

HANNOVER RE'S PERSPECTIVES— CURRENT TOPICS OF INTERNATIONAL LIFE INSURANCE

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*Enhanced Annuities
in the United Kingdom*

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Table of Contents



Chapter		Page
1	Introduction	4
2	Enhanced Annuities – Types and Design Features	5
2.1	Smoker Annuities	5
2.2	Socio-Geographic Annuities	6
2.3	Health-Indicator Annuities	6
2.4	Impaired Annuities	8
3	Actuarial Aspects of Enhanced Annuities	9
3.1	Smoker Annuities	9
3.2	Socio-Geographic Annuities	10
3.3	Health-Indicator Annuities	11
3.4	Impaired Annuities	11
4	Future Developments	13

1. Introduction

Several mature insurance markets are now offering enhanced annuity payments to selected groups of insurance buyers. This stems from the fact that these individuals can be expected to experience higher mortality as a result of their lifestyles or states of health. This paper presents the different *Enhanced Annuity* product variants currently found in the United Kingdom (i.e. as of mid 1997).

In traditional life assurance, such as term or endowment assurance, it is common for a medical examination to be performed in order to establish the level of risk. This has since been extended to the situation where medical evidence is used to insure a so-called "preferred risk" at a "preferred premium". A common example of preferential pricing is to offer reduced premiums to non-smokers.

The situation is completely different in the case of annuity types of assurances. Here, the benefit, i.e. the annuity, is only payable while the assured is alive. The life office can, on average, expect to make annuity payments to sick persons for a shorter period than to healthy persons. Under this scenario, a life in poor health represents a "preferred risk" to the office. It is therefore difficult to understand why it took so long for life offices to take the logical step of offering enhanced rates for preferred risks in annuity assurance.

A number of insurance companies in the United Kingdom, a very innovative insurance market, are now offering special annuity rates to "good risks", i.e. to sick people. The UK pension environment is especially favourable for the marketing of *Enhanced Annuities*. A portion of the capital sum that becomes available at retirement must by law be invested in a life annuity.

A few years ago, this law placed those persons suffering from an incurable disease or poor health, at a considerable disadvantage. These persons are justified in not accepting the fact that they will receive the same annuity as a healthy person, despite a life expectancy that is sometimes markedly reduced.

On 11 February 1995 a letter to the Times was published under the title "Insurer's sick joke":

"I will be 70 next birthday, am 6 ft 6 in, weigh 18^{1/2} stone and have had high blood pressure for 15 years (I'm on the maximum daily dose of my drug). I have had malaria three times, cancer of the larynx five years ago and now have apnoea, which surgery in 1993 has relieved but not cured. So, I am a low health prospect, according to life offices. I agree. But let me seek an annuity – and hey presto! I am a normal life with an expectation in line with the standard tables. Nobody can – or wishes to – explain this paradox. Can you? Is there a provider of annuities for impaired lives?"

This observation was the starting point for *Enhanced Annuities*.

Hannover Re has been a leading supporter of this new annuity product line in the UK and elsewhere. We have been intimately involved in its development and through our involvement over the past several years we have gained considerable expertise.

Enhanced Annuities – Types and Design Features

Enhanced Annuities offer higher annuity payments to population groups with specific medical and/or other characteristics that have been verified by statistical studies. Some examples of these characteristics are smoking or medical data like height and weight or blood pressure. It is possible to include several features in the classification of these lives.

Some of the *Enhanced Annuity* products that have been launched successfully in the UK are now discussed.

The following table shows the difference in payments between a Standard Annuity and the *Enhanced Annuities*.

Table 1: Annual annuity, purchased for a single premium of £ 10,000, payable monthly in advance, guaranteed for 5 years

	<i>Standard Annuity</i>	<i>Smoker Annuity</i>	<i>Socio-Geographic Annuity</i>	<i>Health-Indicator Annuity</i>
Male Aged 60	870	958	970	958
Female Aged 60	790	854	891	854
Male Aged 65	980	1,066	1,078	1,066
Female Aged 65	880	939	968	939

Note that the rates for Smoker Annuities and HI-Annuities are identical, the reason for this is given in paragraph 3.3.

2.1 Smoker Annuities

The methods applied to determine preferred premium rates for non-smokers in conventional life assurance, were extended to annuity types of assurances. Because of their high mortality, smokers can be expected to have a reduced life expectancy and can thus be offered an *Enhanced Annuity*. These products are referred to as *Smoker Annuities*.

Smoker Annuities are sold under the condition that the insured person is a smoker who has smoked at least ten cigarettes a day for the last ten years. Once the annuity is purchased, it is immaterial whether or not the individual continues to smoke. As a guideline, a smoker will receive a monthly payment that is around 10 % higher than conventional annuities.

No special underwriting or medical examinations are necessary to determine the extra mortality for *Smoker Annuities*. A doctor's report confirming the smoking status and a urine (cotinine) test is sufficient.

Sample annuity rates for smokers are shown in Table 1.

2.2 Socio-Geographic Annuities

Another product offered in the UK is the *Socio-Geographic Annuity (SG Annuities)*. Occupational class and the region of residence are the two most important factors in determining the annuity rate.

Table 2: Socio-economic classes in the UK:

Class	Description	Examples
A	Professional & managerial	Actuary, Lawyer
B	Clerical and lower managerial	Optician
C1	Skilled non-manual	Nurse, qualified Bank employee
C2	Skilled manual	Boiler maker
D	Partly skilled	Construction workers
E	Unskilled	Tyre fitter

As for the *Smoker Annuities*, no medical underwriting is necessary for the *SG Annuities*. The last occupation stated in the application form, and the applicant's address is sufficient for determining an applicant's eligibility.

A person must live in one of the light blue areas (see the map) in order to qualify for the special rates.

Table 2 shows the socio-economic classes in the UK. Only the last three classes (C2, D, E) qualify for *SG Annuities*.

These two socio-geographic factors combined have a considerable effect on mortality. The annuity can increase by between five and ten percent compared to normal annuity rates. An example is shown in Table 1.

Regions of the UK

The following two types of *Enhanced Annuities* make use of the health status in order to determine the level of enhancement. They are the *Health Indicator Annuities* and *Impaired Annuities*.

2.3 Health-Indicator Annuities

Health-Indicator Annuities (HI Annuities) combine the effects of different health factors such as blood pressure and obesity or diabetes and smoking habits. Other combinations are, of course, possible. The important characteristic of this type of annuity is the combination of health factors. Usually, it is not possible to qualify for a *HI Annuity*, if there is only one impaired health factor present. In this manner, lives with a reduced life expectancy can be grouped together. These lives can be offered annuities of up to 10% higher than conventional types of annuities as shown in Table 1.

Rating is possible without a medical examination. The applicant is required to complete a questionnaire, which may be verified by means of a medical report, if needed. The following Table 3 is an extract of a possible questionnaire, using an actuary as its subject.



Table 3: Sample Lifestyle Questionnaire for Health-Indicator Annuities

Please complete the following questionnaire	Annuitant
What has been your main occupation for the last 5 years?	Actuary
What is your current (a) Height? (b) Weight?	5' 10" 220 lb.
If you have been a regular smoker over the last 10 years, please indicate the average number of cigarettes smoked each day.	7
If you suffer from Hypertension or High Blood Pressure, please indicate (a) Blood pressure reading (if known). (b) Tablets taken and dosage.	170/90 None
If you suffer from Diabetes, please indicate (a) Date of diagnosis. (b) Tablets/insulin taken and dosage (if applicable).	1980 None
If you have suffered from a heart attack or stroke, kidney failure or cancer, please indicate which and how long since diagnosed.	No

Based on the above mentioned data the extra mortality can be determined.

The calculation of the excess mortality is very simple:

For each impaired health factor there is a special rating table that gives the extra mortality for this health factor. The final extra mortality is obtained by adding together the extra mortality of each impaired factor in a specified manner.

2.4 Impaired Annuities

All three types of annuities considered up to now, are rated according to a scheduled rating system that incorporates certain medical and lifestyle factors. To qualify for one of these annuities an applicant needs only to demonstrate a certain minimum level of impairment. The exact level *above this minimum level* is not important.

Another concept in the area of *Enhanced Annuities* is the *Impaired Annuity*. The approach is comparable to that of *HI Annuities*, but concerns lives who have a markedly reduced life expectancy due to at least one severe disease, e.g. a heart attack. This group can be offered higher annuity rates, albeit at greater expenditure.

The medical evaluation is based on the detailed data provided by a full *personal medical attendant's report* on the assured person's health.

Unlike the previous three types of annuities, the severity of the impairment now plays an important role in the size of the annuity. Mortality probabilities that depend on the age at entry and the severity of each disease were developed especially for *Impaired Annuities*.

As shown in Table 4, the amount of annuity to be paid can be double that of a conventional annuity (e.g. a life aged 60 who has a markedly reduced life expectancy due to cirrhosis of the liver).

Table 4: Annual annuity, purchased for a single premium of £ 50,000, payable yearly, no guarantee (Source: The Pension Annuity Friendly Society)

<i>Medical indication</i>	<i>Male Aged 60 [GBP]</i>	<i>Female Aged 60 [GBP]</i>
Alzheimer's disease	19,459	19,505
Liver cirrhosis	12,712	12,729
Emphysema	10,773	10,802
Diabetes mellitus	7,822	7,820
Bronchitis chronic	6,216	6,072
Hypertension	5,905	5,781
Standard	5,258	4,854

The *Impaired Annuity* is the only type that uses all available information and where the granting of preferred rates is established individually.

From an actuarial point of view, there are basically *two methods* of allowing for the extra mortality in the pricing basis of *Enhanced Annuities*: Constructing a totally new mortality table, or taking a known mortality table and adjusting the mortality rates as needed.

Smoker Annuities, *HI Annuities* and *SG Annuities* all have two things in common: The insured only qualifies for these annuities if he meets specific requirements, and the annuity payments do not depend on the level of fulfilment of the specified requirements.

It does not matter for example, how many cigarettes an annuitant smokes as long as he has been smoking more than ten cigarettes per day for at least ten years. An annuitant who smokes 40 cigarettes per day will get the same payments as one who smokes only twelve cigarettes per day. Although a higher annuity might be justified, no "Heavy-Smoker Annuity" is available. This is to keep the *Smoker Annuities* simple, product-wise.

Therefore, for each of these three annuity products – and each gender – there is a single (known) mortality table which is adjusted for the different situations.

Impaired Annuities are more complex. As every insured gets an individually calculated annuity, a new sophisticated type of mortality table is needed. These special tables give mortality rates depending on the life expectancy of the annuitant, as explained in paragraph 3.4.

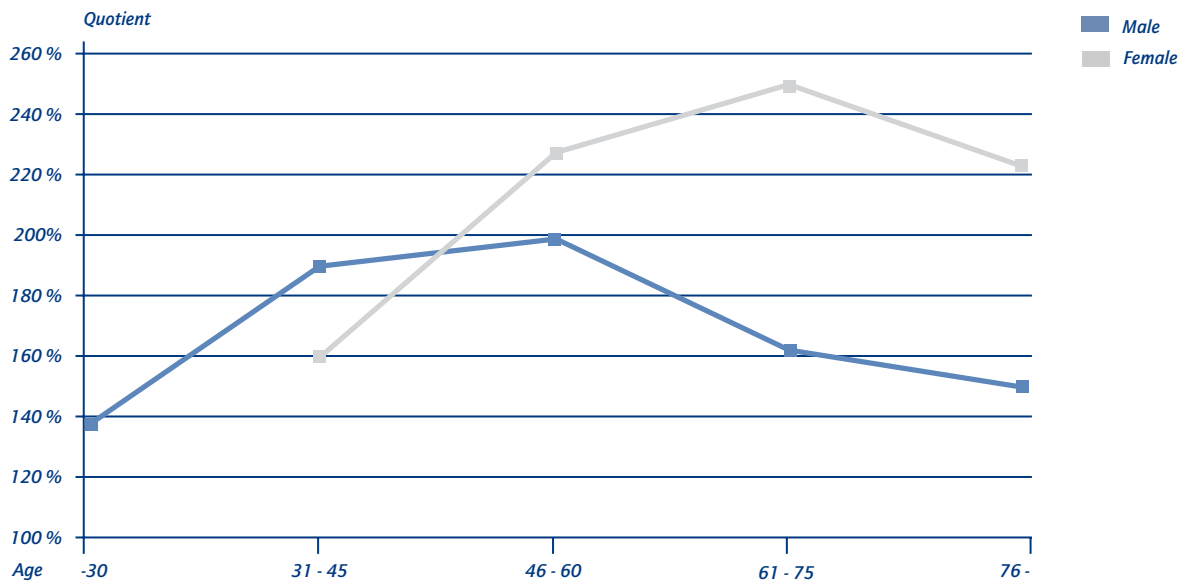
3.1 Smoker Annuities

The mortality of smokers and non-smokers is significantly different. Diagram 1 shows a comparison of the mortality of smokers and non-smokers for males and females at different ages. The mortality for smokers is, of course, higher than the mortality for non-smokers, but it is interesting to note that, except for ages below 45, this effect is bigger for females than for males. Because women start smoking later than men, smoking effects their mortality later.

By combining the portion of smokers and non-smokers of the population with the quotient of smoker to non-smoker mortality, one can explicitly calculate the smoker mortality. The results are then used to construct a special smoker annuity mortality table.

Another important point that should be mentioned is that this quotient of mortality decreases for ages over 60. Although it is only possible to speculate about the reasons, it is necessary to incorporate this in the actuarial basis of *Smoker Annuities*.

Diagram 1: Mortality of smokers to non-smokers in the UK. (Source: Continuous Mortality Investigation Bureau, CMIR 14)



3.2 Socio-Geographic Annuities

For *SG Annuities*, occupation and region of residence are the important factors to consider. Diagram 2 shows the standardised mortality ratio for different socio-economic classes over different periods of investigation. As expected, the rate of mortality increases for the classes from professional to unskilled. More interesting, however, is the phenomenon that the difference in mortality is bigger in the years 1986-89 than in the years 1971-75.

Diagram 2: Standardised mortality ratio for different socio-economic classes in the UK. (Source: The Office of Population Censuses and Surveys: Longitudinal Survey)

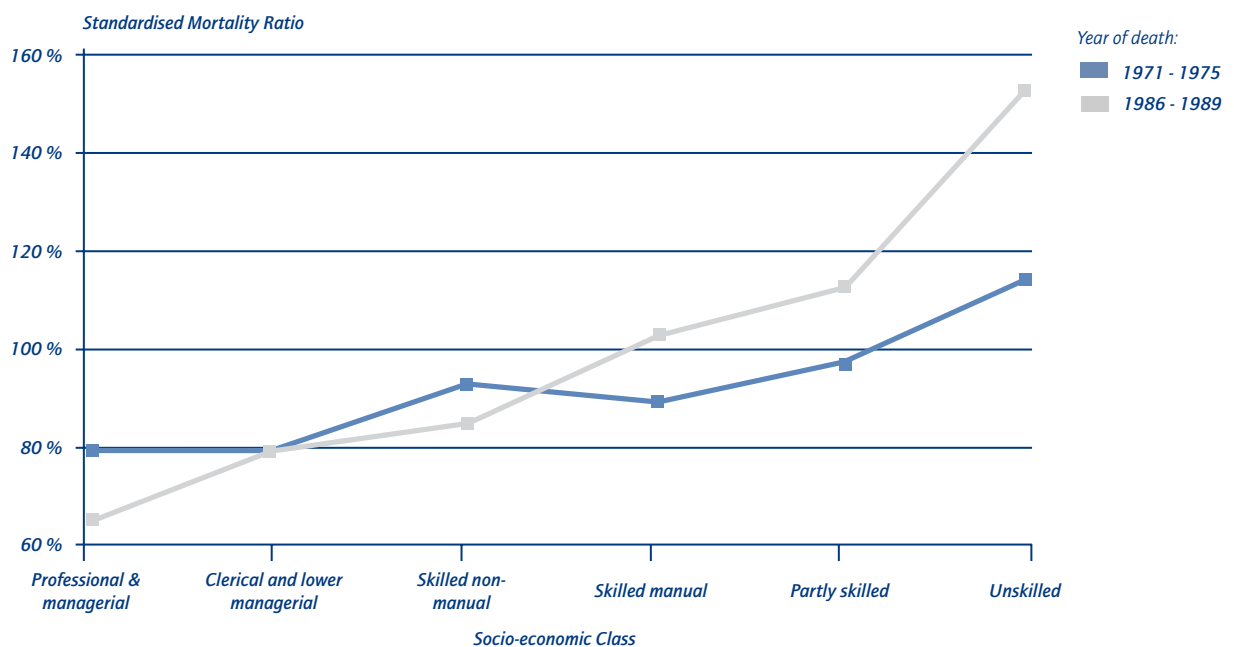
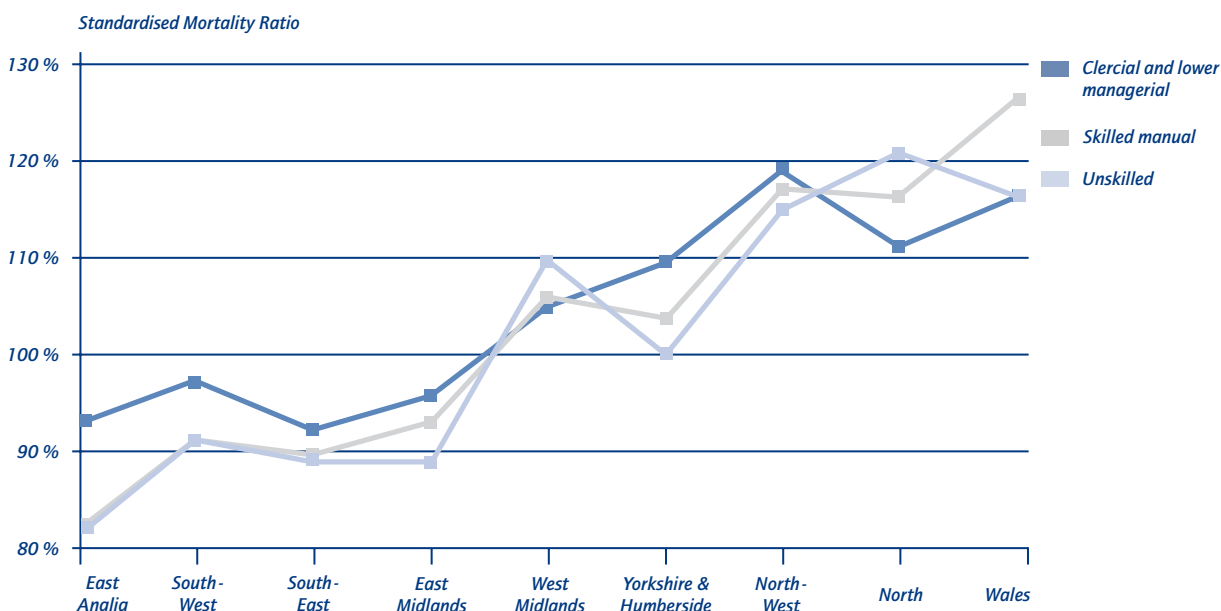


Diagram 3 shows that, even by separating the different socio-economic classes, there are still differences in mortality in the various regions. The mortality in the south of England is in general lower than in the north.

Diagram 3: Standardised mortality ratio for different socio-economic classes and regions in Great Britain for males aged 20-64 in 1982/83 (Source: Office of Population Censuses & Surveys, DS4)



3.3 Health-Indicator Annuities

For *HI Annuities*, the same mortality table may be used as for the *Smoker Annuities*. The medical underwriting is designed in such a manner that only those lives with at least the assumed mortality qualify for *HI Annuities*. So here we inverted the procedure for *Smoker Annuities*: The mortality table was selected first, whereafter a system was constructed that selects only those lives with the desired level of mortality.

3.4 Impaired Annuities

As already mentioned, the *Impaired Annuity* is more complex because of the increase in the number of levels of enhancements. The precise level of the *Impaired Annuity* cannot be predetermined, i.e. the applicant must be underwritten in order to determine the level of enhancement. On the other hand, an applicant for an *HI Annuity*, would be aware of the possible level of enhancement (as there is only one level) before he even knows whether he qualifies or not.

The result of the medical underwriting gives rise to a maximum probable life expectancy (MPLE). The MPLE is basically a quantile (percentile) of the distribution of the remaining lifetime of the annuitant. A quantile can best be described by an example: if a 75 % MPLE is eight years, the probability of living less than another eight

years is 75 %. The MPLE increases or decreases with the respective percentage, e.g. a 50 % MPLE (quantile) will always be less than a 90 % MPLE. MPLEs can be calculated for different percentages.

Special mortality tables, called the *Anderton Mortality Tables*, were constructed for each MPLE. These mortality tables use a flat extra mortality to adjust the distribution of remaining lifetime for the specific MPLE. Each life is assessed individually to determine the MPLE. As can be imagined, the most important – and also difficult – task, is to determine the correct MPLE for the applicant.

Enhanced Annuities have become well established in the UK Market, a fact confirmed by the sales figures to date. They are simple, fulfill a real need in the market and offer excellent value for money.

Enhanced Annuities are already available in certain mature markets. It is certainly only a matter of time before these products become available in other markets as well. It is also quite possible that in the future other types of *Enhanced Annuities* will be offered.

The following is an extract of an article that appeared in „The Daily Telegraph“ of 3 June 1995.

“Impaired life but improved income

PENSIONERS suffering from serious illness can receive a higher income by purchasing an impaired-life annuity.

This rather unattractively named option entails the insurance company paying out larger amounts of capital as well as income on the reasoning that the annuitant is likely to live for a shorter time than someone who is healthy.

It is estimated that 6 pc or £24m, of the £4 billion being paid out in annuities this year, will go to people suffering from such ailments. Yet there are just three life insurance companies and one new friendly society that offer special annuity rates...“

This was, among other things, the market response of the letter mentioned in the introduction.

We expect that in the future *Enhanced Annuities* will occupy a much larger proportion of the annuity market. As a consequence the remaining traditional annuities will attract only the healthy lives, forcing life offices to decrease the annuity rates for this class of business. This is, of course, due to the fact that the current practise of cross-subsidisation between healthy and substandard lives would fall away.

Life assurance is an extremely dynamic and competitive environment. The market for *Enhanced Annuities* is growing. Hannover Re will most certainly be adding new variants to the existing range of *Enhanced Annuities* in the near future.

We have been a leading supporter of *Enhanced Annuities* since their initial development. Based on our many years of involvement with these products, we are able to offer our partners a degree of expertise and service that is second to none.

Prior Issues:

No 1

Wolf S. Becke:

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