RECORD OF SOCIETY OF ACTUARIES
1995 VOL. 21 NO. 1

REINSURANCE OF "LAST TO DIE" POLICIES: IS IT WORTH IT?

Moderator: RONALD L. KLEIN
Panelists: MICHAEL G. DEKONING
KEVIN P. LARSEN
Recorder: RONALD L. KLEIN

The panel will cover the following: design and development issues, capacity problems, and theoretical versus practical pricing considerations.

MR. RONALD L. KLEIN: I'm a marketing actuary for Life Reassurance Corporation of America, and I'll be talking about a survey that I sent out concerning reinsurance of last to die. Kevin Larsen is from Security Life of Denver, (he'll be speaking about reinsurance from a reinsurance perspective), and Mike Dekoning is from Manulife (he'll be speaking about last to die from a direct company's point of view and a retrocessionaire's point of view). We are lucky that he can speak on both topics.

The first I ever heard of last-to-die policies was reading through the textbook *Life Contingenicies,* by Chester W. Jordan (2nd ed., Chicago, IL: Society of Actuaries, 1967) when I was studying for Part 4. The next time I heard of it was when the CEO at my former company came in and said that he had just bought a $10 million last-to-die policy from his former company, and the president of our company couldn't believe that the CEO would buy a policy from another company. So we developed a last-to-die policy and it was supposed to be a specialty product. This was about seven or eight years ago. It wasn't included in the agent persistency bonuses, the financing plans, or in manager's compensation formulas; it was just off on the side. But within three months it was included in every formula and the prices didn't change. We had to hire outside consultants to price it. We had to get reinsurance, and reinsurance was very complicated, especially when they came up with conversion programs. Management wanted to convert term insurance to last-to-die insurance. This gets complicated when the two lives are in different durations, are reinsured with different companies, and one life is substandard. It was my job to try to get reinsurance for this program, and those reinsurers were always asking too many questions. Then I went to work for a reinsurance company, and those direct companies wanted everything. They just wanted us to say yes without even asking any questions. So that prompted me to perform a little survey. I'm going to go over the results of the survey quickly and then let the panelists speak on their topics.

I asked 19 companies to respond to the survey. Of the 19 companies, the number of companies that gave me some sort of a response was 13, which I think is good. Three actually called to tell me they weren't going to respond. And three just blew me off. Those are probably the three that knew me the best.

The first question I wanted to know was how much in-force business as of December 31 they had for joint last survivor (JLS) (Table 1). I don't have much to say about the actual numbers, but I do want to show the relationship to in-force for other ordinary business. The average percentage is approximately 2–3% of the ordinary business. It ranged from a high of 10% and a low of 0%, if you're rounding to 18 significant digits.

TABLE 1
FACE AMOUNT IN-FORCE (13 RESPONSES)
AS OF DECEMBER 31,1994

	JLS (in millions)	Other Ordinary Life (in millions)
Total	12,694	439,019
High	4,000	73,468
Low	24	13,132
Average	976	33,771

Then I asked about new premium (Table 2). I only received eight responses. Many companies had trouble splitting this out, which tells you another thing about JLS if you can't even tell how much new premium you're writing. Basically, I wanted to show the pattern, and the pattern was the same as for in-force business. About 1.5% of the new business premium written was JLS.

TABLE 2
NEW BUSINESS PREMIUM (EIGHT RESPONSES)
WRITTEN DURING 1994

	JLS (in thousands)	Ordinary (in thousands)
Total	2,724	182,759
High	1,750	120,000
Low	3	3,071
Average	341	22,845

Let's go to the next question. JLS accounts for 2% of in-force business, 1.5% of new business premium, and Table 3 shows that 11 companies responded to how many facultative underwriting hours are needed to spend on last-to-die business. On average, these companies spend 13% of their time underwriting joint and last-to-die cases when it's only 1.5% of the business. So the question arises, is it worth it to work on these joint and last-to-die cases?

TABLE 3
APPROXIMATE FACULTATIVE
UNDERWRITING HOURS
(11 RESPONSES) DURING 1994

	JLS	Ordinary
High	30%	98%
Low	2	70
Average	13	87

Now we get into basic questions. Based upon pricing, how do you cover your general expenses for JLS business? Eight companies responded that it's on a fully allocated basis, and five said that they use a marginal basis to cover expenses. So, again, JLS is very

time-consuming, you have to set up systems, etc., and you're only covering your expenses on a marginal basis.

The next question asked their philosophy concerning JLS. Only two companies of the 13 said that they'll actively seek it on a stand-alone basis. The rest of the companies said they'll go out and get last-to-die business, but it's not the business they want. "We're looking for something else or we'll accommodate our current client." (Six will actually seek with the intention of securing ordinary business. Five will only quote as an accommodation.) Again, there's not a real market out there in which companies will go out and reinsure JLS business on a stand-alone basis, which has to tell you that either there's not a lot of the business out there or it's not very profitable.

And how about claims? We're pricing all this. We must know a lot about JLS mortality. Of the 13 companies that responded, there have only been two claims. Actually, someone told me that one company just incurred one more, so maybe I should say three. There have been 135 first deaths reported. But I will tell you that the first death is sort of an artificial number, because most companies don't hear if there's a first death. Usually, these are the companies that reinsure business that has a jump-up in cash value, sort of like Guardian's product, or I think Mass Mutual has one, too. There's a jump-up in cash value, so you need to know when there's a first death.

Next are some of the bells and whistles on JLS products. For split option rider (with no evidence) no company increases mortality by a flat amount, but many of the companies increase their mortality assumption as a percentage of premium. Six of the 13 companies said that they don't increase mortality for the split option rider. One said that it follows the ceding company. Ceding companies usually don't charge for the split option rider, but they bury the expense somewhere. So basically more than half the companies don't charge for a split option rider. I think that everybody would agree that there is a cost for the split option rider. (Six have no explicit mortalilty increase; two companies had "other" responses.)

Next we go to simultaneous death. Most companies do charge for simultaneous death, and they usually charge a couple of cents per thousand for simultaneous death. And I wondered how many direct companies or even reinsurance companies, if they insure a husband and wife who purchase two term products, charge extra for simultaneous death? Do they charge any extra? Everybody charges for JLS, and I'm not sure that I can see the difference in why they would do that. (Ten have an increase in the mortality assumption as a flat amount; one has an increase as a percentage; one has no explicit mortality increase; one responded "other.")

Next is the heartbreak factor. Again, people aren't too sure about the cost of the benefit. I think my point on the heartbreak risk factor is that there have been some articles written about it, and I think that many people will say that some sort of heartbreak factor does exist, but yet of the 13 companies, many different things are being done. So how much do we know about this heartbreak risk factor? (Two companies have an increase in the mortality assumption as a flat amount; five increase as a percentage; four have no explicit mortality increase; two replied "other.")

Do you charge a policy fee? Seven say "sometimes" and six say "never." Actually, the companies responding sometimes wrote only in rare instances, so most of them are

"never." The reinsurers charge a flat amount per thousand, which really could be called some sort of a policy fee, a minimum amount per thousand.

Finally, how do the reinsurers deal with retrocessional cost. Most of the reinsurers will charge an extra amount for retrocessional cost because they know that there are very large cases. (Two charge a higher premium rate for very large cessions; eight base JLS premium rates on the expected JLS retrocession cost for each client; one bases it on the costs for all clients; two base rates on an overall cost for all clients.) If anybody has any questions on the survey, or needs more specifics about the survey, please give me a call. I'll be happy to talk about that.

MR. MICHAEL G. DEKONING: I'm going to talk briefly about the direct side and how the product came about, some of the general features of the product, and some of the pricing issues that a direct company will look at when pricing this product. JLS products first started appearing in the 1940s, but only reached some sort of popularity in the 1980s. Early products had significant reserve and cash-value increases on the first death. Generally, the reserve and cash value would increase significantly on the first death and that was pre-"Frasierization," which basically allows the reserve and the cash value to grow at a more reasonable rate. The reason for growth in the market in the 1980s had a lot to do with the tremendous growth of wealth in the 1980s, as well as the fact that Americans in the appropriate age group of 45 and above were the wealthiest group of people in history. The insurance industry was focused on using life insurance to solve this group's estate tax problems. The same economic boom created business needs, so it began to be used for buy-sell agreements, key person insurance, and so on and so forth. Wealthy Americans could also on occasion use the products for charitable giving trusts. But the major reason for its rise in popularity, by far, was the estate tax problem.

Basically, in the 1980s, with the creation of the unlimited marital deduction, the estate would pass tax free upon the death of the first spouse to the second spouse. The problem was that at the death of the second spouse, there would be a very large estate tax liability. Estate tax rates are approximately anywhere between 35% and 60%. This can take a significant chunk out of an estate, specifically, if the estate either is a business or is invested in assets such as real estate and art and so on and so forth. The law allowed one to pass the first $600,000 of the estate tax free to a beneficiary (other than one's spouse). So above that, you would start to incur tax liability. What a couple can do is, the first spouse can will $600,000 to beneficiaries tax free. The rest of the estate would pass to the surviving spouse, who would then have another $600,000 deduction. So you could, in effect, have a $1.2 million deduction. This type of product is valuable for people with estate values greater than $1.2 million.

So where does JLS fit in? In general, by using an appropriate and legal trust, JLS insurance can be purchased to pay the estimated tax liability on the death of the second spouse to avoid the loss of property or value of the estate. But the JLS proceeds, like every other insurance policy, are passed tax free. So by setting up a trust that owns the insurance and pays the premium, you can keep the insurance proceeds outside of the estate. The money from the insurance policy, which is tax free, can be used to pay the estate tax liability. You must be very careful that the insured has no ownership, or even implied ownership, in the trust. The insured(s) can't pay the premiums, or it can be deemed to be part of their estate and, therefore, taxable.

In the first three years of setting up a trust, the IRS deems that it thinks you may have known you were dying and that is the reason you set up this trust. Then the IRS can actually still revert the insurance death benefit to your estate. I'll get back to that when we talk about one of the riders a little later and why one of the riders, The Estate Preservation Protection Rider, helps to solve that problem.

The market experienced double-digit growth in every year from 1988 to 1992. It grew from $106 million of new business premium in 1988 to $586 million in 1992. That's a compounded annual rate of growth of 53% per year in new business premium.

As you can see in Table 4, in 1991–93 the market was somewhere around $500–600 million of new business premium every year with a significant amount of face amount (between $32 and $36 billion) and the average size in between $1 and $1.2 million.

TABLE 4
INDUSTRY SALES

Year	Annual Premium (in millions)	Face Amount (in billions)	Policies Placed
1991	$492	$32.1	26,987
1992	586	36.0	32,230
1993	584	34.9	33,525

Source: Life Insurance Marketing and Research Association (LIMRA).

Of about 1,700 U.S. companies, 70–80 companies are offering JLS products in the market. Thirteen companies have actually exited the market between 1988 and 1993. Mind you, six of those were taken over by regulators, so I'm not sure that they count. When did companies enter the market? Prior to 1987, there were only 11 companies selling JLS, and from 1988 to 1993, there was significant entry into the marketplace (Table 5). The big sellers in the survivorship market in no particular order are Manulife Financial, Prudential, New York Life, Metropolitan Life, Sun Life, Mass Mutual, Phoenix Home Mutual, and Northwestern Mutual.

TABLE 5
WHEN DID COMPANIES ENTER THE MARKET?

Year	Number of Companies Entering that Year
1987 or earlier	11
1988	5
1989	14
1990	13
1991	13
1992	9
1993	9

Given that it's used for estate planning purposes, it is obviously purchased by the affluent with an estate value of greater than $1.2 million. The average actual age on new business issues is about 15 years older than the regular average actual age on single-life business. You'll find that over 40% of cases will involve at least one substandard life. You'll also find that the average face amount is between $1 million and $1.5 million, which is about four to five times the average face amount of single-life insurance.

What does the customer want? The customer looks for confidentiality of information shared with all parties, including the agent, the financial adviser, and the life insurance company. It looks for insurance company financial strength. It looks for security of the JLS investment, including the investment philosophy of the life insurance company. The customers will also follow the recommendations of their financial advisers, who are very important in this market. They look for guarantees in the product. They look to minimize their tax and maximize their final estate value. They also want to know that the product is flexible enough to handle changes that usually arise due to growth or possible diminution of their estate value.

Somewhat less important are things such as sales seminars, presentations, recommendations of family and friends, flexible premium schedules, and whether the policy is paid up on first death. Things that are considered relatively of little importance are articles in newspapers and magazines, direct-mail solicitations, cash-value accumulation, and ability to borrow against the cash value. Cash-value accumulation for this product generally will be quite good, simply because of the JLS mortality charges when you combine the two lives. The mortality charge will be very low, so you'll have significant cash-value accumulation. But if you had a product that didn't have much cash-value accumulation and offered value to the customer, I don't think that would be a problem, from a sales point of view.

Moving on to the future, according to 1988 census data, baby boomers, who are people between ages 35 and 54, control $3.2 trillion of total household net worth. Total household net worth in the U.S. is about $8.4 trillion. So that group controls about 38% of the total household net worth. Even better for life insurance companies, they are looking to inherit trillions of dollars during the next 20 years. They will inherit more than $6 trillion of net inheritance; that's net after tax, after probate fees, etc. Further, the top 1% of those baby boomers is going to get one-third of that number. So you can see that the JLS market can only expand as inheritances continue.

Par products are the mainstay of JLS policies, and the simple reason for that is because people are used to the guarantees and are happy with the guarantees. During the last five or six years, significant universal life (UL) products have been introduced on a JLS basis. Over the last few years, about seven to ten companies have come up with a variable JLS product. In my opinion, the variable universal life (VUL) JLS will be very important to the marketplace because of the flexibility it offers. It will probably not be the basis of people's estate-planning needs because of the lack of guarantees. It will become a part of, but not necessarily the mainstay of, their estate planning.

There are three types of JLS products: one has a cash-value increase at the time of the first death and premiums continue. One has a cash value that increases at the first death and premiums cease. And, finally, the most popular one these days is that the first death has no effect on the cash values or the premium status.

Generally, premiums are payable for a shorter period than life. They become paid up quite quickly. Due to the lower combined mortality rates, which is the chance of two people dying as opposed to one, premiums are substantially lower than single-life policies. One life uninsurable, which is generally defined as a person rated greater than 500%, or it could be as much as 1,000%, is acceptable, but JLS policies at that point usually charge a single-life premium for the less restrictive life. Buying a $2 million JLS policy on two 50-year-olds has a premium of about 60% of two single $1 million policies on the same two lives using a single-life policy. So, it is significantly cheaper using a JLS policy.

Regarding underwriting classes, most products offer a preferred class in today's market-place. Policy loans are generally allowed but are rarely used. The utilization is extremely low.

The product generally has a surrender charge and it applies especially on back-endloaded products in the marketplace. There are some front-end-loaded products that do not have surrender charges.

Mortality charges can obviously be implicit through traditional products or more explicit through UL and variable.

Finally, the riders are what makes JLS unique from single-life products. The policy split option (PSO) basically allows the joint life policy to be split into two single-life policies. This has to be triggered by an event, which is defined as divorce, disillusion of business partnership, or estate law tax change. Generally, in my opinion, there should be a charge for that rider when there's no underwriting at the time of the split. In theoretical terms, the cost should be about 2% of premium, 5% of cost of insurance (COI), or somewhere between 70 cents and 90 cents per 1,000. Most companies, however, do not charge explicitly for the rider, so they build it in some other way. Most PSO riders allow the policy to be split in half, although some policy split riders will allow you to designate the split at issue. So you could have a 70/30 split when it occurs as long as you choose that at issue. Generally, the PSO rider also has a limit on the age and the mortality rating of the people who've purchased the PSO rider.

The estate protection or preservation rider: Do you recall when I talked about the IRS possibly nullifying a trust in the first three or four years? At that point the insurance proceeds would become taxable. This rider bumps up the death benefit for the first three or four years, so that the net result would be to cover estate taxes on the death benefit so that when the IRS deems it to be part of the estate (therefore, subject to estate tax), you'd still come out with the death benefit that you desire. Generally, the cost of this rider is built into the product and it's also rarely an option. It's almost always automatic.

Paid-up additions and cash-value enhancement riders or term-type riders allow for using dividends to purchase paid-up additions (PUAs) to increase the face amount. Quite often they might also have a cost-of-living rider, which basically allows the estate value to be tracked as time goes on. They also quite often have the first-to-die rider, which pays an additional benefit on the death of the first spouse.

Issue ages are generally between 20 to 80 or 85, although I have seen products at issue up to age 95. Minimum face amount is anywhere between $100,000 and $250,000. I would rarely expect to see policies that small because of the estate tax problem.

Usually if one life is uninsurable, a JLS policy can be issued with single-life rates. The uninsurable life still must have a minimum life expectancy of two to three years and usually there is a limit on the healthy life; that is, it must be below say, age 70 or 80 and only rated up to table four or six. It is one important that this should only be offered on type-three coverages, which do not have the increase of cash value at the first death.

Notification of first death is a real issue for most companies with a type-three policy in which there's no advantage to the insured. There's no benefit to the insured to notify the company on the first death. So that makes tracking of mortality on JLS products very difficult. Why is it a problem? Besides tracking mortality, it has to do with your contestability period. If somebody were to die in the first few years, you have a contestable claim, or at least a contestable portion of the claim, if you want to call it that, and you lose that when you don't get it reported to you.

Suicide during the contestability period: If one of the lives commits suicide during the contestability period, the standard contract position would allow for a new single-life policy to be issued for a reduced face amount, usually about half of the original amount.

Finally, I get to pricing issues on JLS business. As I said, the face amount can be expected to be four to five times that of a single life insurance policy. The age distribution will probably be anywhere from 10 to 15 years higher than the single-life product. Also, expect a lot of substandard cases.

Expect significantly lower lapses or surrenders on the products for many reasons: (1) the insureds are older and cheaper coverage is difficult to obtain; (2) the price is not as important in the buying decision. That's not to say it's not important, but it's not as important as the actual death benefit itself; and (3) finally, the cost of setting up the trust, the three-year contestability period of the trust by the IRS, and the legal cost and hassles of trust administration usually point to a very informed buyer making a long-term decision. Therefore, he or she is highly unlikely to lapse the policy. Expenses for a policy should not be significantly different than the single-life policies except you have to increase your per-policy underwriting costs because you have to underwrite two lives as opposed to one. Also, the administration of JLS business can be more complex because not only do you have to track the two lives, but also you have to link the two lives as well in your administration systems. Commissions for the products can be higher. You may see them higher as a percentage of premium simply because the premium in and of itself is lower.

There's quite a range in retention treatment for direct companies for JLS business. Some companies split the JLS policy 50/50 and attribute half of the policy to each of the insureds. That, in effect, doubles the company's retention. Some companies, however, take the total line as their total retention for both lives. It depends on what your appetite for risk is, because finding that there is two-times your single-life retention claim hitting the books is going to be rather upsetting.

Mortality is generally the most difficult issue to address from a pricing view. Given that most products are of the type three, there is usually no motivation for the policyholder to report the first death and therefore, tracking mortality is very difficult. Very few companies track their JLS mortality rates separately from their single-life business; therefore, even if data are available, the credibility of them is quite suspect. I heard a statistic and I

can't validate this, so you can let me know if it's right or not. I heard a statistic that the whole industry in the entire history of JLS products has had 30 claims. Doing a mortality study on that would show a very high standard deviation, I think.

You can either use the Frasierization Method, which is a more exact method for combining mortality rates, or you can try to come up with a proxy using what is called the equivalent single-age method. This method defines a Z, so the q_z has the same mortality as q_{xy}. Note that X and Y are the ages of the insureds and are adjusted for all ratings. And Z is usually lower than the actual ages of the insured. You can also use the joint equivalent age (JEA) method. This method defines a Z such that q_{zz} has the same mortality as q_{zy}. Z is usually somewhere between X and Y. Either way the number of mortality rates would be significantly reduced for administration purposes. Under either of the two approximate methods, the ages X and Y need to be converted to an age Z, and this is generally done by a formula that adjusts the starting age of either X or Y by smoking status, underwriting class, substandard versus standard, flat extras, as well as the difference between X and Y. You'll generally find a formula that allows you to do the JEA calculation.

Ronnie talked briefly about the contagion factor. Once the raw mortality is determined one must load for what is called heartbreak syndrome. While they're not that credible, statistics have shown that mortality of the surviving spouse increases by about 150% in the year following the death of the first spouse. This contagion factor can be between $0.02 and $0.03 per thousand or significantly lower, depending on how competitive you want to be.

Getting to Ronnie's earlier question, I think that simultaneous death loading is necessary because the Frasierization method assumes that both lives are independent. You must, therefore, add a loading to reflect the nonindependence of a simultaneous death. This loading is generally between five and ten cents per thousand, although it can be lower. A 1993 SOA study published in the January 1994 issue of *The Actuary* showed experience on simultaneous death to be around $0.04 per thousand. However, the number of claims in the study was only seven, so I'm not sure how much credibility that has. Reinsurance is available to cover just the simultaneous death risk.

One note of caution on mortality. You will generally find that when you're doing single-life mortality, that you have a lot of room between your current mortality charges and your guaranteed, which are usually 80 CSO. When you combine mortality rates with the Frasierization method, you will find a much lower margin between your current and guaranteed mortality changes. As a percentage it may be similar, but because the mortality rates are so much lower, you have very little margin between your current pricing and 80 CSO. That's especially important if you're looking at variable products, which have SEC sales load limitations. The COIs on VUL may be higher than the standard UL products, because they have limitations on sales loads. Therefore, one would charge COI and still not hit 80 CSO. This is much more difficult for JLS products because of the thin margins between current and 80 CSO mortality.

Finally, briefly talking about companies' experience in a general and informal survey finds that the financial results for JLS are very good. Persistency has been excellent both from a premium view and an overall lapse-surrender point of view. Mortality has been stellar. At given premium levels and given face amount levels, the fact that there have only been

20 to 30 claims in the industry is quite good, but that may also be because of the fact that it is a JLS product. We can't get lulled into complacency.

Finally, is it worth it? From the direct company's perspective, reinsurance of JLS business can provide a low-cost, income smoothing coverage for large policy amounts. Given that the JLS mortality cost is so low and a minor component of the overall profits for the direct company, it can be well worth reinsuring. However, one would generally have to pay a higher price for the reinsurance than the direct writer would have priced it for, due to the fact that the reinsurer will have to require some sort of profit loading in the yearly renewable term (YRT) rate. Therefore, buyer beware.

MR. KLEIN: That was a great overview of the product and some of the other pricing issues. Kevin will now speak about some reinsurance issues.

MR. KEVIN P. LARSEN: I'm here to give you a reinsurer's perspective on this type of product. If you're a reinsurer and have been shy about getting into this product, or if you're a direct company that's developing a product, this should give you some appreciation of the issues that we're dealing with and let you determine if you think reinsuring this product is worth it.

I have some questions or points that I want to cover. Are reinsurers interested in the product? What different assumptions are used when pricing second to die from ordinary-type coverage? What kind of challenges do reinsurers face? How much capacity is available? How do you get it? What makes that determination? How do we treat one-life uninsurable cases? What are some of the common riders that are reinsured? You've seen some of the ones that are offered to policyholders, but what ones are reinsured and how are they done? I'll touch on some administrative considerations that you ought to think about.

To begin with, we must have been one of those two companies that answered, yes, we're interested in this product. We do price it to stand on its own merits, but we actively quote it, of course, as part of an entire portfolio. We do want to get into other products, but from our point of view, it is worth finding an appropriate price and offering reinsurance coverage to our clients. The product does have better persistency. I think that makes us a little more comfortable with it. Providing this product gives us opportunities to quote other products for companies where we may have not had the entry before. In addition, some of our actuaries have experience creating a second-to-die product for our direct side. We think we have some knowledge in that area, and gives us the potential to give help to a client that is entering a new market.

When we price, do we price it marginally, depending on other products to subsidize or cover the cost, or do we price it with full expenses? We price it to stand on its own. We are providing a price that will allow us to recover our cost and achieve our desired profit level. It seems that the number of reinsurers that do quote on this product is quite a bit smaller, which is favorable to some extent, because at least we're not in any crazy pricing wars right now. But there's no guarantee that that won't happen; as everybody who knows the reinsurance market can affirm. There are some pricing challenges that we do face, though, and I'm going to go through that.

So what different assumptions do we use when we price second-to-die policies? The lower lapse rate does extend the life of this policy and make us consider many other factors that may have been ignored in the later durations, but it also lets us know that this policy's going to persist and carry future profits to a longer extent.

The age distribution on this product is quite different. It has a much higher average age and, of course, we have much higher age limits. Because of that, I think it's paramount that direct companies and reinsurers get a much better handle on old-age mortality. I don't think that area hasn't been explored nearly to the extent it needs to be looked at, and there's a lot of disparity. I can tell from the quotes that we get from clients that there is a great deal of fluctuation in how the rates are structured on the older end of the scale. It will be interesting to see how we use the findings from the study that the Society and that individual companies are doing.

The mortality charges can be structured in a couple of different ways. One that was already mentioned is the joint equal age method; that's one that we see. Another is the exact age or Frasierized method. One advantage to using a joint equivalent age is that it's easier to administer. You're able to build all your assumptions into the calculation of that joint equivalent age, and that allows you to use a single-rate table, a single set of rates. On the negative side, you're building that formula to be appropriate in the aggregate overall, but you may have some sensitivity to profit fluctuations between cells when you have a disparate age difference, depending on whether that age difference is occurring when they're both at the younger end of the scale or when they're both older. And, in addition, you do have to create a set of second-to-die rates. So it is an additional table that you have to create for yourself.

The exact age method allows you to be more accurate case by case. In every individual case you're combining the single-life mortality and building a joint contingency function that allows you to cover every case exactly, including substandard mortality, age differences, and different smoking classes. The rates are derived directly from the single-life rates, so you don't have to create another table. You just have to apply an algorithm to get to those second-to-die rates, but you're not creating a separate second-to-die scale. A drawback, though, is that you cannot contain this in one simple set of rates. There are so many combinations of ages that it's not something you can put in your pocket, give to your agent, and run with. You're dependent on systems to illustrate the plan and even obtain the rates that you would want for a particular situation, and for administration you need a good system as well. But based on the quotes that our company has received, it's quite clear that the exact-age method is becoming the method of choice.

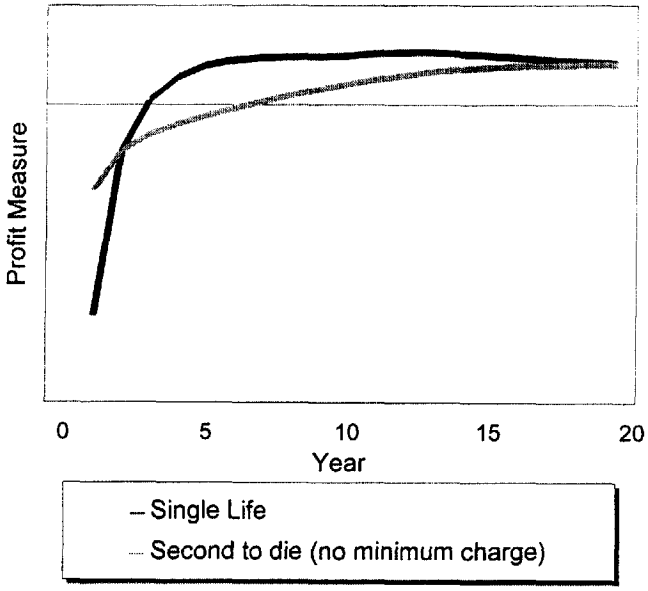
Other mortality risk factors to be considered have already been touched on. There is the simultaneous death risk (which is usually expressed as $0.04–0.05 per thousand net amount at risk) and the heartbreak factor. Again, I think there's some debate on that last one.

So as a reinsurer, what kind of challenges do we face? Well, we have lower premiums. Because of the low cost of insurance rates, the reinsurance premium based on those COI rates is going to be very low in early durations. Also, if the direct companies aren't building contagion into their rates and you as reinsurer are building it into your underlying mortality charges, you have another disparity to deal with. On top of that there are higher underwriting expenses. You have two lives to underwrite and you're usually dealing with

larger cases. You also have to do financial underwriting so there are higher costs. As well, there are the higher issue ages, and underwriters tend to pay much more attention to cases that are higher in age. So this combination of factors leads us into a little bit of a tricky situation.

With a single-life plan and a new first year premium, you start with a first year loss. Then you'd have a break-even somewhere during the first five years and then you're trying to obtain some large profit over time. Now with second-to-die products the pattern on its own tends to look a little different as shown on Chart 1. That creates a problem if you have requirements at your company that you achieve certain profit measures earlier in time than these later durations.

CHART 1
PROBABILITY OF SECOND-TO-DIE VERSUS SINGLE LIFE



So there are some ways to make that happen. One consideration is to extend the recapture period. All that does is give you protection that you're not going to have a massive lapse of policies caused by the direct company recapturing business, but it doesn't make your profits happen any sooner. So the most common thing that's being done is to charge a minimum rate per thousand; in some situations as low as $0.10, sometimes as high as $0.25. That moves some of your future profits and revenues into the earlier durations. You then can get a normal type of profit pattern that you're used to with single-life products.

Are you as a direct company using the same retention schedule for single life and second to die? Are you just simply adding them together, or do you have an independent scale? After you've answered that question, look at your underwriting. When you're underwriting each life, are you considering it for half of the amount for each life, or are you

considering the entire policy for each life? Those kinds of things weigh in and need to be communicated with reinsurers to determine what kind of capacity they may be willing to provide on an automatic basis.

Automatic binding typically is built where you have some table that varies by issue age and by mortality rating. If have two different individual age/rating situations, you could end up with different amounts. In the past you'd look up the two values, find the smaller amount, and that would be the amount that you could bind the reinsurer for second to die. I think it's becoming much more common to use the larger of those two amounts now. So capacity has increased just on the change in methodology.

Again, as Mike had mentioned earlier, we defined uninsurable risks as those that typically are above rating Table 16. But it can be combined with another life into one product—again, speaking only with respect to the type of plan that doesn't increase in cash value at the first death—as long as the healthy life is less than or equal to table eight, although I think some stricter ones such as Table 6, 4, or even standard, are common. There are ways to provide coverage for that uninsurable risk in the context of the second-to-die policy.

How do you rate it? I think the most common and the easiest approach to administer is to charge a single-life rate on the healthy life, but because of changes in our systems and in computer technology and with different approaches, you can make the uninsurable person age 99, 100, whatever the high-end limit on your table with the joint equivalent age, and then apply the joint equal age calculation, proceed, and insure it under that basis. If you're using the exact-age approach, you might make the uninsurable risk a Table 40, a Table 60, or perhaps have a very large flat extra $200 per 1,000 and then proceed through the Frasier algorithm to obtain the exact-age mortality rate.

The estate preservation rider certainly is a common rider. The way we can reinsure it is to charge the same underlying base rate for this rider that we do for the base policy and just provide it on the additional amount covered in that rider. Single-life term riders are quite common and can be based simply on the single-life rates that are underlying the computation of the joint rates in the product.

For split option riders, if there's evidence of insurability at the time of the split, there is no impact. It's just like having a new policy, so you don't have to worry in this situation. But without evidence, the way we're approaching a split option, is to charge a small percentage of the base second-to-die premium somewhere in the range of 2–4%. In some cases, though, we've had to work with direct companies. They would not like to have that charge explicitly in there. So then we take one of the other methods that Ronnie had mentioned in the survey to just build it somehow into the mortality cost. After the time of exercise, they will enter a single-life policy point in scale. We would only allow 50/50 splits and the events that could trigger that are a divorce, an estate tax law change, or a dissolution of the business.

In administering this type of product you need to have some good systems. Can your systems handle the Frasier method calculation? Can your systems handle second-to-die reserving? I know we have encountered many challenges in making our systems come up with appropriate reserves. Often a great deal of manual calculation is involved. I think you have to give consideration to how you make that happen.

With respect to first death reporting, if the tree falls in the woods and you're not there to hear it, did it make a noise? It's that kind of thing. If there's no benefit or cash-value effect at the time of a first death, then you're likely not to be notified of all those first death situations.

If you're constructing treaties, you have to consider the additional language that you will need to put in to cover the capacity issues. You have to be sure to define your mortality calculations. And if you're auditing, you need your administration team to understand how second-to-die risk charges are computed. They're not going to be able, in many cases, to just look up a factor from the table and verify that the company's been paying these appropriate amounts. So I think you have to invest some time and resources into training them to do that correctly.

I've thrown some additional things out here from what we deal with as a reinsurer. I think Mike has a few remarks to make from a retrocessionaire's point of view. I'd invite any questions you'd have at the end of the session.

MR. DEKONING: Just to briefly talk about retrocession, given that that's what I do now, the sources of profit on a JLS policy or on any single-life policy are the mortality gain, expense gain, investment gain, and some other type of gain. But what is being reinsured? Obviously, for retrocession what is being retroceded is simply the mortality gain. Most of the time it's excess business above the insurance company's and reinsurer's retention.

Now let's look at mortality gains; that's what reinsurers and retrocessionaires try to live on. A good estimation of the mortality and future profits should increase with mortality gains. The question is, what kind of mortality gains can you expect to get? Table 6 shows an age-45 male nonsmoker and these are 100% of the 75–80 rate. When you combine using the Frasier method for an age 50 using 100% of the 75–80, the rates are minimal. That's generally why you will find a retrocessionaire and a reinsurer requiring some sort of minimum premium.

TABLE 6
REINSURER/RETROCESSIONAIRE'S PERSPECTIVE

Duration	Age 45 MNS*	Age 50 MNS/MNS†
1	0.83	0.00
2	1.22	0.02
3	1.64	0.04
4	1.95	0.07
5	2.22	0.12
6	2.46	0.19
7	2.70	0.27
8	2.96	0.38
9	3.26	0.52
10	3.65	0.70

*Based on 100% of the A75/80 Male table slit into nonsmoker/smoker components
†Based on 100% of the A75/80 Male table split into nonsmoker components and Frasierized

We talked earlier about heartbreak and simultaneous death being somewhere around $0.08–0.10 or so. It may be lower, it may be higher, but you can see from the JLS mortality that by the time you get to the fifth year, if you were not to add and put a minimum on the YRT risk, you wouldn't even be hitting the simultaneous death loading. That does not include tax, expense, or profit for your friendly reinsurer or retrocessionaire. That's generally why the reinsurer and the retrocessionaire must insist on some sort of minimum premium somewhere between, as Kevin said, $0.10 and $0.25.

The volume of this business compared with single-life business for retrocessionaires is actually significantly higher on a percentage basis; it's smaller than single-life business, but it's higher as a proportion of the number of policies written. In other words, there are many more JLS policies that are retroceded as a percentage of total policies written than single life policies. The reasons why the volume overall is smaller is because it's mostly sold by large mutuals with high retentions. Smaller companies also have trouble breaking into the JLS market because of the fact that financial strength is so important to the purchaser. Only about 70 or so direct writers in the country write JLS business, so the absolute volume is also smaller. But, once again, from a retrocessionaire perspective we see more JLS business. Ronnie was talking earlier about the amount of JLS policies that are generally seen by most reinsurers. The average was 2–3%. Well, for Manulife Financial Retrocession, ours is around 10%, and I believe that's basically in line with most of our competitors. One of the problems with JLS business claims variability is that you can go along for many, many years and not have a single claim and then get hit quite heavily.

The opportunity cost is something else. Because of the fact that the profit margins and the premiums are so small on this product, you're generally tying up retention that you could be using for more lucrative and more cash-intensive single-life products. From an administration standpoint, we talked earlier about the difficulty of first-death reporting. From a retrocessionaire's perspective, it's often quite difficult to get reports that link the two lives from the reinsurer or from the direct company. You can have two lives on your administration system and not know that they're a JLS policy. So you receive notification on the first death and you might accidentally cut a check. Retention management is also, of course, an issue for retrocessionaires, and this policy type is no different than any other with respect to retention management.

For riders, again, we're two steps removed from the process. It's quite difficult for us to be able to price the riders adequately if our clients and their clients are not charging for the riders either. Also, how is the rider going to be split among the reinsurer, the direct company, and the retrocessionaire? For example, in the first four years an estate preservation rider causes the insurance amount to go up to more than 200% of the original. Well, what happens then? Will you just retrocede the amount above your retention? Let's assume it's a million dollar policy. Your retention is $1 million. Well, the estate preservation rider basically kicks your first four-year death benefit to about $2.2 million. I don't think too many reinsurers and retrocessionaires would be too happy if you only reinsured for those four years. So generally you take a proportion of the split of that based on your retention and the reinsurer's and the retrocessionaire's retention times 2. Then when the face amount comes back down, everybody keeps their proportionate share of the policy amount.

Finally, is it worth it? From a retrocessionaire's perspective, much like Ronnie's survey showed, in many ways we do JLS business more as an accommodation than we aggressively pursue this business. It's not a significant source of profit for us or for any retrocessionaire. So that's why generally this type of business is not something that everybody actively runs around for. I think, and Ronnie's survey bears this out, that most reinsurers think that this business is quite risky and they pursue JLS business as a service to their clients or as a way to get into other accounts; we generally view it the same way.

MR. KLEIN: There was an excellent article in the March 1995 issue of the *Reinsurance Section News* by Steven B. Teeple, an underwriter for Lincoln National entitled, "Underwriting Joint and Last Survivor Insurance: the Challenge Remains." His point basically was that it's going to be about 20–25 years until we get any kind of credible mortality information on JLS business. So it's another concern in the industry. We won't know if we're pricing it properly until we get more data in.

MR. DAVID M. HOLLAND: Do you if you consider risk-based capital a factor in analyzing the profitability of this product?

MR. DEKONING: Generally, the direct company will factor in the cost of required capital in pricing the product. There's not an explicit charge per se, but it would be built in through your strain and, therefore, your return on investment (ROI) targets.

MR. LARSEN: I think we're similar.

MR. CHARLES ROBERT DOLEZAL: You've already touched on a number of adjustments that you need to make in mortality for the various factors, but your single-life mortality isn't appropriate without some adjustments. I guess I'd like to bring up three areas where you might want to make adjustments to reduce the mortality. The first one is you're typically dealing with married couples, and a number of studies show that married people have better mortality than the insured population as a whole. The other idea has to do with the difference in lapse rates. For the single-life lapse rates, I'm not sure what an average is for the industry, but let's say it's 7–10%, somewhere in there. Your single-life mortality rates already reflect this level of lapsation, and so there's some antiselection that's going on there. We don't know if it's going to hold true we have a much lower rate of lapsation on JLS policies, there shouldn't be as much antiselection.

The other area has to do with social and economic class that we're talking about here. We have a larger size and many studies have shown that larger-sized policies have better mortality. These people generally have access to the best medical care.

MR. KLEIN: I'd like to comment on the lapse part. I think that lapses could actually work against you on a JLS. So where there may be some effects of lower lapses helping you, there could also be an effect where lower lapses could hurt you. And the situation I would be talking about is when one death has occurred on those policies. That one person is paying a JLS premium and right now it's a single-life policy and that policy's not going to lapse and that is working against you. If you split the low lapse rates into when they're both alive and when only one is alive, I think that when both are alive is where you're incurring all your lapses. They'll be lower because of all the hassle of getting it into the trust. I think the lapse factor is actually going to work against you in that no one is going

to lapse when the first death has occurred. It's almost like the same effects of people becoming very ill; they're not going to lapse their policies.

MR. DEKONING: Yes, I would agree with Ronnie on that. I also agree with you on a number of things you raised. Just to touch on the few things that you did raise, I think it's very appropriate for this type of business not to price with AIDS loads because, generally, you are talking about married people. Now that doesn't necessarily mean that they're not susceptible to AIDS, but that may be one way of adjusting the mortality downward to reflect the married status of the people who are involved. I agree with the lapse rate difference. You must try to get the antiselection factor out of your single-life mortality, if you can. The problem is, that it would be very difficult to do. As many people select against you with lapsation, many people will lapse a single-life policy just because they don't want it anymore, or it was missold, or whatever. The buying decision on this particular product involves people who are very sophisticated. So if they're going to lapse, they're lapsing because they either don't need it anymore or they're selecting against you. So I think the percentage of antiselective lapsation of the total population that's lapsing may be higher with these policies; I don't know, I'm just guessing. Socioeconomic class is a definite adjustment that should be made. I know corporate-owned life insurance mortality, for example, which generally looks at executive insured lives, is generally significantly better than normal insured mortality, so you definitely do have a point on the socioeconomic status.