*Transactions*, SOA).

From the Floor: It will be included in the 1995–96 Reports, which will probably come out in April.

Mr. Smith: The results will also be published on *Actuaries Online* (<http://www.soa.org/>) at that time. Now we will discuss some actual results. Table 95a had access to 250,000 records, of which we used 178,000. I expect to add close to 100,000 records to Table 96. The auditing process made the data reasonable enough so that we have fairly good confidence in the results.

The preliminary findings come from analyzing data from eight companies. The experience that each company showed was fairly tight. I believe this is one of the things that differs from the Canadian experience and is a place where the two studies have some variance. Within the eight companies, the major cells were quite close too. We all know the CGDT was conservative. Let's discuss some estimates derived from running the portfolio of data in its entirety through it. These estimates are not for any particular cell that varies on age or duration. Aggregate terminations were 180% of the CGDT and 165% of the CGDT basic. You may want to note that where companies did not have good death data I used Social Security death

records. I was able to obtain 20 million Social Security death records which aided the process of splitting deaths and recoveries.

The data was looked at by the following splits: elimination period (30, 60, 90, 180, 360 days); sex (male/female); cause (AIDS, maternity, mental and nervous, "other," and combined); and termination reason (death, recovery, combined). The combination of these splits can produce about 150 tables, and now that we have decided to combine AIDS, mental and nervous, and "other," this pushes the number to about 180 tables. These numbers highlight the challenge we face in deciding what to publish in the reports. What's more, not only do we have these data for the actual, but also for the partially smooth tables, and eventually Table 96. Due to these various forms, we have too much to publish. As mentioned previously, we will also be publishing IBNR and Social Security analyses which are will be discussed later in the presentation.

The termination tables as part of Table 96 will be on a diskette for some sort of distribution. Also, as part of this diskette there is a very sophisticated reserving algorithm that is intended for a critique of the table. It was handed out at Colorado Springs and has since been enhanced. Although still not complete, the CGDT, CGDT basic, and Table 95 are on it. Table 95a is not on the diskette but it is very close to Table 95.

Let me give an overview of the tables included in the 1984 Reports. These reports had information primarily on incidence; they had a table for three elimination periods: 90, 180, and 360 days; and they had a few actual-to-expected reserve analyses. The current study has considerably more information; however, as previously mentioned, we are uncertain as to what to publish.

From the Floor: Is there a list of tables that we can make publication suggestions from?

Mr. Smith: Not really. Whether all of these results get published in the reports is questionable since the information is fairly extensive. In addition, we keep thinking of more information we could publish.

From the Floor: A checklist would be helpful, since with open feedback you could end up with too many suggestions.

Mr. Smith: The Society will make editing decisions.

From the Floor: Do you have any information, and do you have any intention of publishing anything in regards to interest rates?

Mr. Smith: Not at this point. The consensus on incidence information at the initial committee meeting was either that the companies did not have this information or they considered the information proprietary.

From the Floor: Is there enough separation of accidents?

Mr. Smith: We have the ability to separate out accidents which would create another cut of the data. Because this study began as a pilot, we intend to use the data as a way to gain more understanding of termination rates. The data we have is so extensive we have not had time to look at all the aspects such as separating out accidents.

From the Floor: Will the pension analysis information that you were going to make later be by number of claims?

Mr. Smith: This is all by number of claims.

From the Floor: Does anything come up?

Mr. Smith: No. However, we do have a table by salary. We have looked at a bunch of other parameters and do not see anything nearly as significant as salary. The way I create Table 95 or 96 is I can add salary as a variable. If we did this, we would end up with something like 600 tables instead of 150 tables. We purposefully constructed the tables this way so that we could add variables easily. The other option would be that I just flip a switch and have the table constructed using salaries. This would change it somewhat.

From the Floor: Have you analyzed partial terminations?

Mr. Smith: I have not had a chance to get to that. There are some partial terminations in the data but not a large number. Partial terminations are part of what I consider residual issues. Others include settlements and buyouts.

The current study includes more records, and is much more extensive than what was published in the 1984 Reports. In addition, compared to the CGDT, which included the 1984 Reports, the current study has more data. The presumed conservativeness of the CGDT is compensated for by modifying the front end. This is one of the issues for the current study since we must decide if we should publish an official modification table based on this study experience, or if we should simply publish the study data so that people can use it to modify the CGDT.

From the Floor: It sounds like you are talking about publishing a valuation table. Wouldn't this be done in two separate steps: publish the table, and then publish the valuation table?

Mr. Smith: Yes, it would. However, I was not talking about a valuation table. It would be a bit of a leap here, but since you are allowed to modify the table, you could conceivably conduct your own study and find that your actual-to-expected (A/E), even though it may be based on 100 records, ties back to Table 96. With just one actual-to-expected, you could judge whether it is an applicable valuation standard for your business; therefore you can use the front-end part as the modification. You don't need to have enough data to construct your own table.

From the Floor: So valuation is something that the state would have to deal with, and in this way, is it still an issue?

Mr. Smith: Yes, they do not have to approve your modification; however, you are required to demonstrate that you use proper techniques to create it. Of course, we hope to move on to a new table very soon. For example, the CGDT only runs out to age 62 which is a little short for current ages. I have been contemplating having the current study tables always go out to age 75. If this does not seem appropriate we can go out farther.

Let's make a couple of comparisons to the CGDT. The study dates for Table 1995 are January 1, 1987 to June 30, 1995, whereas study dates for the CGDT were from January 1, 1975 to December 31, 1980. The number of records for the current study are approximately three times the number used for the CGDT. Table 95, 95a, and 96 are marginless tables; whereas, the CGDT rates are 90% of the basic or fitted table. One additional feature to the current study table is that there is an own occupation point built into the table and there is a spike where the own occupation point is. Own occupation was not part of the contracts when the CGDT was constructed.

We tried some segmentation in order to get an actual prospectus. As mentioned previously, salary was the most significant variable. We did not find much variation by standard industrial classification code or state. We did find a little variance with the cost-of-living adjustment (COLA) but we do not have a lot of data.

Let's recap A/E findings (CGDT Basic). We need input on whether we should use the basic or the valuation table for comparison. Overall A/E is 165%. By duration, 0–6 months is 211.6%, 16–18 months is 112.5%, 19–24 months is 237%, and the tail is 165%. The large discrepancy for the 19–24 month duration can be attributed to own occupation coverage. By sex, A/E for males is 138%, and for females it is

186%. Females mark higher due to maternity. Finally, the 180-day elimination period was closer to the CGDT than the 90-day elimination period table.

From the Floor: Is the 16–18 month duration supposed to be 7–18 months?

Mr. Smith: No, those months are picked out randomly. Overall, these results show reserve conservatism to be in excess of 10% against the basic table. It is probably closer to 15% but it depends on your portfolio.

There are some issues we are hoping to get suggestions on. We have a question on select-to-ultimate transition timing for select periods, maternity deaths and recoveries, and AIDS deaths and recoveries. As mentioned previously, we need to decide if we will publish anything on salary. We also have questions about conservatism. If Table 96 is considered a quasi-valuation or becomes a new valuation standard, should we put any conservatism in it or should we publish the modification to the CGDT? Also, what should be put in for that? Comments we have had on reserve by cause include suggestions ranging from merging cause down to one and separating cause into 10 or 20 different categories.

Another issue we need to address is the own occupation spike. You will see through a demonstration of the disk that there is a spike in the chart where own occupation definition of disability ends. Finally, table bounds or specifications need to be decided on. There are some ideas on the feedback form that you can refer to.

There are other variables that we considered running A/Es for. For most of them we did not find anything particularly significant, other than the salary, which is why we smoothed them.

From the Floor: What was used to test the significance of these variables?

Mr. Smith: Variance from 100% was used to test the significance. The data are fairly tight around 100%.

From the Floor: Did you run a single variable like an aggregate?

Mr. Smith: Yes, actually it was an aggregate.

There are some actual-to-expected analyses that we have not looked at and probably will not look at in this study at this point.

There were some issues about merging the disability by cause tables and having one table. Because of requests, we will create the one table. However, with the

maternity running at 417% of the CGDT basic table, I think maternity should have its own table. The reason AIDS is 64.7% and not close to 100%, as compared to the experience study, is in large part due to the blending of the separate tables in the select part to the ultimate. This causes the distortion I mentioned earlier. Table 95 is actually a little more accurate; however it creates real strange looking tables when you have the step function going from their own table to the ultimate deaths and recoveries. In this way, a blending was done in order to smooth the data.

Finally, I have already mentioned that salary appears to have some correlation with terminations. An actual-to-expected analysis (CGDT) for the total terminations by salary show an approximately 10% spread going from low salary to high salary. Because this is a fairly logical progression, it appears to be a real phenomenon and something we may want to take into consideration.

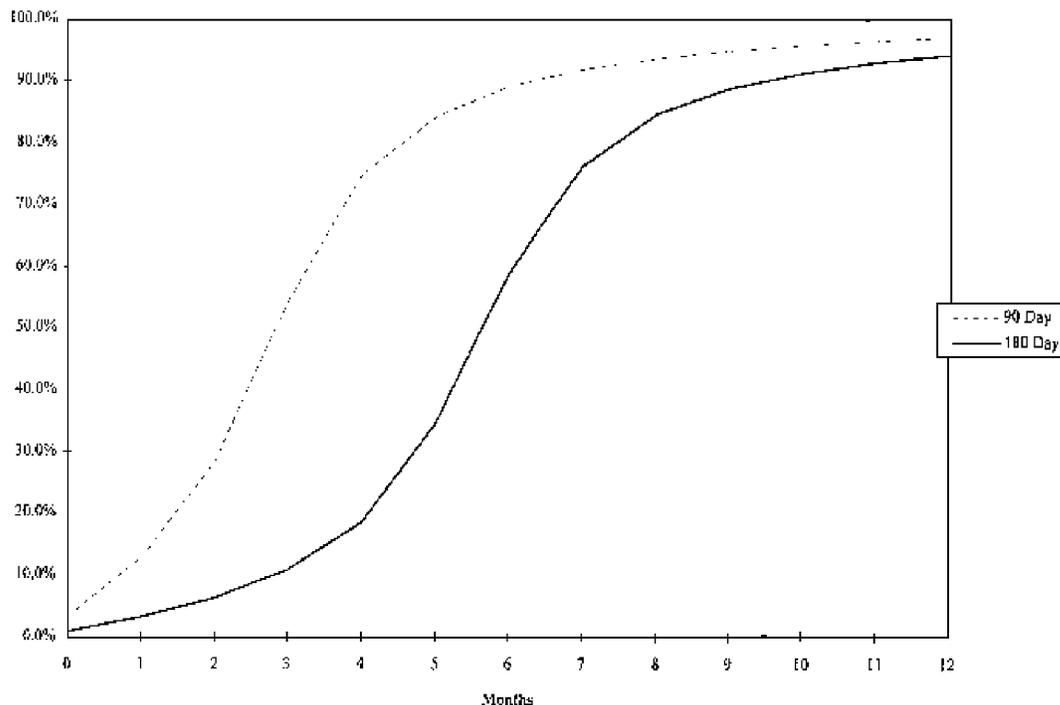
Chart 1 depicts some of the new information we have compiled. This is an IBNR curve. For people who want to test their IBNR we now have some factors. They are based on a realistic loss ratio and show what the pattern is. If your pattern is different, then you have learned something. We will probably create some actual-to-expected analyses for the IBNR or for each company to see how they test against the table.

From the Floor: Does this measure from date of incurral to the date they show up in the system?

Mr. Smith: This chart is date of disability to date reported. I have another analysis that is from date of disability to date approved. For companies that do not reserve if the claimant is in the earned premium, I am going to create another one that will be the greater of reported or out of the earned premium. One of the reasons that we conduct experience studies is for benchmarking, so this is intended for benchmarking.

The next chart depicts Social Security approval rates and again is for benchmarking purposes (Chart 2). It shows the number of people who are receiving or will receive Social Security. For example, a person at the 36-month point may not have Social Security, but at the 48th month may. I have backed that all the way down to the Social Security eligibility date. The chart shows two curves. One curve is for age 47 and that looks normal. It starts out fairly low and rises to around 80%. The other curve depicts eventual Social Security approval rates for age 67. It rises up and then once it gets past 65, there is a scattering of the data. This could indicate that people are deciding not to collect their Social Security, or there may be a contractual difference where people are not allowed to integrate with Social Security retirement, or so on. It is an interesting pattern to have it drop after age 65.

CHART 1
IBNR: REPORTED CLAIMS



From the Floor: I am not quite understanding what you are showing here. Is this the subset of people who have ever received anything from Social Security? Then what is this by?

Mr. Smith: This is the subset of people who have ever received Social Security by the total number of claims. For example, I take 36 months, see how many had Social Security that are disabled after 36 months, and divide by the total people that are disabled at 36 months.

From the Floor: And again this is only by number of claims and not by the amount they were awarded?

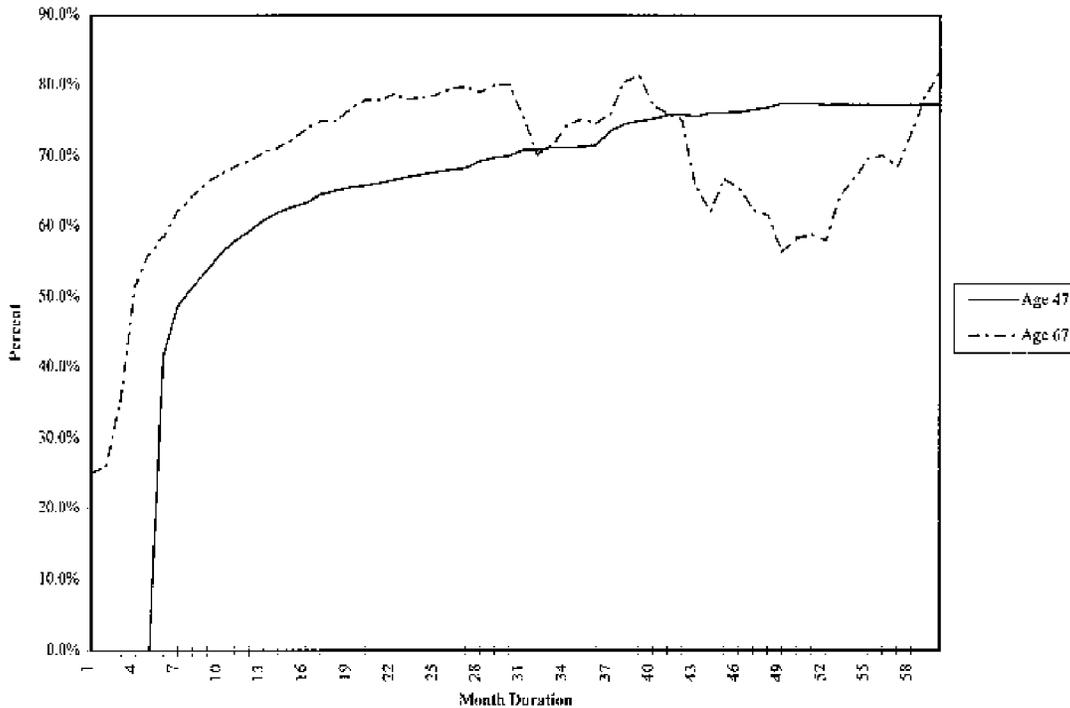
Mr. Smith: There will be charts by month, but I did not see anything there.

From the Floor: Does this give us a feel for where Social Security varies by type of work?

Mr. Smith: I would like to run doctors and lawyers separately.

From the Floor: Do we know whether there will be changes in the amount of award of Social Security based on dependents?

CHART 2
EVENTUAL SS APPROVAL RATES



Mr. Smith: No, there's nothing on that. I wanted to use the other chart which shows Social Security notification date so that we could create a table for doing estimated Social Security. However, the data are too limited at this point. We might still try to do it in the future.

From the Floor: How did you handle the claims that are still active yet have not been awarded Social Security?

Mr. Smith: I ignored those claims in the last year. Nonetheless, they are still in there somewhat.

From the Floor: You pulled them out of the data?

Mr. Smith: Yes, for this chart I did not use the full exposure period so there is some distortion. For instance, a claim that is 24 months old and will get Social Security but we don't know it yet, would still be included in this.

From the Floor: The claim would be in there as not getting it?

Mr. Smith: Yes, it would be included as not getting Social Security. I tried to cut down on this distortion by ignoring the first 12 months.

From the Floor: Why does the curve that depicts age 67 start at zero months?

Mr. Smith: Those are retirees who get Social Security immediately.

From the Floor: The curve that depicts age 47 starts at five months. Now is this only Social Security benefits based only on disability and not based on old age?

Mr. Smith: It represents both. It shows people who are or will get Social Security as an offset. It is intended to accompany a good termination table, and to provide people with useful Social Security information.

From the Floor: Isn't it the case that we cannot use as an offset what people receive in Social Security for old age?

Mr. Smith: Most contracts try to do that. It depends on the contract and what the person is eligible for or receiving.

From the Floor: Can a split of old age and disability Social Security be provided?

Mr. Smith: I do not believe the data show what type it is. I would have to guess what it was.

The diskette that we will be discussing has Table 95 on it. There was a minor conflict with the original diskette concerning Microsoft Object Linking and Embedding specifications. It prevented the user from copying rows. That has been fixed so that you can expand the table, if you want. Also, included on the disk is a new expanded reserve algorithm. It is not complete. Nonetheless, it is able to do most any type of reserving. The disk has Table 95, not Table 95a. This disk is not to be used for reserving, but to review the tables. Because it has the CGDT people could test some of their own reserves within the diskette itself.

Information with the diskettes includes a comparison of the actual results to the CGDT, Table 95, and Table 95a. This gives you an idea of how good a fit the table on the diskette is. It also has the IBNR and Social Security tables and charts, as well as the solicitation and follow-up materials if you have an interest in participating. Finally, the packet with the diskette has some documentation on the diskette algorithm.

At this point we will flip to the diskette to give you a sneak preview. We will go to Table 95.

The diskette allows for two views of the data. One view allows you to look at recoveries and the other view allows you to look at deaths. Now we are looking at mental and nervous cause of disability. If we want to view "other" cause of disability, click on "calculate now," and this changes the values. A look at view one demonstrates what I mentioned previously about producing some partially smoothed data. If you look at those humps in the chart, one is definitely real; however, the other appears to be amplified somewhat by the method I use to smooth the data. Now we will switch to the own occupation spike by entering 24 months for the duration. At this point we will move on to the reserve diskette.

From the Floor: This is all in Excel?

Mr. Smith: It's all Excel. It uses a fairly large Dynamic Link Library.

From the Floor: Is there any data there by calendar year?

Mr. Smith: Yes, there is some information by calendar year. It is somewhat volatile and it appears in large part due to new companies entering the mix of existing companies. I have not been able to draw any conclusion on that yet.

From the Floor: Is the study period automatically extended as you integrate new data?

Mr. Smith: Yes, one of the differences we plan to implement with this study versus others, is that when we continue the study in 1997 we will rehash the old data too. It is an immense task cleaning up the data; however, well worth the effort because you can find new things when conducting a further pass through the old data. In this way, the study will not be just the new transactions for the last year, but instead it will get redone again.

From the Floor: Regarding the salary information you presented, the actual-to-expected numbers were all around 100%. Was that normalized to be at 100%?

Mr. Smith: The data were tested against Table 95a which would hopefully be the average of around 100%.

The reserve algorithm is a big spreadsheet. Some of this material may be real meaningful to you; some of it may not be. The diskette allows quite a bit of control in tailoring the algorithm. If you run 0% or no terminations, then you get a count of

the payments. This can be used to check the algorithm to see if it is calculating correctly, or for training, to demonstrate how LTD is paid, and so forth. The diskette has the CGDT, CGDT basic, and Table 95. You can either use the Society's algorithm, that is the one that is on the diskette which was created in 1985 and modified in 1987, or you can use an exact algorithm which attempts to exactly duplicate the payment pattern. If you use the exact algorithm then most of these other options are applicable. For instance, it tells you when to cut checks, when the checks clear (for interest purposes), when survivor benefits are paid, etc. I won't get into that. The spreadsheet displays about five screens worth of data. Most of them are not needed at a minimum duration; however, if you want to try these, you can code in a maximum duration that the claim is paid to. You could also put in a duration code of "To Age 65" or "to Social Security Normal Retirement Age" and it will calculate it for you. The main thing we are not able to do at this point is handle the offset. So the net amount is what is used and it is fixed. In the next edition of this, you will be able to enter a state disability offset and that will go for the six months of the year and then be removed. Part of the reason why we created the Social Security table was to see if we could get estimated Social Security in there.

Mr. J. D. Have: The past few years I have been involved in a Canadian LTD study similar to the U.S. study. We recognize, of course, that the 1987 tables were a little bit too conservative. In fact, we never really had a table in Canada, so we started a process. I will discuss a background of the study and study participants. We had phenomenal participation in Canada as I will show you later. Also on the agenda will be a discussion of study methodology, some results, and future plans.

This is really the first table that we have been able to successfully complete. We have actually had a couple of attempts previously. I think some of the reasons they did not succeed is because we tended to emphasize the incidence side of the business as opposed to the termination side; in fact we had a lot of problems getting the data sets together. This time, however, we concentrated on the termination side and in fact, we grew quite serious about it, the participation was outstanding. Anyway, we had an expected experience committee, which was sponsored by the Canadian Institute of Actuaries. We had a lot of assistance from Jack Luff from the SOA in helping us with the data set itself. Some of the rationale behind the study was in fact the new valuation rules that exist in Canada, which we call the policy premium method (PPM). PPM is a Canadian version of generally accepted accounting principles (GAAP) where essentially you are required, where possible, to get an expected table. Typically that means using your own experience, if it is credible, for the first few years blended into some recognized intercompany table. The problem in Canada is we did not have an intercompany table. The best we really had was the 1987 table and we knew that didn't quite fit.

We were quite fortunate in terms of participant solicitation. I believe the chairman of the committee at that time was Peter Savek, who worked in reinsurance marketing. He did a great job in contacting a lot of the insurers. In fact, we were able to get 24 insurers to participate, representing 70% of the Canadian market. In fact, it could have gone a little bit higher, but we were unsuccessful in acquiring one database because the trustee did not want to spend any money to participate in the study. Next time, however, we will get it. I think we'll probably get up to about 80% next time we do the study. This was phenomenal.

We essentially included insurer administered claims; that included both insured and administrative services only (ASO). As you will see later, the ASO is about 12%. Of course, not included were direct marketed or creditor type products. We ended up using a 1988–94 experience period, although we actually had data going back to 1972. Part of the reason for choosing the 1988 start point is that we wanted to be sure there were enough companies who had data at that point. In fact, I think, there were six companies. At various points, and certainly in 1993, all companies participated in that time period.

We asked insurers to provide as much data as possible, usually their valuation files. We did, however, ask participants to provide data in a specific format, which is somewhat different than what Nick Smith did. Jack Luff helped us with this part. Jack had a lot of patience with the Canadian health answers and helped us through some of the tough times in trying to understand the codes. Jack also communicated directly with the insurers. Part of the reason for this was to protect insurers' own data sets. In fact, it was kind of unique that Pierre, who is a reinsurer, and I as a consultant, and of course, Jack as an independent, worked directly with the data to look at the actual results on a company-by-company basis. In this way, no member of the committee knew actual company results except obviously their own results. No one knew that company XYZ up the road was doing a bad job adjudicating claims. I think this issue of anonymity is fairly important and perhaps one of the reasons that we were able to get such high participation. We were very careful in terms of protecting participants' own results. In the end I actually produced a computer model that developed the actual-to-expected claims you will see later.

We actually got the data set by mid-1995. I guess we probably should not have been amazed by all the inconsistencies in the data. For example, a common error was that the disability payment was issued before the disability date. We spent a fair bit of time trying to figure out how to reconcile those errors. Of course, this is where Jack Luff did a lot of work. We did end up with an actual-to-expected analysis in time for the Canadian Institute of Actuaries' Quebec meeting in June 1996. That was really based on our initial data set. We then sent the results back to each insurer and asked them to review the results for clarity. We found that close to

ten out of the 24 data sets did not make sense. In fact, we discovered that, in some cases they were missing quite a bit of data. In other cases, due to the format in which data were submitted or the way they were interpreted, we ended up doubling up the data. We went through that whole process and Jack was instrumental here too. At the beginning of this month we had insurers review and sign off on their own results; then it was time to rerun all the data sets.

While we actually had data from 1972 on, we only used the 1988–94 period. Of course, as I indicated before, not every company participated in each year.

We knew we would have trouble with data so I guess, to some extent, we concentrated on the basic data only. We did ask for some additional data such as indexing or COLA, the report date, benefit, and offset. We have a Canada pension plan which is similar to U.S. Social Security. We also asked for cause of disability, partial disability, and rehabilitation benefit. Other data fields include plan type (insured or ASO), occupation, and region. Some of the fields are relatively sparse. We were not too demanding on codes on some of the extra information. We just wanted companies to submit what they had. Then in fact for cause, again Jack ended up trying to map that into something that made sense. I think in one case we had probably 40 pages of codes submitted by one company. I am not going to ask how much time Jack spent trying to map that into the ten we ended up with. Generally, we had some areas that were not fully populated. We ended up with 165,000 claims with 70,000 terminations. Interestingly enough, I think that's about the same size as the 1995 run.

The actual-to-expected we used is the product called the 1987 basic LTD, which is really the same as the U.S. CGDT table. Again, we only did the study by number of claims. In fact, there were some instances where companies did not even give us the amount of benefit. So let's look at some of the results. Table 1 shows elimination periods combined. In the first year we have a lot of terminations (32,874) with an actual-to-expected of 118%. The large number of terminations lends to credibility; however, combined elimination periods make the analysis somewhat less credible.

In the second year, the actual-to-expected is 146%, and in the third year it is 261%. Interestingly enough, but perhaps not surprising, the spike at the end of the own occupation period found in the U.S. Study, very much dominated in the third year for the Canadian study. In fact you are seeing actual-to-expected ratios at 400%, 500%, or 600%. When you run individual months, you can see that over a two- or three-month spread that it actually jumps quite high. This is quite interesting.

TABLE 1
RESULTS: ALL ELIMINATION PERIODS COMBINED

	A/E	Terms	Male	Female
Year 1	118%	32,874	129%	106%
Year 2	146	17,735	155	135
Year 3	261	10,863	233	309
Year 4	185	3,335	170	217
Year 5	132	1,583	126	146
Year 6-10	114	2,948	110	125
Over 10 yrs.	104	956	107	97
Total	139%	70,292	145%	131%
Terminations	N/A	N/A	40,941	29,351

The results are always smooth even when you look at the individual cells. One of the places, of course, which even large companies are interested in is what happens after the fourth or fifth year. Interestingly enough, our data comes quite close to the basic table.

This table shows results broken down by male and female. Obviously the 1987 table is a male/female table. I think it is interesting to note that for females over ten years, the actual-to-expected is actually below 100%.

Table 2 shows results by elimination period where the expected table is the three-month table. I measured all of them against it because I find that the three-month table is a better representation of the actual experience. Some things to note are that the primary elimination period being sold in Canada is three and four month. A four-month elimination period is popular in that it integrates nicely with our employment disability insurance, which is short-term disability.

It is interesting to note that for the higher durations (over ten years) and longer elimination periods (6 months and 7–22 months) the actual-to-expected dips below 100%. This is something to keep in mind. I think you can see that the own occupation period seems to have a more pronounced effect on the shorter elimination periods. Perhaps this is due to too many claimants getting in that would not be counted in with a shorter elimination period.

TABLE 2
RESULTS BY ELIMINATION PERIOD

	3	4	6	7-22
Year 1	110%	116%	115%	119%
Year 2	137	146	115	161
Year 3	326	283	246	243
Year 4	202	169	150	231
Year 5	148	136	108	142
Yr. 6-10	126	118	109	115
over 10	134	132	94	92
Total	129%	134%	134%	162%
Terminations	8,000	27,000	20,000	10,000

Table 3 is an actual comparison that demonstrates what happens if we measure against the 3-, the 6-, or the 12-month expected tables. In fact what you see is that the three-month table is a better measure of where it actually is compared to the 6-month table. That occurs in almost all instances. For the 1987 table, 6-month elimination period at year two, the actual-to-expected is 158% compared to 138% for the 3-month table. The 1987 table, 12-month elimination period at year two is 229% versus 172% for the three months. Of course, the third year was the same because there is no difference.

TABLE 3
RESULTS: 3-MONTH VS. 6-MONTH AND 12-MONTH TABLES

A/E	SIX MONTH		TWELVE MONTH	
	3 months	6 months	3 months	12 months
Year 1	115%	147%	NA	NA
Year 2	138%	158%	172%	229%
Year 3	246%	246%	192%	192%

Table 4 shows some results of ASO business. In fact, some of the large carriers have a fair amount of ASO business in Canada. One of the interesting things that you can see is that in almost every case you can multiply each of the insured column numbers by 80% and you come very close to the ASO column numbers. It is almost uncanny how close it is. I guess that is not an unexpected result. In fact, if you do not own the risk, perhaps you do not take as much care.

TABLE 4
RESULTS: ASO AND INSURED

	ASO	Insured
Year 1	94%	123%
Year 2	132	147
Year 3	200	287
Year 4	169	189
Year 5	113	141
Year 6-10	104	121
Over 10 yrs.	91	123
Total	118%	144%
Terminations	10,000	47,000

Table 5 looks at deaths and recoveries to see what the anomalies are. As you move out in duration, the death component becomes quite large. In fact, over ten years, death is the dominant termination reason at 68%. Of course, in year three it drops. From the pattern of the data, you might expect deaths to be around 20%, but in fact it is 12%. This is due to an increase in terminations by the own occupation definition. Another interesting thing to note is that, even here, females die at a much lower rate than males (half the rate). Again, we are getting results that are expected.

TABLE 5
RESULTS: TERMINATION REASON

	Deaths	Recovery	%Deaths
Year 1	10%	108%	8%
Year 2	22	124	15
Year 3	31	231	12
Year 4	46	139	25
Year 5	47	85	36
Yrs. 6-10	57	56	50
Over 10	71	33	68
Total	20%	119%	14%
Male	26%	118%	18%
Female	12%	119%	9%

We did look at a few causes of disability (Table 6). One, of course, is mental and nervous, which interestingly enough is 13,000 or 19% of the claims. I think, if we were to do the same analysis 20 years ago, I'm sure it would have been more like 10%. What is interesting for mental and nervous is that the overall is 139%, but this is in fact 114%, which is about 20% less than the regular.

TABLE 6
RESULTS: CAUSE OF DISABILITY

	Mental and Nervous	Chronic Fatigue	Pregnancy
Year 1	98%	30%	252%
Year 2	121	45	199
Year 3	226	165	580
Year 4	141	158	344
Year 5	109	118	*
Yrs 6-10	92	*	*
Over 10	93	*	*
Total	114%	54%	252%
Terminations	13,000	200	1,000

* sufficient data not available

Chronic fatigue, of course, is one of the new illnesses of the late 1980s and 1990s. In fact, what you are seeing is a dramatic difference in actual recovery for chronic fatigue, especially in the first couple of years.

Most of the cells I have shown have at least 100 terminations, and very few of them have less than 1,000 terminations. For chronic fatigue we only had a couple of hundred, which is an exception. Again, we are seeing results that are not unreasonable and perhaps even what you might expect. For example, with maternity we see high terminations in the early durations which is probably due to high recovery rates.

I should caution you a little bit about some of the information in Table 7 because, in fact, we were not able to code AIDS and injury for every company. What we have done is taken a preliminary look and, based on Jack's mapping, created something that kind of makes sense. Interestingly enough, the AIDS probably does make sense. AIDS as a cause of termination would have been interesting to study, especially because we see low numbers initially and then high later on. That is probably what would be expected. Recovery rates for accident and injury are by and large higher. One other thing to note is that accidents and injuries represent

around 14% or 15% of the claims. I believe that was one of the factors that was in an original short-term disability plan study I saw many years ago.

TABLE 7
RESULTS: CAUSE OF DISABILITY

	AIDS	Injury
Year 1	42%	140%
Year 2	126	168
Year 3	251	384
Year 4	310	248
Year 5	446	155
Year 6–10	400	129
Over 10 yrs.	*	78
Total	91%	166%
Terminations	200	10,000

*Sufficient data not available

One of the things that we find in Canada, particularly for group insurance, is that we have to look at regions because Canada is quite diverse. In Table 8, we divided Canada into a western region, Ontario, Quebec, and then an eastern region, which has had fairly high unemployment rates for quite a long time. This is evidenced by an actual-to-expected of only 106% which is lower than the actual-to-expected for the other regions. Quebec, for some reason, shows up as having higher termination rates than normal (188% overall). We have to be a little bit careful in making assumptions about these data because really higher termination rates only exist in the first couple of years. Higher termination rates in Quebec could be due to the difference in regional pension plans. In Canada we have a Canada Pension Plan, and we also have a Quebec Pension Plan. Quebec administers its own disability plan, and we know it is tougher, or at least has been historically. The Canada Pension Plan in Ottawa is trying to become more stringent, so maybe, in the future, termination rates for the other regions will be closer to Quebec's. This is my explanation for higher termination rates in Quebec.

We do plan to publish something hopefully, by December 31, 1996. We have a meeting in Toronto soon where we will be presenting the initial draft of this publication. We plan to repeat the study every two years. I think every year is probably a little too often. Like Nick, when we feel comfortable with the whole process, we plan to produce a graduated table. In the future, we would like to change some of the study specifications in order to get more participation in some

of the cells. We found that industry, own occupation, residual disability, and partial disability should be added to the study.

TABLE 8
RESULTS: BY REGION

	Coded	West	Ontario	Quebec	East
Year 1	110%	95%	97%	181%	84%
Year 2	142	134	136	201	111
Year 3	225	285	205	240	183
Year 4	178	189	152	273	177
Year 5	126	160	113	144	108
Year 6-10	113	145	104	115	96
over 10	98	140	94	79	92
Total	131%	127%	120%	188%	106%
Terms	43,000	10,000	21,000	9,000	3,000

From the Floor: Looking at the Canadian experience, which is similar to the U.S. table, it is surprising that termination rates for mental and nervous claims were actually higher than expected. I had always heard that termination rates for mental and nervous were lower than other terminations.

Mr. Have: They are certainly lower initially.

From the Floor: I am curious to know if this comes as a surprise to you, and if you are going to work on an individual table. There was something published in a disability newsletter a while ago that showed very low termination rates for mental and nervous claims.

Mr. Have: We are showing lower than normal termination rates for mental and nervous claims. In fact, they are about 20% lower.

From the Floor: Is that in the first year?

Mr. Have: In fact, the first year is 98% versus the overall of 118%. As mentioned previously, it is about 20% lower.

From the Floor: In the first year?

Mr. Have: Termination rates are 20% lower almost universally all the way through. That is kind of what I expected and that is what we got.

These next few tables compare the U.S. and Canadian LTD experience studies. There are 12 participants in the U.S. study and 24 in the Canadian. The big difference really is that the U.S. study includes about four-and-a-half more years. In addition, the U.S. study covers 70 data fields whereas the Canadian study covers 23. The Canadian study had 70,000 claims terminated versus 100,000 for the U.S. study. The Canadian study had 73,000 open claims at the end of the study as compared to 56,000 for the U.S. study.

Table 9 shows some of our most popular elimination periods. Months four and six are most popular for the Canadian study. The most popular elimination periods for the U.S. study are months three and six. The Canadian study has slightly more males. ASO plan type encompassed 12% of the Canadian study whereas no ASO was included in the U.S. study. In Canada, age 65 is typically the end of the benefit period so we only went to age 69, whereas the U.S. study went to age 72.

**TABLE 9
COMPARISON OF U.S. AND CANADIAN A/E
TOTAL TERMINATIONS RECEIVE**

	U.S.	Canadian
1 month EP:	8.3	
2 month EP:	5.7	5%
3 month EP:	35.0	10
4 month EP:	1.7	34
5 month EP:	2.1	2
6 month EP:	39.0	30
9 month EP:	.18	5
12 month EP:	1.8	7
Other EP:	5.8%	19%

*U.S. % Derived from Exposures

Table 10 shows some of the interesting actual-to-expected total termination differences. The actual-to-expected total terminations for the U.S. study seem to be higher than the Canadian study in the first year; whereas, actual-to-expected total terminations for the Canadian study are higher than the U.S. study in the third year.

TABLE 10
COMPARISON OF U.S. AND CANADIAN A/E TOTAL TERMINATIONS

	U.S. A/E Terminations	CA A/E Terminations ('87 Basic GLTD-3):
all durations	165%	139%
year 1	155	118
year 2	114	146
year 3	200	261
year 4	215	185
year 5	187%	132%

From the Floor: Is this a direct comparison? For example, are both elimination periods the same?

Mr. Have: I think we have both used the same basic tables, is that right, Nick?

Mr. Smith: Yes, however, the U.S. study used the entire basic table, whereas the Canadian study used just three months.

I think part of the difference in first-year total terminations could be due to maternity.

Mr. Have: We see the primary difference in year one, which, for the Canadian study, had about 40% of the terminations. This is where we are getting most of the leverage. I think beyond year one there is a little bit of shifting but the experience is similar. It looks like the own occupation period, in fact, is larger in the Canadian study. There may also be some difference in methodology doing the calculation.

For total terminations by year, the U.S. study is a little more uniform through the beginning years (Table 11). At the high point there are 18,287 terminations for the U.S. study. Terminations are at a high point for the Canadian study at 19,661 in 1993. One of the problems for the Canadian study is we did not have a lot of terminations in 1988; nonetheless, we did decide to include it.

From the Floor: The study period spans quite a number of years. Is there anymore wage difference in the more recent years, and, if so, is there a lot of variation in more recent years as a result?

TABLE 11
COMPARISON OF U.S. AND CANADIAN STUDIES:
TERMINATIONS BY YEAR

	U.S. Total Terminations	CA Total Terminations
1988	6,830	2,861
1989	7,668	7,232
1990	10,020	13,434
1991	14,817	15,180
1992	16,135	18,791
1993	16,993	19,661
1994	18,287	15,187

Mr. Smith: In my study I found there was quite a bit of variation, however the data are not clean enough to isolate it to experience. Generally, from the start of the study period to the present time, companies have changed their claim systems so there is a significant bump between old data and new data. The severity of the “bump” depends on the blending of the old and new data; therefore, it is a process of continuing to clean up the data. The data for the U.S. study were fairly homogeneous from 1991 on, but again, a few claim systems came up. There is evidence of claim systems changes within the data fields. For example, crude International Classification of Diseases, Ninth Revision (ICD-9) code versus complete ICD-9 codes change over time. In addition, fields that were sparsely populated become more populated over time. I cannot really draw a conclusion, other than to say, if you look at the data, it shows a worsening termination rate. Of course, if you read the literature and what claims departments are saying, they report that they are doing a much better job now.

From the Floor: Did either one of the studies capture replacement ratios in your data field, and if so, did you do any analysis?

Mr. Smith: The U.S. study had limited information. Salary appeared to be more important.

From the Floor: Salary is more important than replacement ratio?

Mr. Smith: Salary appeared to be more important than replacement ratio; however, the replacement ratio field was not as populated as the salary field was.

Mr. Have: The Canadian study did not capture salary information.

From the Floor: Nick, related to that, the U.S. study looked at contributory versus noncontributory plans; how did you actually know if something was contributory versus noncontributory? Is there a percentage for these types of plans?

Mr. Smith: No.

From the Floor: You did not see anything that related to contributory versus noncontributory?

Mr. Smith: Companies would label policies as contributory, noncontributory, and unknown. The contributory and noncontributory combined might comprise 10% of the unknowns.

From the Floor: In the U.S. study, why do you think you did not get any ASO experience?

Mr. Smith: We have ASO experience. We will ignore it until we clean up the regular business data. In addition, the ASO data is in worse shape and has different codes than the regular business data. We have not had time to analyze this data yet

From the Floor: Is it about the same volume, say 10% of your study?

Mr. Smith: There are about 250,000 records of which we used about 178,000. Half of the remaining records are ASO. Again, we went way back to the early 1970s to get data but that was also ignored. We also obtained some credit disability experience that is interesting, but again, we do not have time to spend on that right now.

From the Floor: Nick, the columns in the death rate reports in the diskette information packet are labeled recoveries, deaths, total terminations, max outs, and voluntary termination. Does max out mean that the claimant reached the end of the benefit period? What does voluntary termination mean?

Mr. Smith: Max out means that the claimant reached the end of the benefit period. Voluntary termination is a term that I created a few years back and I thought that other companies were using it too. I initially created the term to designate a claim that just stopped for unknown reasons. For example, it would be used for a claimant who was being paid no amount so he had to yearly certify that he was disabled; however, he received nothing. Some other companies have similar codes that actually use that term: "Per request of the claimant, the individual ceases getting benefits." It is a peculiar situation. My suspicion is that in most cases the claimant is still disabled. One of the definitional challenges in these studies is

whether we are studying the termination rate for deaths and recoveries. Should we include claims whether they are getting paid or not? One of the issues that will come up with the next pass of the data will concern settlements. Specifically, what is the termination date of a settlement? If you used the table or even the cause of disability and figured that a claimant could expect another ten years of payments but you commuted it to two years, does that mean the claimant really recovered two years from now? The answer is unknown.

There is a chance that those who work past age 65 represent a super select set of people. This group may follow a completely different pattern and not represent a continuation of the pattern indicative of pre-65 experience.

From the Floor: Let's go back to the point about the terminations in the first year. John, you made the point that in Canada, terminations are not as high as in the U.S. and, Nick, you mentioned that this could be due to maternity. Could you elaborate on that. What could cause a big difference in terminations in the first year?

Mr. Have: I think one of the reasons would simply be that the majority of the U.S. plans are three- and six-month elimination periods, whereas in Canada they are four- and six-month elimination periods. I think that in itself could cause the difference.

Mr. Smith: The actual-to-expected are quite misleading at times. You can have the first year actual-to-expected running at 110% and then running at 90% after that. The overall may come out to around 105%. In this situation, the 30-day elimination period, which might have a quarter of the volume of total claims that you see on a 90- or 180-day elimination period, may have the same number of terminations as the 90- or 180-day elimination period. A situation like this will dominate the statistics. That is why, in some ways, it is best to test on reserves to assess the impact on reserves. Many of these actual-to-expected analyses will not have much impact even though their terminations are quite high. It is not a merger, it is a lot more than a joint venture. It is a very unusual structure.