

# Actuaries Summit

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## Anti-Selective Lapse Effects in YRT Business

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## 1. What do we mean by “Anti-Selective Lapses”?

“Anti-Selective Lapses” is described as follows in the Canadian Life Insurance Standards, paragraphs 2350.27

*“..... “Anti-selective lapse” is a tendency of policies on healthy insured lives to lapse or unhealthy insured lives not to lapse, with a concomitant deterioration in the insurer’s mortality or morbidity experience. To determine whether the tendency has operated in a particular case would require either a re-underwriting of those who have lapsed and those who have not, or a study of the mortality among those who lapsed, neither of which is likely to be practical. Policy owners will, however, make decisions in their own perceived interest, so that anti-selective lapse is plausible whenever that perceived interest is for policies on unhealthy lives not to lapse or for policies on healthy lives to lapse”<sup>i</sup>*

In this paper, we argue for a base level of lapses being considered a normal level, with lapses over this base level (for any reason, of which there may be many) being anti-selective to some degree.

## 2. Why should we consider Anti-Selective Lapse effects?

As Actuaries in a Life Insurance company, whether in pricing, valuation or management, our fundamental responsibility is to ensure the appropriate classification and evaluation of risks, ensuring the long term financial soundness of the organisation. In short, profitability and sustainability.

We are well aware as an industry of the benefits of underwriting to remove medical anti-selection – creating a significant positive selection effect in mortality at early durations.

Other forms of selection are perhaps less obvious, but can be observed in emerging experience. RGA Internal experience studies show selection effects in the following areas:

- Policy Size – larger policies are showing materially worse experience than medium sized policies, despite more stringent underwriting requirements
- Suicide – Average duration at claim for suicide policies is half that for all causes with an average suicide claim amount of approximately twice that for all causes.

- Trauma business – despite initial underwriting there is no apparent medical selection benefit, suggesting that underwriting is removing the worst elements of anti-selection, but that anti-selection is still significant.

These forms of selection are more obvious and are clear indications of policy owners making decisions in their perceived interest. If these decisions are made at the time of purchase, then it would seem logical that in reviewing the ongoing need to maintain insurance there could also be a selective element at work.

Looking at anti-selective lapse effects is perhaps harder than some of the other forms of selection considered, as the effects may be more gradual and less likely to demonstrate credible divergence from current best estimates. Portfolio management and results analysis is often performed on an aggregate basis and compared to a “plan” number. Many companies look at their overall loss ratios and emerging net operating income by product line and their focus is generally on a short term set of results. Impacts on profitability through anti-selective lapses are likely to emerge slowly over time and may not be obvious in the emerging experience, but this does not mean that they are not there. New business with the significant benefits of initial selection will outweigh anti-selective lapse effects and there may be no deterioration apparent in a stationary or growing portfolio. Mortality improvements potentially have masked, and may continue to mask, the effects of anti-selective lapses.

In an Australian context, we have seen the possible emerging effects of anti-selective lapses in historical “legacy” portfolios of business, particularly Income Protection business. While some of the poor experience in these products may be attributable to poor design, with the rate increases that these portfolios have been subject to over time we have seen lapses significantly higher than what might be considered “standard”. An element of these excess lapses is in all likelihood from healthy policyholders who no longer see value in the product, potentially leaving behind the less healthy lives and starting a spiral effect of worsening morbidity due to anti-selective lapses.

In our industry Yearly Renewable Term experience, there is limited credible data as to the effects of duration on mortality, beyond a relatively short selection period reflecting the benefits of initial underwriting. KPMG FSC mortality tables<sup>ii</sup> released in 2013 allow for a 2 year select period only, but this does not mean that anti-selective lapse effects don't exist.

As with any factor that we consider in a pricing or valuation context, the rationale for inclusion in our bases is that the factor has a material effect on the emerging experience of the product, either in magnitude, timing or both. Understanding the

effects of all these factors is vital and, to the extent that anti-selection in lapse behaviour may affect our experience, it is important that we consider it.

### 3. North American Experience in Annual Renewable Term (ART) Business

In determining if a pricing factor may be relevant, it is often instructive to consider similar products or features, amongst other factors, in a different market and consider if there have been similar issues with those products.

With a term life market many times the size of the Australasian market, the United States provides a useful comparator. While currently the dominant form of term insurance in the United States is a product with a level premium term for a defined period (commonly 5, 10 or 20 years), this has not always been the case.

Annual Renewable Term Insurance<sup>iii</sup> in the US emerged in the 1970's and by 1977 was "the most popular and competitively priced product in the term marketplace"<sup>iv</sup> Anti-Selective lapse effects were starting to be observed even then. "This competitive situation, in combination with sales compensation heavily weighted to first year premium has, we believe, led to a situation where business is systematically moved from one company to another. Any field representative with the capacity to broker term business also has the capacity to establish a program of periodic rewrites for many of his clients. This involves a broker contacting his client every two or three years to update the amount of his coverage. The broker can then fairly easily sell a replacement on the basis of lower per thousand ART premiums and a free physical examination. This produces a new first year commission for the agent and the potential for mortality anti-selection on lapse for the original writing company".<sup>v</sup> Sound familiar?

Driving the ART market at that time were factors which may not exist in Australasia:

- Allowance for select premium rates - 4 or 5 years was common but some products had select periods up to 10 or even 15 years
- Recognition and inclusion of significant expected future mortality improvement in prices

Over subsequent years, there was much thought and time spent developing pricing approaches and in 1980 a paper by Dukes and MacDonald<sup>vi</sup> developed an approach for the pricing of anti-selective lapses that is still referenced and used today in US pricing. We will look at this in more detail later.

Over time in the US, experience on these products was particularly poor, driven in no small part by the anti-selective lapse and churn behaviour. In 1983<sup>vii</sup> it was commented "Being the conservative people that we are, and recognising the potential for selection, we started utilising "worst case" scenarios in our profit tests. Withdrawal rates of up to 25% in the first year, grading to an ultimate of 15% seemed reasonable to many of us. So what really happened? In many cases, almost unbelievable results. First year lapse rates have exceeded 30-40%".

In the same discussion, while perhaps not directly relevant for our discussion on anti-selective lapses, were the following observations of other factors in the US market at the time:

- Underwriting had diminished, table shaving is common
- Non-medical limits have increased tremendously
- Insured lives have been divided into more specific risk classifications, such as smokers and non-smokers
- Persistency has dropped substantially

All of these factors are true for Australia in the recent past. Perhaps we should be considering the lessons of history?

In response to the poor experience of the late 1970's and early 1980's, the US market evolved to the level premium term product sets that exist today. Interestingly however, with the level premium term designs there is still a high degree of anti-selective lapse behaviour at the end of the level premium period, where most products revert to an ART style rate structure. A recent paper in 2010 by Rozar, Rushing and Willeat<sup>viii</sup> looks at the lapse rate following level premium periods and the increases in mortality in conjunction with those lapse rates. For 10 year level term plans, they found shock lapses of 65% in the first year grading down over time and mortality experience in year 11 at 275% of the duration 6-10 mortality. Obviously these are extreme values based on the product structure, but an inference may be made that as lapse rates increase, so do the effects on mortality for the remaining policyholders.

#### 4. Drivers of Lapse Behaviour

So, if we believe that there is some level of base lapses and excess lapses are anti-selective in some way, shape or form, how do we measure this? What influences might be anti-selective and what might a base lapse rate be?

In order to consider this it is instructive to consider possible drivers of lapse behaviour.

Fundamentally, the initial driver of an insurance policy purchase is likely to be need. Does the consumer require insurance? This need will change over time – if the policy was to protect the value of a home for example, this will diminish over time as the mortgage is paid down to a point it is no longer required. If it was to provide security for a young family, this will diminish as they age and leave home. Needs will change and in general could be considered as the fundamental driver of a “base” lapse rate. What factors might then influence the total lapse rate and potentially drive anti-selective behaviour?

Firstly, an over-riding feature of lapses in a YRT environment is that there is a high correlation between absolute premium size, level of rate increase and lapse rates. This may be considered “Affordability”. Rozar (2010) and internal experience studies at RGA Australia demonstrate that lapse rates vary significantly by:

- Age – As age increases, so do lapse rates, such that by the early 60’s lapse rates are between 20% and 25% for mortality business. (Although interestingly at very young ages there are higher lapse rates as well)
- Gender – Males, who have higher premiums, have higher lapse rates than Females<sup>ix</sup>
- Policy Size – larger policies have consistently higher lapse rates than smaller policy sizes (possibly some correlation with the age effect here)
- Smoking Status – Smokers have higher lapse rates than Non-Smokers
- Benefit type – Lapse rates vary by benefit type with lapses on Trauma products (stand alone and rider) higher than for mortality

These factors are all well-known and accepted as being drivers of higher mortality experience. What may be happening and unappreciated however is that there is also anti-selective lapse behaviour that is impacting the experience to some extent. If this is true, differentials between experience across these factors may increase in the future.

Other drivers of lapse behaviour, beyond those that directly impact the level of premiums, might include:

- Advice. Insurance in Australasia is dominated by the IFA advice channel. Provision of advice to consumers that there are alternative or “better” products

available will drive some lapse behaviour – this is likely to drive anti-selective lapses as unhealthy lives will be less able to benefit from these “better” products

- Premium Payment method. Annual payment policies will typically have higher lapse rates than monthly payment policies. This is potentially less anti-selective than some of the other drivers
- Health Issues. Healthy lives will have a different basis for determination of need – they will see less value in the insurance and thus be more likely to lapse (all other things being equal), leaving the unhealthy lives

All these factors will operate over the “base” normal level of lapses that we postulate, but what is that level and how do we determine it?

Turning again to the US market, consideration of the level term lapse rates experience might provide some insight into a base lapse rate. As would be expected in a level premium environment, early duration lapses are higher than later durations. Studies in the US<sup>x</sup> show that the last 4-5 years prior to the end of the level premium period have quite low lapses – as the benefit to premium ratio is increasing relatively quickly in this period, lapse rates might thus be considered as more needs based (i.e. lack of need) and potentially more indicative of an underlying base rate (relative to the other durational lapse rates observed on the particular product.)

Rozar et al (2010) show the following lapse patterns for US T10 (10 year level premiums) business transitioning to ART.

Duration	6-9	10	11	12	13	14	15	16+
Lapse Rate	6.6%	60.9%	38.3%	14.5%	12.8%	10.6%	8.8%	7.0%

Similarly for US T15 business:

Duration	11-14	15	16	17
Lapse Rate	5.4%	50.3%	23.4%	6.8%

It is interesting to note that the lapse rates for both products are as low as 5% - 7% in the period immediately preceding the end of the level premium term, exhibit a high degree of shock lapse and then revert reasonably quickly to be only slightly higher than those pre shock levels. Given the product design, this level might be considered a lower bound for the choice of a base lapse rate. YRT business will exhibit a different ongoing benefit to premium effect, amongst other things, so that a base rate for YRT lapses is probably higher than this level.

What then are the potential learnings for Australia?

## 5. Australian experience

Recent NMG<sup>xi</sup> (2012) analysis shows that lapse rates in Australia for the last 5 years have been steadily increasing:

Sum of quarterly lapse rates	2008	2009	2010	2011	2012
Income Protection	12.7%	13.7%	14.1%	14.4%	15.3%
Lump Sum	13.6%	14.7%	15.0%	15.7%	16.2%

Although this measure is not exact, it is representative of what is happening in the Australian environment at the current time. Recognising product differences from the US level premium term designs, let's postulate 10% as a "base" lapse rate for illustrative purposes. From our working assumption, we might conjecture that the difference between 10% and the lapse rates above is anti-selective. On this basis, the level of anti-selection would be increasing and based on the US models, this would lead to deteriorations in mortality experience – hopefully not at the same level as experience in the US though!

It might be argued that, as most company's pricing bases will be derived from some form of industry mortality table, the level of lapses underlying the period on which the table was constructed is more accurately the base level of lapses. In this case, if the industry were to move to the recently released FSC KMPG mortality table (2008 – 2010) (which is the first YRT only rate table in the Australian market) then the average lapse rate for lump sum business would be about 14.4% and there has been less anti-selective deterioration since that time than from the 10% assumption. This would assume that the mortality table as constructed fully represents the effects of anti-selection inherent in the underlying experience and also ignores the potential "natural" variation in base lapse rates on account of economic conditions.

With lower lapse rates than seen in the US it would be reasonable to assume that the immediate effects of anti-selective lapses are lower and potentially take longer to emerge. As the YRT industry in Australia is still in its relative infancy and given the high lapse rates, there is still relatively little exposure at durations greater than 7 years and the mortality table may not yet fully reflect the mortality experience from the anti-selective lapses that have occurred.

Rozar et al (2010) consider the effects of shock lapses on subsequent mortality experience. Amongst other factors, their analysis considers the "premium jump ratio" (ratio of premium rates for the immediately post level period to the level rate). A clear correlation appears to exist between the shock lapses at various premium jump ratios

and subsequent mortality rates. When a simple linear regression model was fitted to individual company data, the correlation coefficient was 0.69 (Rozar, 2010, p53).

Premium Jump Ratio	Shock Lapse rate, duration 10 (T10 business)	Ratio of post level mortality (all periods) to Level
1.01 – 2.00	38.4%	148%
2.01 – 3.00	44.1%	180%
3.01 – 4.00	51.7%	137%
4.01 – 5.00	64.0%	165%
5.01 – 6.00	75.0%	282%
6.01 – 7.00	82.7%	321%
7.01 – 8.00	85.0%	349%
8.01 +	84.0%	323%

If we were to assume that the difference between a 10% base lapse ratio and the actual observed ratios is anti-selective, then based on the simple linear regression performed by Rozar, the extra mortality will be relatively low – potentially in the order of 1% - 2%. This is relatively small and at this level is unlikely to have been observable in our existing experience. It would however be sufficient to dampen any assumptions as to mortality improvement over time.

## 6. Possible pricing approaches

If we accept that anti-selective lapses pose a risk and that they may have an impact on our future experience, then how do we allow for them in pricing?

Turning again to the US for guidance, Dukes and MacDonald (1980) developed a model for the allowance of anti-selective lapses in pricing. This model, and versions of it<sup>xii, xiii</sup> are still in use today<sup>xiv</sup> in the US and Canada.<sup>xv, xvi</sup>

Dukes / MacDonald (1980) based their model on the concept of conservation of total deaths. Their core assumption is that from any starting insured population, the total aggregate deaths from in-force policies (“persisters”) and lapsed policies (“reverters”) in any year are the same as the original aggregate assumptions. Thus, where those who lapse are assumed to have better mortality, those who remain have worse mortality (being the difference between the aggregate assumption and those who have left). In the original model, reverters were assumed to exhibit fully select mortality experience at the time of lapse grading back to ultimate over time.

Becker / Kitsos (1984) use the Dukes / MacDonald model with additional assumptions about the effectiveness of the selection while Shapiro / Snyder consider a ratio of persister mortality to reverter mortality that increases each year on an assumption that the new reverters are fully select.

In Canada, the CIA educational note and general standards of practice outline methodologies that are essentially versions of the original Dukes / MacDonald. The CIA also released a valuation technique paper that deals with anti-select mortality.

In all these models, there are assumptions about the components of lapse, the degree or effectiveness of the selection and the duration for which it is maintained - all of which make it a reasonably complex process. For example in the education note of the CIA, the following is noted:

*"It is necessary to divide the lapse into three mutually exclusive components.*

*They are:*

- 1. "Underlying" lapses are the part of the lapses comparable to what was experienced in the exposure underlying the construction of the select mortality table.*
- 2. "Average" lapses are the part of the additional lapses which will exhibit mortality experience identical to that expected for the group of lives who persisted at least to the beginning of the current policy year.*
- 3. "Selective" lapses are the remaining part of the additional lapses which will exhibit mortality identical to that of newly selected lives.*

*Since the mortality of all the lapses taken together is not likely to be better than that of the third group nor worse than that of the second group, all three components will be positive or zero.*

*Using the division given above, it is possible to develop a recursive formula which defines the expected mortality of the persisting group of lives."*

Initially in Australia we would expect that there would be trials with simple models to determine possible effects that could be monitored and enhanced over time.

No experience study will be able to derive these components, so there will be a certain level of "do, learn and refine" in relation to this matter.

## **7. Other considerations**

To date we have focussed mainly on the impacts on profitability of, and pricing responses to, the existence of anti-selective lapses. As can be appreciated however if anti-selective lapses exist there may be implications for a business beyond pricing.

We have not sought to consider the details of these for the purposes of this paper, but any reflection of anti-selective lapses could have implications for valuation and capital purposes, particularly for legacy blocks or open blocks with longer duration policies.

## 8. Possible Product Responses

If we believe that anti-selective lapses are occurring, what can we do to diminish the effect? Pricing is but one response and does not solve the problems.

Product features that will reduce the drivers of lapse would be beneficial. Given this then, what features might we consider?

- Level premium periods in policies
- "hybrid" level / stepped structures
- Reduced initial commission
- Decreasing term policies
- Removal of automatic CPI indexation above a certain age
- Combinations of the above

Level premium period products, as was the US response nearly 30 years ago, would seem to be a logical step. While level premium products would carry their own challenges, some of the worst effects of anti-selective lapses might be removed, or at least delayed.

Other options mentioned above seek to reduce the changes in annual premiums and the level of absolute premium that seems to be a key driver – if we can find designs that reduce the significant annual cost increases (13% to 15% combined for age and CPI indexation), then perhaps this will reduce the triggers for lapse and overall lapse levels.

Restructuring advisor commissions might also assist. Having an incentive of 100% up front commission provides powerful rationale for an IFA to find a better product. For example, could we pay 50% of year 1 and then 50% of year 5 premium? – this might encourage lower early duration lapses and the delay in receipt of commission for the advisor is somewhat made up for by the increases in premium over the 5 years that would generate a higher commission in dollar terms after 5 years. If we could couple

this with a design feature that reduces premium increases or enhances benefits after 5 years this would assist.

## 9. A Call to Action

While Australian YRT products are designed differently to the US ART products in the late 1970's to early 1980's, there are many features of our market, distribution and design, coupled with normal policyholder behaviour, that are sufficiently similar that the possibility of anti-selection through lapse behaviour must be considered.

As an industry, particularly with the effects that have been seen in legacy portfolios and the current level of lapses in the market, we would be remiss if we did not seriously consider the possibility. We believe that consideration is vital for the ongoing profitability and sustainability of our market.

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<sup>i</sup> Canadian Life Insurance Standards, paragraph 2350.27

<sup>ii</sup> Financial Services Council – KPMG, “2008 – 2010 Lump Sum Risk Experience Investigation Report”, February 2013

<sup>iii</sup> Annual Renewable Term business is essentially the same as business that we call YRT in Australia and was a predecessor to their current level premium term products

<sup>iv</sup> Panel discussion: Actuarial Considerations in the design of term products – Record of the Society of Actuaries, 1977, Vol 3, No. 4, comments by Mr Robert D. Shapiro.

<sup>v</sup> *ibid*

<sup>vi</sup> Jeffery Dukes and Andrew M. MacDonald, “Pricing a select and ultimate annual renewable term product”, Transactions of Society of Actuaries, 1980, vol. 32

<sup>vii</sup> Burnett A Halstead Jr, Panel discussion “Term Insurance” Record of Society of Actuaries Vol. 9 No. 2

<sup>viii</sup> Tim Rozar, Scott Rushing and Susan Willeat, “Report on the lapse and mortality experience of post-level premium period term plans” Society of Actuaries, 2010

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<sup>ix</sup> Males may also have higher average policy sizes – this effect has not been isolated

<sup>x</sup> Rozar 2010

<sup>xi</sup> NMG Consulting, Risk Distribution Monitor - IFA Trend Analysis Report, Q4 2012

<sup>xii</sup> Shapiro and Snyder “Mortality expectations under renewable term insurance products” Proceedings of the Conference of Actuaries in public practice, Vol. 30

<sup>xiii</sup> Becker and Kitsos “Pricing for Profitability in ART” Bests review, September 1984 and “Mortality and Lapse assumptions in renewable term insurance” Reinsurance Reporter, August 1984

<sup>xiv</sup> A good summary of the main methods and their key differences can be found in “Product Matters” July 2003, Issue no. 56 published by the Individual life insurance and annuity product development section of the Society of Actuaries

<sup>xv</sup> Educational Note on Expected Mortality: Fully Underwritten Canadian Individual Life Insurance Policies (July 2002)

<sup>xvi</sup> Canadian General Standards of Practice, section 1730 Anti-selection, paragraphs .18 to 23