

**DREAD DISEASE/  
CRITICAL ILLNESS**

## PERSPECTIVE

This issue of *Risk Insights* focuses on Dread Disease/Critical Illness insurance, a product that is well developed in some markets and in the early stages of development in others. Dread Disease/Critical Illness insurance has attracted much attention because it differs significantly from other life products in that the benefit is paid upon occurrence of a specific disease rather than upon death. In this issue, we address a broad range of topics - evolving product design, pricing issues, underwriting and claims considerations, and definitions of covered events. The articles, written by our specialists in various countries, will help you gain a worldwide perspective on Dread Disease/Critical Illness insurance. If you are interested in gaining further insight on this product, we encourage you to contact one of the General & Cologne Re locations listed on the back of this issue.

## ACTUARIAL ASPECTS OF DREAD DISEASE PRODUCTS

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Throughout this article the generic term “dread disease insurance” has been used in reference to the variations of insurance products providing payment of a lump sum benefit on the happening of specified medical events, usually including cancer, heart attack, stroke and coronary artery bypass surgery. This form of insurance differs significantly from products previously offered by life insurance companies in that the benefit is payable:

- a) upon the happening of an event, or
- b) following the happening of an event and the suffering of some degree of disability, or

- c) upon the undergoing of a specified medical operation.

For any “event” to be included in a dread disease contract basic insurance principles should ideally apply:

- a) it should be perceived by the public as one that could afflict them and one that may leave them in need of a lump sum benefit,
- b) it should be capable of clear and precise definition,
- c) there should be adequate data for costing, and
- d) it should not allow anti-selection by applicants.

We believe none of the dread disease products currently available in the world fully meet all of the above criteria. The greater the extent to which a product or event departs from these basic insurance principles the more likely the insurance company is to suffer adverse experience.

With rare exception, the product around the world has developed more in response to competitive advantage strategies (e.g., attempts by the life office to include more “events” than the competitors) rather than any meaningful attempt to meet an identified consumer need. That said, the level of sales of the product in several countries indicates a real consumer demand, or at least a significant degree of consumer desire, for the basic benefits provided by the product.

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## Covered Events

The range of “events” for which a benefit is paid under various products in the market may include some or all of the conditions listed in the Table on page 3.

This is by no means the total list of conditions that are currently covered by dread disease products. Which conditions are included is totally up to the life office developing the product and the perceived marketing advantages of including various benefit conditions. The list is quite extensive and some products include nearly all of those listed, if not more. Some companies also offer a “basic” product which would typically include the first 6

to 7 (left column) events, and a corresponding “executive” or “deluxe” version which would have many additional events.

## Product Variations

Dread disease products generally come in two main forms: acceleration benefit or a stand-alone benefit. Another variation is the buy-back benefit.

- a) Acceleration benefit- This is a “package” of both death and dread disease covers, i.e., death is one of the covered events. The dread disease benefit can be seen as an acceleration rider benefit which pays out the

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## COLOGNE RE: A GLOBAL LEADER IN DREAD DISEASE INSURANCE

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The world’s first Dread Disease product was launched in South Africa in 1984. Cologne Re provided the reinsurance and later helped redesign the original product. The appropriate pricing model was published in 1986 by Cologne Re and is still used by actuaries worldwide. Dread Disease products soon spread to other parts of the world. Cologne Re introduced the product concept in Australia (1987), Taiwan (1989), Germany (1991), and Austria (1993). Today, we are a leading reinsurer of Dread Disease insurance as reflected by our strong position in global markets: Cologne Re is the leading Dread Disease reinsurer in Hong Kong, Singapore and Taiwan; 11 of 25 Australian companies offering Dread Disease benefits are reinsured by Cologne Re; and in the United Kingdom we reinsure one of the largest companies in the Dread Disease market.

As a global leader in Dread Disease insurance, Cologne Re provides a comprehensive range of services. Our product solutions are local and complete since our aim is to provide tailor-made support for our clients in each market. Services include the following:

- Market analysis & feasibility studies- Assistance in launching or re-engineering Dread Disease products.
- Product design- Assessment of product concepts by cedants; design of policy wordings and provision of assistance with design of marketing material; development of standard definitions for the diseases covered.
- Pricing- Development of actuarial models and

adaptation of existing models in line with local product design and statistical data.

- Sales- Simplified explanations of the covered diseases for sales staff and applicants in the world’s most common languages.
- Underwriting- Complete underwriting guidelines and application forms.
- Claims handling- Claims forms for specific diseases covered by a policy.

In addition to helping companies with product design, we offer other services. The world’s most comprehensive Dread Disease claims analysis was conducted by Cologne Re in Asia in 1996, encompassing 55 life insurance companies and 2.5 million policies. Our latest claims survey is published in this issue of *Risk Insights*. We will continue our research into this field, with the ultimate aim being the development of local Dread Disease experience tables. Cologne Re also holds Dread Disease workshops and seminars for entire markets and specific companies, as well as international workshops at our head office in Cologne. Our publications on Dread Disease appear both as articles and in book format.

Our center of competence for Dread Disease is headquartered in Cologne and is staffed by a research team that coordinates international activities and information flow. Additional competence centres are located in life offices around the globe, each manned by actuaries who are familiar with the field of Dread Disease and who have access to our Group’s global expertise.

sum assured on the earlier of either death or one of the dread disease events happening, and not on both. Optional additional term insurance may also be available.

- b) Stand-alone benefit- The sum insured is payable upon the happening of one of the listed “events” (excluding death), provided the life insured also survives that dread disease event for a period of 14 or 30 days.
- c) Buy-back benefit- This benefit is offered in conjunction with the acceleration benefit. Under this benefit some or all of the original death benefit can be reinstated, without health evidence, over 1 to 4 years after payment of the “dread disease” benefit. For example, if the dread disease benefit is paid and the person survives for 12 months after the dread disease event, then the insured may automatically reinstate a proportion of the sum assured paid as death only cover. If death occurs after this 12-month period then the sum assured that was reinstated is paid to the beneficiary.

**Pricing Methodology**

Although the dread disease product has been around for many years there are no industry standard pricing tables based on actual insured lives experience. Insured lives experience results are available in some countries, including the United Kingdom and Australia, and it is hoped that the data will eventually lead to the creation of standard tables in these countries. In the absence of incidence rates relating directly to insured lives, the pricing of the benefit is derived from population incidence rates for the various events. This approach (deriving insured lives incidence rates from population incidence rates) is based on the assumption that the relationship between insured lives and population incidence rates will be similar to the relationship between insured lives and population mortality rates.

*Acceleration Benefit Pricing Formula*

For acceleration benefits, the extra premium required to cover dread disease events in addition to the mortality rate is given by:

$$i_x - k_x q_x$$

where  $i_x$  is the incidence rate of dread disease,  $k_x$  is the proportion of deaths attributable to dread disease, and  $q_x$  is the mortality rate.

Allowing for the cost of mortality the pricing formula for a combined death plus dread disease benefit reduces to:

$$i_x + q_x (1 - k_x)$$

i.e., the incidence rate for the covered dread disease events plus deaths from other than one of the covered dread disease events.

*Stand-Alone Benefit Pricing Formula*

For the stand-alone dread disease product, the incidence rate of dread disease is reduced to take account of the required survivorship period, i.e., deaths following a dread disease during the survivorship period are not covered. The pricing formula is therefore given by:

$$i_x (1 - iq_x)$$

where  $i_x$  is the incidence rate of dread disease, and  $iq_x$  is the mortality rate during the required survival period following the dread disease event given that the dread disease event has occurred. The required survivorship period should be expressed as being independent of artificial life support systems because of the technological ability to artificially sustain “life” for very long periods of time. We recommend increasing the required survival period by a day for each day that the life insured is dependent on an artificial life support system.

*Buy-Back Benefit Pricing Formula*

Each buy-back benefit can be priced as the difference between (1) a stand-alone dread disease contract with a

**Table.** Covered events under various dread disease products

Cancer	Dementia
Heart Attack	Encephalitis
Stroke	Heart Surgery (valve and/or aorta)
Coronary Artery Bypass Surgery	Liver Failure
Kidney Failure	Lung Failure
Paralysis (para/quadruplegia)	Major Head Trauma
Major Organ Transplant	Multiple Sclerosis
Motor Neurone Disease	Coronary Artery Angioplasty
Occupationally Acquired HIV (& AIDS)	Alzheimer’s Disease
Parkinson’s Disease	Aplastic Anaemia
Primary Pulmonary Hypertension	Blindness
Severe Burns	Cardiomyopathy
Speech Loss	Coma
Cardiac Valve and Aorta Repair	Deafness
Terminal Illness	Total and Permanent Disablement (TPD)
Benign Brain Tumour	Loss of Independent Existence

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survivorship period equal to the buy-back period, and (2) an acceleration dread disease benefit, i.e., if the insured does survive for the buy-back period after a dread disease event, then the policy in effect becomes a stand-alone benefit rather than an acceleration benefit since the death cover can be reinstated. The pricing formula for the buy-back benefit is therefore given by:

$$i_X (1 - iq_X) - (i_X - k_X q_X)$$

which further simplifies to:

$$k_X q_X - i_X iq_X$$

where  $i_X$  is the incidence rate of dread disease,  $iq_X$  is the mortality rate during the buy-back period following the dread disease event,  $k_X$  is the proportion of deaths attributable to dread disease, and  $q_X$  is the total mortality rate. After including the cost of the death and dread disease cover, the combined formula for a product covering death and dread disease, plus a buy-back benefit, reduces to:

$$q_X + i_X (1 - iq_X)$$

i.e., the mortality rate plus the incidence of the covered dread disease events less deaths that occur from one of the covered dread disease events during the buy-back period following the dread disease event.

### Definitions

It is important that the insurance company understands the possible scope of the definition for each dread disease event included in the policy. A significant amount of learning is required and the importance of this process should not be underestimated. Close consultation with the senior medical adviser is strongly recommended when determining the definitions for the events to be covered under a policy. It is also necessary to relate the scope of the definition to the available statistics used for pricing. There is a very real risk that the policy wording of the “event” may be subsequently found to apply to a much wider range of conditions than was envisaged. It is also possible that the criteria for payment may not be consistent with those underlying the statistical data on which the premium rates were based.

The possible lack of correspondence between the definition and the available statistics may not be readily apparent. This may be illustrated by considering “stroke.” Many medical practitioners will say that stroke, especially one involving neurological dysfunction lasting more than 24 hours, can be readily identified. However, when one reads reports of specific studies and also considers some claims to date, it is apparent that diagnosis of stroke is not always unambiguous. To complicate the situation further, most companies attempt to specify the meaning of the word “stroke.” A typical wording is:

*Stroke is a cerebrovascular accident or incident producing neurological sequelae lasting for longer than twenty-four (24) hours. This includes infarction of brain tissue, intracranial and/or subarachnoid haemorrhage, embolisation from an extra-cranial source, but excluding transient ischaemic attacks.*

The wording defines “stroke” as known by the medical profession. However, this definition may also include “events” not usually considered as “stroke” by the medical profession, but which result in neurological sequelae lasting for longer than 24 hours, e.g. head injuries and hypoxia due to near drowning. So rather than covering just “stroke” as intended, the policy is now covering any cerebrovascular event that produces neurological sequelae lasting more than 24 hours. These events would certainly not be included in the population “stroke” statistics used for pricing. Thus, when determining the definitions that are to apply not only should we be asking “Does this wording cover the insured condition?” but also “What else might be covered by this wording and how certain is the diagnosis?” The objective is to express as unambiguously as possible the company’s intent with regard to the circumstances in which it will pay a claim. The pricing assumptions should correspond with this intention.

### Sources of Pricing Data

When searching for statistics on dread disease events it would be rare for one source of information to have all the answers. Generally, data from several sources are required, and when combined produce reliable data upon which a dread disease benefit can be priced.

Population incidence rates for dread disease events can be determined from a variety of sources including:

- Cancer societies
- Hospital statistics
- Other health interest groups, e.g., Transplant Registry, Multiple Sclerosis Society
- Motor accident statistics
- Medical papers relating to specific diseases/events
- General population studies
- Specific population studies, e.g., MONICA project (see *Specific studies*)

The specificity and reliability of data depend on the source. Health and the cost of health care are major concerns to most countries and this interest has led to the creation of vast quantities of health-related data. Getting access to this data and finding what is available can be a problem, but generally there is some information that can be very useful for pricing dread disease products.

### Cancer societies

As a result of the enormous amount of cancer research worldwide, collecting good statistics on cancer is rarely a

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problem. Data is generally available by sex, age, site, and sometimes size or depth of tumour. Completeness is usually achieved through legislated mandatory reporting in some countries. Cancer statistics for specific sites can be influenced by changes in government policy, such as widespread screening for breast cancer for women and prostate cancer for men. This can lead to a perception of large increases in incidence rates when really it is just an increase in the diagnosis of the condition, not the underlying incidence rate.

#### *Hospital statistics*

Most countries collate numbers of hospital patient discharges according to codes for “principal reason for admission” and also for “principal procedures performed while in hospital.” The data is generally quite complete with subdivisions available by sex, age, and duration of stay in hospital. Hospital data is most useful in pricing where the “event” is such that hospitalization results for all cases, the diagnosis or procedure is unambiguous, and payment does not depend on the degree of severity. Clearly these criteria do not apply for cancer. They also do not apply for stroke since a significant proportion of persons suffering a stroke are not admitted to hospital. The criteria apply to some extent for heart attack (in that a high percentage of persons suffering a heart attack are admitted to a hospital) and also for bypass surgery.

#### *Health interest groups*

In most countries there are interest groups in the health area. These groups are generally centred around medical disabilities such as Multiple Sclerosis, Dementia, Spinal Injury, Blindness, Deafness, Heart Attack, etc. They provide assistance to people who have the condition or are carers of people with the condition. In addition to supplying support services, health interest groups also generally collect statistics on the disease and some of the larger organisations may even fund medical research into the condition. They can be a good source of pricing data.

#### *Specific studies*

Specific studies, usually based on population registers, can often provide a more reliable statistical base for pricing than routine statistics such as hospital reports or death registers. However, specific studies generally only cover a fairly small population base, and care needs to be taken when extrapolating the finding of these studies to the wider population.

In 1983 the World Health Organisation sponsored the MONICA project (Monitoring Trends In Cardiovascular Diseases) which commenced in 39 centres over 26 countries. Papers have appeared in medical journals over the years detailing some of the findings. In association with this project, heart attack and stroke registries have been

established in many centres around the world, some of which have continued to collect data since the MONICA project finished around 1994. Papers from this project are a very good source of data in pricing cardiovascular events for dread disease products.

Many findings from specific studies are reported in medical journals available around the world. A problem in researching dread disease benefits is trying to find out which issues of these journals have the articles you are looking for. One of the best ways to search for this information is via medical online information services on the Internet. These services can search medical database libraries which contain references to millions of medical articles, such as Medline, Cancerlit and HealthStar. In most cases an abstract of the article can be viewed online, and if required a copy of the whole article can be purchased.

#### **Adjustment to Incidence Rates**

It may be appropriate to adjust population incidence rates to reflect a wider or narrower policy wording of the “event” compared with the criteria underlying the statistical data. For example, if the benefit includes a requirement relating to some significant degree of impairment then the incidence rate may be reduced to exclude “minor” events. However, some proportion of persons with only minor impairment following a “first-ever” event may become significantly impaired subsequent to a further event. Careful consideration should be taken with what is included in the pricing statistics compared to what is provided under the policy wordings for the dread disease benefit.

Incidence rates also need to be adjusted to exclude cases of multiple “dread disease events.” For example, many persons undergoing a heart bypass operation will have already suffered a heart attack, which would have already triggered a benefit payment. For the age range of most of these covers, the probability of an individual suffering two (or more) unrelated dread disease events is quite low and can be ignored in pricing. However, failure to adjust statistics to exclude cases of multiple dread disease events is likely to lead to a material overstatement of claim costs if the insurance continues to advanced ages. It must also be remembered that in the majority of statistics the incidence rates were derived by dividing the number of cases of the event by the estimated total population at risk. Generally this population does not exclude those persons that have already suffered a dread disease. This may lead to understatement of derived incidence rates for first-ever conditions.

Raw data will need to be smoothed so that reasonable results are produced, and some very substantial manual adjustments may be required to get everything consistent.

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As data for any one dread disease benefit can be based on several sources, it is very easy to just enter data without adjustment, but in most cases this leads to non-sensible results. Some basic checks on the data are that:

- a) the stand-alone dread disease rate is higher than the acceleration rate (excluding mortality),
- b) there are no negative rates for any of the benefits (acceleration, stand-alone, and buy-back), and
- c) the rates follow a smooth pattern by age.

### Insured Lives

As noted previously, the population incidence rates need to be adjusted to reflect anticipated insured lives experience. The adjustment is based on a comparison of the mortality of insured lives due to the “dread disease” causes with that of the population from those same causes. This anticipates a similar degree of selection effect for dread disease benefits.

Companies need to be careful to not inadvertently allow for some effects twice, e.g., excluding congenital conditions from population incidence rates. Whilst it can be argued that these cases would be excluded through the underwriting process, this fact is also inherent in the adjustment to population incidence rates needed to obtain assumed insured lives incidence.

The starting point for determining incidence rates for insured lives is to adjust the derived population incidence rates by the ratio of insured lives mortality to population mortality for causes of death that are related to the dread disease events covered. This assumes that the selection effects are the same for “dread disease” benefits as for death. The ratio is applied according to age (or age group) and sex.

Insured lives claims experience indicates a significantly lower proportion of deaths from respiratory diseases compared to general population mortality data (even at ultimate durations), and thus it appears that the selection effect is greatest for respiratory diseases. However, respiratory diseases are generally not included as dread disease events. It is also interesting to note that the mortality ratio (actual/expected deaths) for male insured lives in respect of “all accidental and violent” causes of death is generally lower than the ratio for “all causes” of death. Therefore, the mortality ratio for the remaining causes combined must be higher than the ratio for “all causes,” i.e., the ratio of assured lives mortality to population mortality is closer to unity for causes of death other than accidental and respiratory failure. This means that the ratio of dread disease incidences (principally cancer, myocardial infarction, and stroke) for insured lives compared with population incidences can be expected to be greater than the mortality ratio calculated for “all causes,” i.e.,

$$\frac{\text{Insured lives dread disease incidence}}{\text{Population dread disease incidence}} > \frac{\text{Insured lives mortality}}{\text{Population mortality}}$$

### Initial Selection

The natural progression of events is from:

- (i) clear of symptoms (i.e., underwritten), to
- (ii) suffering a dread disease event or death from an unrelated cause, to (for survivors)
- (iii) death subsequent to the dread disease event.

Life insurance selection factors measure the effect from (i) to (iii) in relation to mortality. Dread disease insurance, of course, is payable at the second stage. Thus the point at which ultimate rates are reached can be expected to be much sooner for dread disease insurance than for life insurance. Therefore it can be expected that the effect of selection will be substantially less for dread disease benefits than for life insurance.

### Smoker/Non-Smoker Ratio

It can be anticipated that the incidence of dread disease events generally will be higher for smokers than for non-smokers. It is not possible to obtain statistics relating to the extent of the differential morbidity rates for most of the dread diseases, although some medical studies are available that attempt to quantify morbidity risk associated with smoking. The most appropriate assumption is the same differential as used for mortality, unless other data is available. This avoids anomalies that may occur in calculating the cost of the acceleration benefit if different smoker/nonsmoker ratios were to apply between the death benefit and the dread disease benefit.

### Trends

Because population incidence rates are derived from observations over prior years, it is necessary to consider the trend of those incidence rates to the present and to the future period for which the rates will be used. In determining the cost for acceleration benefits it is the difference between the incidence of and mortality from each dread disease at each age that is most important.

The trend in incidence rates can be considered to consist of two components: (1) underlying natural trend, and (2) trend in the rate of detection. It could reasonably be expected that a reduction in the death rate from any particular cause of death would be greater than the reduction in incidence rate. This would occur as a result of improvement in treatment of the “dread disease.” Over time, this situation can cause the acceleration cost of a dread disease benefit to increase as a proportion of the death-only cost.

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It is likely that continuing advances in medical diagnosis will lead to detection of some “dread disease” events at earlier stages of their development, particularly where the “event” definition does not include some degree of physical impairment. In fact, this trend may represent the greatest risk to the life office. Significant increases in diagnostic incidence rates might well occur following the introduction of population-based screening programs (such as for specific cancers). Of course, improved diagnostic abilities may also reduce the incidences of false positives, particularly where full investigations are carried out at the behest of an insurance company.

### **Pricing Risk**

There are several areas for potential mis-pricing. These can be subdivided as follows:

#### Population incidence

- Mismatch of “benefit criteria” and statistical base
  - deliberate
  - inadvertent mismatch (definition mistake)
- Incorrect trend estimate
- Medical advances

#### Mortality

- Mortality from “dread disease” events incorrect in official statistics
- Incorrect trend estimate

#### Insured lives adjustments

- Ratio of insured lives to population incorrectly estimated
- Selection effects different from assumed

#### Smoker/non-smoker adjustment

- Incorrect estimation of smoker to non-smoker incidence ratios
- Incorrect assumption of proportion of insured lives who admit to being smokers

The maximum probable error arising from most of the above can be estimated, albeit with some degree of effort.

#### *Mismatch*

The conscious adoption of a coverage different from that relating to available statistical data has been discussed. Mis-pricing should not occur as a result of a conscious decision unless the company misjudges the extent of the variation. However, as indicated earlier, it is possible that the benefit wording may cover much more than was anticipated and that claims may arise which were not included in the pricing.

#### *Trend estimate*

Whilst it is difficult to obtain reliable and relevant data

relating to the incidence of some dread disease events, it is even more difficult to obtain reliable data relating to trends in incidence rates. The trend in mortality from an event may be a poor indicator of the trend in its incidence.

#### *Medical advances*

Perhaps the greatest risk with the dread disease product arises from the advances occurring in diagnostic techniques. This is particularly so in relation to “dread disease events” which require only diagnosis of a particular state and do not include any degree of severity. This situation exists in most, if not all, policies for “cancer” and may also apply to some other events. As an example, it is not inconceivable that a high proportion of individuals, perhaps all, have cancer cells in their bodies. There may also be a high proportion of persons with “cancer” in terms of the policy conditions, but which are as yet undetected. These “cancers” may be (and may remain) microscopic in size, but policy definitions generally do not include any “size” criteria. If a relatively simple and reliable test were developed that allowed early detection of some of the more common “cancers,” then the pricing could be woefully inadequate. The life office would then be faced with a significant number of “claims waiting to be made.” The ability to vary premium rates would not provide adequate protection because the lapse and re-entry option (at least to another company) available to those testing negative could be expected to result in an accelerating proportion of the (remaining) portfolio able to make claims.

Medical advances may also have a beneficial effect, e.g., better drugs to treat cardiovascular diseases may reduce the incidence of heart attacks, bypass operations, and strokes, and new surgical procedures may reduce the incidence of other covered events, such as angioplasty as an alternative to bypass surgery.

The risk that medical advances may have a detrimental effect on claim results can be greatly reduced if policy terms are worded such that a modification of benefit criteria (in response to medical advance not envisioned when the policy was developed) can be applied to all policies, both inforce and new. This would allow for the definitions applying to the various covered dread disease events to be changed as new diagnostic techniques and medical treatments become available.

### **Conclusion**

The dread disease product has been very successful in several markets around the world and is considered a new marketing edge for most companies. However, the product does have many dangers for the unwary. As long as measures are taken in pricing and product design to limit these dangers, then the dread disease product should provide a good source of profitable new business to life insurance companies around the world.

# CURRENT ISSUES IN CRITICAL ILLNESS PRODUCT DESIGN

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This article will examine current issues in critical illness product design. Emphasis will be on the United Kingdom and Ireland, but most points will be applicable to all markets.

## THE UK & IRISH MARKET

The UK and Irish markets are amongst the most developed in the world from the perspective of critical illness products. The list of covered illnesses is comprehensive, the cover is packaged with other protection products, buy-back options are available, guarantees for up to 30 years can be found, it is sold via all main distribution channels, and it is available on both a group and individual basis. Product features are listed below.

- List of covered illnesses - New products include around 30 diseases.
- Target market - The greatest success has been with loan protection products, particularly mortgages for house purchase. Because of this, most products are accelerated (i.e., a prepayment of life cover) rather than stand-alone and are written for a fixed term (although whole of life cover is available). Bancassurers have a large market share.
- Payment of sum assured - A lump sum is payable which is the same for all diseases.
- Waiting period - None. Claims can be made from day one of the contract.
- Guarantees - Guaranteed products (in terms of premiums and coverage) are common.
- Packaged products - Modern products aimed at the mortgage market package critical illness with (1) life cover, (2) disability insurance to pay the mortgage payments in the event of accident or sickness, and (3) unemployment protection. Irish products are often packaged with optional health benefits such as hospital cash or major medical insurance.

## CURRENT ISSUES

### Claim Definitions

Claim definitions are changing in the light of actual experience. At one extreme are changes in the claims wordings themselves. At the other extreme is a possible move in the Permanent and Total Disability (PTD) benefit away from a subjective occupational based definition to a more objective definition based on failing activities such as bending, lifting, climbing stairs, or being able to read normal sized print. The latter change was in response to high declination

rates (over 60%) of PTD claims, due in part to misleading information given by the salesperson, a misunderstanding or unawareness of the phrase “permanent and total,” or opportunistic behaviour by the policyholder. However, the principal reason for high declination rates is that benefits have historically been paid under the PTD definition if the insured could not perform one (or any) occupation, and potential claimants and claims assessors had difficulty determining whether a certain disability rendered the person incapable of performing that occupation. It is hoped that the newer definition, which is still in its infancy and therefore largely untested, will be more objective and lead to a clearer understanding of what constitutes a valid claim from the perspective of both the policyholder and the insurer.

### Buy-Back Options

Buy-back options are a fairly recent entrant to the UK market. They allow reinstatement of life cover lost following a critical illness claim on an accelerated policy, a very advantageous benefit from the policyholder’s perspective because purchasing new life cover after a critical illness would be very expensive and perhaps not possible. The buy-back option can take different forms: full life cover can be reinstated one year after suffering a critical illness, or it could be reinstated over periods such as four years, e.g., 25% after one year, 50% after two years, etc. Buy-back options have marketing appeal - there will be expense savings compared to purchasing separate products - but they also have drawbacks. For example, full reinstatement after one year is only slightly cheaper than purchasing separate life and stand-alone critical illness policies. This is because the only claims savings under an accelerated plan with a buy-back option (compared to separate life and stand-alone critical illness policies) are those deaths that occur during the one-year reinstatement period (which can be a fairly small number depending on the policyholder’s age). A second drawback is that buy-back options may also affect the taxation position of the benefits in the UK.

### Terminal Illness

Most acceleration products include a terminal illness benefit that pays part of the death benefit at diagnosis of an illness that will probably cause death within a specified period of time (e.g., one year). However, inclusion of terminal illness as one of the covered events in a stand-alone product is problematic: stand-alone covers do not pay out on death, so there is a fundamental mismatch of the two benefits. This could lead to a situation where death claims were

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covered under a stand-alone contract (after all, death is the ultimate proof of a terminal illness). The 28-day survival period would be worthless since it would be impossible to determine when a terminal illness commenced. Also, refusal by the insurer to honour post-death claims might not be viewed sympathetically by the courts, Ombudsmen, or the press.

### **Scaled Benefits**

Some product providers are discussing the possibility of scaling the benefit according to the severity of the illness or surgical procedure. Whilst the logic for scaling is clear - better targeting of benefit to need and limiting payment of a “windfall” benefit after occurrence of a very mild covered event (e.g., a nondisabling myocardial infarction) - there are significant disadvantages to introducing this benefit.

Let us consider the situation of two people who own a scaled benefit critical illness policy. Both experience a “mild” myocardial infarction (one that causes little or no long term disability). The first person may want to return to full-time work shortly after the event, whilst the second individual might prefer a long period of convalescence followed by part-time employment. Policyholder one would be happy with the scaled benefit because he/she enjoys the rigors of the workplace and is eager to return. The second policyholder would rather avoid the stress of full-time work but the scaled benefit dictates the reaction to illness, i.e., it indicates that his/her heart attack was not serious. The *raison d’être* of critical illness insurance - provision of the financial flexibility to react to a critical illness - has been lost. It is important to remember that there would be nothing wrong with paying each person 100% of the benefit if the policy did not contain a scaled benefit provision: the myocardial infarction was not anti-selective behaviour and the covered event would have been included in the pricing.

Scaled benefits may add very little to the UK market from a sales perspective, cost savings are likely to be minimal, and claims administrative and product design could become much more complicated. Regarding the latter, it might be instructive for product development actuaries to perform the following exercise. First, classify the list of critical illnesses into three categories: critical, serious, and emotional. Second, discuss the categorisation with the Chief Medical Officer or someone from the claims department who understands the illness, not just in terms of medical severity but also the physical, mental, and emotional consequences. What this process would probably reveal is that the categorisation would often change depending on one’s perspective. Magnify this process by trying to define covered events plus gradations of severity, and it likely there would be less interest in scaled benefits. The current simplicity of the product is a big plus point - why change it?

One situation where scaled benefits may be appropriate is in the high sum assured market, particularly for key person

insurance. (“High” varies according to market. In the UK critical illness sums assured of £1 million are not uncommon and cases of around £3m have been written.) Product providers and their reinsurers are extremely wary of placing cases of this magnitude since it is difficult to determine the “need” for the cover in terms of the benefit amount. Moreover, some of the diseases are open to anti-selection, particularly own occupation PTD (“own occupation” refers to policies which pay the benefit if the insured is unable to perform his/her specific type of work), and the moral risk increases in line with the sum assured. Given the likelihood that the key person may be more motivated to return to work than the average insured after a “minor” event, perhaps scaled benefits would help in this particular market segment, particularly if combined with other design modifications, e.g., a maximum sum assured for own occupation PTD with an “any occupation” top-up.

### **Income Payments**

We sometimes hear calls to pay the sum assured as income rather than as a lump sum. Proponents of this approach argue that the lump sum can be squandered. Whilst this may be true in some cases, there will be many more situations where the lump sum is used wisely. A lump sum gives more flexibility - part of the marketing message of the product - and could always be used to purchase an (impaired) annuity if income is desired. It is essential to remember why people buy critical illness insurance in the first place. They like lump sums! This is one of the reasons why critical illness outsells disability insurance in the UK despite having been around for only a fraction of the time. To remove that feature of the product would jeopardise future sales.

### **THE FUTURE**

Issues discussed thus far are current concerns. But what will happen in 10, 15, or 25 years? This is a crucial question because experience to date is generally inadequate to identify long term trends. In addition, some critical illness policies are written on guaranteed premiums with guaranteed benefits.

### **Critical Illness vs. Disability Insurance**

Critical illness insurance pays out on the occurrence of one of a number of specific events, whilst disability cover pays out on being sick. The former is therefore infinitely more vulnerable to changes in screening, diagnostic techniques, and general medical advances than is the latter. These points need to be borne in mind in product design, pricing and reserving, and when considering long term profitability of critical illness insurance.

### **Trends & Shocks**

It is important to distinguish between trends and shocks. The meaning of trends is fairly obvious and examples

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include the increasing frequency of coronary angioplasty in the UK, decreasing mortality rates in most developed countries, and improved survival following myocardial infarction. Whilst not easy, it is possible to produce a reasonable estimate of future claims by analysis of historic data, government projections, recent medical research, and discussions with Chief Medical Officers. (It may only be possible to predict future trends within a certain band, e.g., the incidence of a covered event might be projected to increase approximately 2-3% per year.) Thus, trends can be anticipated and handled via pricing adjustments.

One noteworthy trend is the increasing frequency of minor, less invasive surgical intervention via laparoscopic techniques - or keyhole surgery. In the UK some critical illness claims have been paid for heart valve replacements via this procedure, and some insurers include laparoscopic coronary artery bypass and valvuloplasty as covered events. This development raises two concerns. First, there is the issue of whether the covered event is a critical illness. Does “minor” surgery reflect a “minor” condition (in which case the claim may not be justified), or has the mode of treatment merely changed and the underlying condition remains “critical?” The second issue is incidence. Given that minimally invasive surgical techniques are less expensive and associated with lower morbidity, will claims for the critical illness benefit be more common and occur earlier?

Shocks are, by definition, more difficult to predict and can be more serious in terms of unexpected claims. An example is prostate cancer. This impairment is very prevalent in older men, but most cases are not detected because diagnostic techniques have been inadequate and most men with prostate cancer die of other causes. However, this situation is changing because physicians in many countries are beginning to screen for this disease with the prostate specific antigen test. The “increased” incidence of prostate cancer (population incidence has actually remained the same, but diagnostic ability has improved) could lead to an avalanche of unexpected claims. It is for this reason that critical illness insurers in many markets have exclusions for less serious forms of prostate cancer.

### PRODUCT DESIGN IN AN ERA OF UNCERTAINTY

In addition to these trends and shocks there is another concern: medical advances have the potential to effect changes in diagnosis and treatment that cannot be envisioned by those who design future generations of critical illness products. For example, some researchers predict that it may be possible to prevent many types of cancer, whilst others warn that virtually all people harbour early cancers that will one day be detectable with sensitive tumour markers (and potentially sources of unanticipated claims). Other investigators suggest that coronary heart disease may be prevented by taking prophylactic antibiotics. And breakthroughs in genetics could conceivably change our most fundament

understanding of the pathophysiology of disease, particularly regarding when a diagnosis is made, e.g., disease may be diagnosed in asymptomatic people via genetic testing, thereby triggering a request for a claim payment.

How should insurers react to these medical uncertainties? Listed below are a number of product design ideas that could mitigate unfavourable claims results. None of these “solutions” are perfect, and some work better in certain markets than in others. However, with regard to preservation of a company’s options to deal with claims that could not be anticipated at the time of product design, all provide a more robust solution compared to products that guarantee premiums and benefits.

- Product A - Guaranteed diseases and definitions, but with reviewable premiums. This design would be less risky but would depend on the ability to review premiums to the desired degree. Selective lapsation might occur if increases were too large.
- Product B - Guaranteed premiums and coverage, but with a maximum term of perhaps 10 years. There would be an option to renew the policy without underwriting and take out the policy available at that time. The cost of the renewal option would need to be less than the cost of the longer guarantee that was given up.
- Product C - A long term product with varying diseases, definitions, and premiums, i.e., the coverage would alter in line with medical advances. To be acceptable to the policyholder, changes to the coverage would need to match the policy conditions of new business at the time the changes were made. Such a product would not be allowed in the UK but it might be introduced in other markets.
- Product D - A product where payment of the sum assured required not only the occurrence of one of the critical illness events but also some degree of disability. This would be assessed on an objective basis, e.g., degree of disability present 3 months after the initial event. Care would need to be taken to avoid confusion with disability insurance.
- Product E - The sum assured would be payable as part lump sum and part income. The income element would cease on recovery or death. Again care would be needed to avoid confusion with disability insurance.

### CONCLUSION

Critical illness products need to be designed and priced with a full appreciation of the factors mentioned above, with particular attention to the projected pattern and nature of future claims. Some of the uncertainties attendant to medical advances could be mitigated by incorporating features that allowed insurers to deal with situations that could not be anticipated at the time of product design.

# THE FUTURE OF CRITICAL ILLNESS DEFINITIONS

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The Critical Illness (CI) product, also known as Dread Disease (DD), was launched in the Australian market in 1987 and was closely based on the successful South African product, almost directly utilising its insured events and definitions. The four covered events (hereafter referred to as “core” events) were Heart Attack, Coronary Artery Disease Requiring Surgery, Stroke, and Cancer. Of these four events, only Stroke included a requirement for permanent impairment, whereas the policy proceeds could be received for the other events even if full recovery occurred. These events were given the following definitions:

*Heart Attack* means the death of a portion of the Life Insured’s heart muscle as a result of inadequate blood supply. The diagnosis will be based on:

- a history of typical chest pain, with
- new ECG changes, and
- elevation of cardiac enzymes.

*Coronary Artery Disease Requiring Surgery* means the actual undergoing of surgery (other than angioplasty or other intra-arterial procedures) for the treatment of coronary artery disease.

*Stroke* means the Life Insured has suffered a cerebrovascular incident, producing neurological sequelae lasting more than 24 hours and including infarction of brain tissue, haemorrhage, and embolisation from an extra-cranial source. Evidence of a permanent neurological deficit must be produced.

*Cancer* means that the Life Insured has a malignant tumour characterised by the uncontrolled growth and spread of malignant cells and the invasion of normal tissue. The term cancer includes leukaemia, lymphomas and Hodgkin’s Disease. All skin cancers except invasive melanomas are excluded. An invasive melanoma is one which is classified as Clark Level 2 or beyond, or has a thickness measured in excess of 0.75 mm.

Another two events, Kidney Failure and Paraplegia, were added about a year later, and the number continued to increase over the next ten years to the current level of 40 to 50 events.

## CURRENT CHALLENGES

The Cologne Re monitors the operation of CI definitions. Anti-selection and advances in medical technology are recognized as major issues in this regard.

### Anti-Selection

By 1987, South African experience indicated that

anti-selection occurred in the early months of CI contracts as evidenced by significantly higher actual numbers of claims compared to expected, particularly for cancer. All companies in Australia therefore adopted a 3-month waiting period for core events and this practice has helped minimise the problem. Anti-selection still occurs to a lesser extent, especially with breast cancer, and may extend as far as two years after policy commencement.

Two product design recommendations stem from experience in managing anti-selection. First, it is recommended that a 3-month waiting period be imposed for major events (including Multiple Sclerosis). Second, the benefit for an insured event should be payable only on the “first occurrence” of a nominated event, i.e., if a defined event occurs within the waiting period, any recurrence of this insured event should not be covered as this is likely to be highly indicative of anti-selection. Care must be taken to draft unambiguous policy conditions to satisfy this objective. Examples of such wordings would be:

“The benefits are only payable if the first occurrence of an insured event arises after risk commences and after any waiting period.”

“No benefits will ever be payable for those events subject to the waiting period, e.g., Heart Attack, Cancer, Stroke, Multiple Sclerosis, Coronary Artery Bypass Grafting, or Coronary Artery Angioplasty,<sup>1</sup> if symptoms first appear, or the condition first occurs or is first diagnosed, within 90 days after the Risk Commencement Date or the date of any reinstatement.”

### Advances in Medical Technology

Diagnostic techniques and treatment have advanced very rapidly over the past 10 years and the rapidity of these advances can be expected to increase in the future. One effect of these improvements has been earlier diagnosis of medical conditions, as well as diagnosis of medical events on a much smaller scale. It is now possible to diagnose “micro medical events” for three of the four core conditions, i.e., micro strokes, micro carcinomas, and micro myocardial infarctions. This development is of critical importance because CI products were generally not priced to pay a benefit in these circumstances.

#### Micro Strokes

As a result of intense market competition, many companies in Australia have removed the requirement that a stroke result in “permanent neurological deficit.” The medical fraternity has supported this approach, as the traditional medical diagnosis of stroke requires only that a neurological deficit last at

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least 24 hours (so as to differentiate between stroke and transient ischaemic attack). However, the problem is that brain scans can now detect strokes that caused no residual neurologic deficit and may have been totally asymptomatic, and many sufferers of these events may submit claims for the CI benefit. A recent article in *Risk Insights*<sup>2</sup> addressed the implications of small and asymptomatic strokes and highlighted these developments as a major challenge for CI products.

A possible safeguard against paying large sums insured for very minor medical incidents is the inclusion of a set of “severity criteria.” For example:

*Stroke resulting in functional loss* means a cerebrovascular event producing permanent neurological deficit and causing permanent impairment of at least 25% of whole person function. This requires clear evidence on computed tomography (CT), magnetic resonance imaging (MRI), or similar scan that a stroke has occurred, as well as:

- infarction of brain tissue, and
- intracranial or subarachnoid haemorrhage, or
- embolisation from an extracranial source.

Cerebral symptoms due to transient ischaemic attack, reversible neurological deficit, migraine, cerebral injury resulting from trauma or hypoxia, and vascular disease affecting the eye, optic nerve, or vestibular functions are excluded.

#### *Micro Carcinomas*

This is probably the most challenging issue for the CI product, as definitions of cancer are highly technical and almost incomprehensible to most policyowners. The very high incidence of low grade, non life-threatening prostatic cancer has already been addressed by most companies in Australia by excluding “Prostatic Cancers which are histologically described as TNM Classification T1, or are of an equivalent or lesser classification.” Another challenge is the increasing frequency of diagnosis of papillary micro carcinoma of the thyroid. Incidental detection of this micro carcinoma following thyroidectomy for benign goitre - thereby resulting in a possible “windfall” insurance payment - is a matter of concern. The principal issue is that, sooner rather than later, new medical technologies will allow other micro carcinomas to be diagnosed at a non life-threatening stage. A possible solution is the exclusion of all non life-threatening cancers. For example:

*Life-Threatening Cancer* means the presence of one or more malignant tumours, including leukaemia (other than chronic lymphocytic leukaemia less than Rai stage 3), lymphomas and Hodgkin’s disease. The malignant tumour is to be characterised by the uncontrollable growth and spread of malignant cells, and the invasion and destruction of normal tissue for which major interventionist treatment or surgery (excluding endoscopic procedures alone) is considered medically necessary. The following tumours are excluded:

- Tumours showing the malignant changes of carcinoma in situ (including cervical dysplasia CIN-1, CIN-2, and CIN-3) or which are histologically described as premalignant, and
- All skin cancers, including hyperkeratoses, basal cell carcinomas, squamous cell carcinomas, and melanomas of less than 1.5 mm maximum thickness as determined by histological examination using the Breslow method, unless there is evidence of metastases, and
- Non life-threatening Cancers such as prostatic cancers which are histologically described as TNM Classification T1 or are of another equivalent or lesser classification, and papillary micro carcinoma of the thyroid or bladder.

#### *Micro Myocardial Infarctions*

Do these occur? If micro strokes exist, it is likely that micro infarctions of heart muscle occur too. Evidence for this comes from use of the Troponin test in emergency admission hospital wards. Troponin has been found to be an excellent independent predictor of a major cardiac event and a highly sensitive marker for myocardial necrosis. Diagnoses of Minimal Myocardial Damage (MMD) or Minimal Myocardial Injury (MMI) are sometimes given to patients who present with chest pain and raised Troponin levels, but without CK/MB elevation and without diagnostic ECG changes.

As most markets have a definition which requires that chest pain, elevated cardiac enzymes, and ECG changes all be present for the diagnosis of Heart Attack, diagnoses of MMD and MMI do not satisfy the usual policy definitions. In markets with strong consumer influences, however, the pressure to pay is (or will be) difficult to resist as some cardiologists tend to diagnose Heart Attack on the basis of the death of a portion of the heart muscle as evidenced by the presence of elevated Troponin levels associated with chest pain.

Again, a possible solution is the inclusion of additional criteria, such as:

*Heart Attack* means the death of a portion of the heart muscle arising from inadequate blood supply to the relevant area. The diagnosis shall be supported by the following criteria being consistent with a Heart Attack:

- clinical history,
- confirmatory new electrocardiogram (ECG) changes, and
- diagnostic elevation of the cardiac enzyme CK/MB.

If the diagnosis of a Heart Attack is not supported by the above criteria, a claim will be considered based on evidence that the event produced a permanent reduction in the Left Ventricular Ejection Fraction to 50% or less.

#### **ALTERNATIVE SOLUTIONS**

There is no easy answer to the possibility that these micro

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events may increase CI claim rates. Cologne Re Australia recently put forward the above suggested definitions for Heart Attack, Cancer, and Stroke as one solution to this challenge. Another possible solution is the use of “severity criteria” for all events. Three approaches to assessing impairment can be considered:

- Permanent impairment of at least 25% of whole person function.<sup>3</sup>
- Permanent inability to perform at least two (or three) of the Activities of Daily Living (ADLs), or cognitive impairment which requires continual supervision to protect the insured or others. ADLs are defined as bathing, dressing, toileting, mobility, and feeding.
- Permanent inability to perform more than 50% of the insured’s usual activities, pursuits, and processes of everyday life.

### REVIEWABILITY OF DEFINITIONS

Ultimately it is very difficult to predict the direction or speed of developments in medical technology. The right to review the insured event definitions within the policy may be the only practical solution. Rapid changes in medical science associated with genetics, as well as general medical advances in diagnostic techniques, treatments, cures, vaccines and classifications, suggest that insurers should include the right to review Event Definitions in certain circumstances. An example of such a policy condition would be:

“Your policy cannot be cancelled by us due to a deterioration in your health, or changes in your occupation or pastimes.

Your Critical Illness Plan provides financial assistance in the event you suffer a substantial loss as a result of one of the specified events defined in your Policy Document. Due to continuing advances in medical treatment and diagnostic techniques, we may need to review the Definitions used in

your Policy Document to ensure that in the future they:

- remain appropriate with regard to medical terminology and classification,
- take into account effective cures, vaccines and modern diagnostic procedures,
- include some diseases considered appropriate in the future,
- exclude diseases which are found to have become minor in the future.

We reserve the right, therefore, to adjust your Critical Illness Definitions and/or premium rates, but only if the changes apply to all policies of this class and are approved by the Actuary having access to information and data which are reasonable and reliable in the circumstances.”

### CONCLUSION

Consumer and marketing pressures to relax CI Event Definitions are always present. If CI is to avoid design and claim problems similar to those which affected disability income insurance in the USA, it is essential that events and definitions be relevant, concise, and allow for future advances in medical technology. Your local Cologne Re office would be happy to assist you with the development or review of any Event Definitions.

<sup>1</sup> In Australia, the Coronary Artery Angioplasty event pays only 10% of the sum insured with a maximum of A\$25,000.

<sup>2</sup> Pokorski RJ. Underwriting implications of lacunar and silent stroke. Risk Insights. November 1998, p.17-21.

<sup>3</sup> The calculation of “Whole Person Function” is derived from the 4th Edition of the American Medical Association publication entitled “Guides to the Evaluation of Permanent Impairment.” This book is widely used by law courts and insurance companies throughout the world to objectively evaluate impairments. The evaluation is very detailed and complicated, especially where multiple impairments are involved.

## DREAD DISEASE: UNDERWRITING AND CLAIM CONSIDERATIONS

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When Dread Disease (DD) products were first released in the South African market over fifteen years ago, underwriters and claim assessors were hurriedly forced to devise their own methods of assessing these risks. The product was new and untested, it was a “living cover” lump-sum benefit (which would probably attract more antiselection than usual), and for a while it was feared that the industry would be inundated with claims. Because of this initial fixation with claims, it is appropriate to first discuss the nature of DD claim assessment before dealing

with underwriting considerations.

### CLAIM ASSESSMENT

In theory, DD claim assessment could not be simpler. The product covers “dread events.” Each event is defined and the claim criteria which must be met when a defined event occurs are carefully set out. For example, the definition of “heart attack” may be as follows:

“Diagnosis of the death of a portion of the heart muscle as a result of inadequate blood supply to the relevant area as

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evidenced by (1) symptoms of typical chest pain, (2) new electrocardiographical changes, and (3) elevated cardiac enzymes.”

The enumerated criteria must all be met if a claim is to qualify. Unlike occupational disability covers in which claims are assessed in terms of the claimant’s ability to work, an aspect which may involve considerable subjectivity, DD criteria are almost always of an objective nature. One should therefore use the DD criteria as a first line of defence, with the understanding that subjective evaluation may also have to be practised.

Perhaps surprisingly, the early DD definitions and criteria have performed their objective functions very well over the years. Attempted antiselection did take place and continues to occur, but strict adherence by assessors to the claim criteria (which are integral to the insurance contract) has done much to counter false claims. Genuine claims pose few problems. They are easily validated in terms of evidence and claim criteria. When assessing claims, the usual identity and in-force checks are made before addressing the DD element.

The major challenges in DD claim assessment arise in four areas: (1) claims in which not all the criteria are met, (2) advances in medicine and diagnostic techniques, (3) market developments, and (4) misrepresentation of existing medical conditions at application stage.

### Claims Criteria

Definitions and claim event criteria often use medical terminology that is incomprehensible to the average policyholder. This terminology is necessary because the product deals mainly with specific medical events. To make the product more understandable, every attempt is made to simplify the language used, e.g., using “heart attack” instead of “myocardial infarction,” but one must be careful not to simplify too much. As a case in point, the “cancer” event is usually described as follows:

“The presence of one or more malignant tumours including leukaemia (other than chronic lymphocytic leukaemia), lymphomas and Hodgkin’s disease, characterised by the uncontrollable growth and spread of malignant cells, and the invasion and destruction of normal tissue, diagnosed by a Medical Practitioner who is a consultant oncologist. The following cancers are not covered:

- tumours showing the malignant changes of carcinoma in situ (including cervical dysplasia CIN-1, CIN-2, and CIN-3) or which are histologically described as pre-malignant;
- melanomas of less than 1.5 mm maximum thickness as determined by histological examination or less than Clark Level 3 depth of invasion;

- all hyperkeratoses or basal cell carcinomas of the skin;
- all squamous cell carcinomas of the skin unless there has been a spread to other organs;
- Kaposi’s sarcoma and other tumours associated with HIV infection or AIDS; and
- prostatic cancers which are histologically described as TNM Classification T1 (including T1(a) or T1(b), or of another equivalent or lesser classification).”

Unless well-versed in medicine, a policyholder is unlikely to understand much (if any) of the above, but there is little an insurer can do to simplify the definition without losing a high degree of protection or having to increase the DD premium to probably unacceptable levels. Yet a DD product is often simply marketed as providing cover in the event of generic “cancer.” To an average person, “cancer,” “carcinoma,” “malignancy,” and “tumour” are synonymous. Medical practitioners may tell their patients of a “pre-malignant condition”; the patients hear only “malignant condition” and immediately equate it with full-blown cancer. Misunderstanding by the policyholder of the exact nature of the cover purchased should be addressed throughout product development and in marketing briefings, as the ramifications inevitably impact on claim assessors and medical officers and could determine the success or failure of the company’s product.

Claim assessors evaluate claims in terms of the criteria laid down by the company. As a result of public misunderstanding of these criteria, they also have to face aggrieved policyholders who were led to believe they had suffered a specific claim event. “Cancer” may turn out to have been only a squamous cell carcinoma or a superficial melanoma, but a policyholder is likely to insist that the claim is valid: “My doctor told me it was cancer.” Such misunderstandings can have legal consequences and marketing repercussions. One result is certain: claim assessors may have to spend considerable time reaching and defending their decisions, not only in relation to cancer events but to other misunderstood events as well, e.g., heart attacks.

Heart attacks must be assessed in terms of the definition criteria but the situation can become problematic when one of the criteria is missing (e.g., cardiac enzymes were never determined), or when one criterion is of an equivocal nature, such as a conduction defect which may be masking an infarction. Again, the situation is worsened when patients’ medical attendants assure them - usually erring on the side of caution - that they have probably had a heart attack.

In cases like this when it is virtually certain that a dread event occurred even though all the criteria may not have been met, insurers must decide whether or not to make

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ex-gratia payments. Such payments will involve claim assessors, medical officers, and legal personnel. If made too often, insurers may jeopardise their position with regard to future claims in that they may be deemed to have set a precedent, and because such payments will inevitably attract false claims and antiselection. Policyholder ignorance of the actual cover purchased can therefore be a very real problem at claim assessment stage unless the sales force is properly trained to accurately describe the product, and adequate measures such as “plain-language” policy explanations are made available at application and policy inception.

### Advances in Medicine

Diagnostic, curative, and therapeutic advances in medicine mean that many diseases which once resulted in almost certain death can be overcome and identified much earlier. Simply put, one can be forewarned of a dread disease long before the manifestation of any symptoms. These diseases can be averted or, if already present, can be cured or successfully treated, thereby prolonging life. Because the chances of survival from a disease have increased and because DD is concerned only with the specified occurrence of certain diseases, the product is attractive to those sufferers or potential sufferers who are willing to place odds on their survival rather than their death. While this is a direct concern of underwriters, claim assessors are also affected as, in many cases, claimants may have neglected to disclose their “true” intentions when applying for their DD policies. These cases can often be identified from the meticulous manner in which the criteria have been met at claim stage, and because as much DD cover as possible has been purchased over the past two or three years. Unless a claim assessor can uncover concrete proof of an undisclosed diagnosis or symptoms, very little can be done.

But this is not a situation new to life insurance. For example, x-rays and other tests were always capable of detecting early disease prior to symptomatic manifestation. In many societies, it is all too easy for a person to undergo examination by a “distant” medical specialist and somehow forget to mention this in an insurance application. Claim assessors and underwriters have always had to deal with such tactics, especially in disability and health coverages, and DD need not be singled out for special attention.

Given medical advances and a greater chance of survival, more and more people are becoming aware of the “living cover” advantages of DD, hence its popularity in many markets and insurers’ initial fears that they would face excessive antiselection. Strict underwriting and claim assessment, as well as adequate definitions which can be readily modified, have laid many of these fears to rest. This can be demonstrated by reference to a simple example - coronary artery by-pass grafting (CABG), an event which

has, since inception, been regarded as a particularly “soft” target. The usual definition is:

“Coronary artery by-pass grafting means the actual undergoing, on the advice of a consultant surgeon, of coronary artery by-pass surgery to correct stenosis or occlusion in the coronary arteries but excluding non-surgical techniques such as angioplasty, laser treatment or other non-surgical procedures.”

In the early days of DD CABG was still considered a risky procedure, but now, in certain parts of the world, it is perceived and often practiced as a prophylactic measure. Fortunately other procedures developed during the intervening years are taking the place of CABG - various types of angioplasty, laser treatment, among others - and so the standard definition above still provides a large measure of protection. However, companies and their claim assessors then found themselves under market pressure to cover the “non-surgical” techniques as well. Product developers did so, using new (but still objective) definitions and criteria, and even introduced “variant” DD products, e.g., coverage as a percentage of the benefit amount. Public demand and insurers’ fear of fraud therefore combined to create new marketing opportunities. Happily, this also reduced pressure on the “traditional” CABG event definition because new products included angioplasty as a separate claim event (priced accordingly), thereby easing claim assessment and underwriting, and so enhancing customer service.

New tests continue to challenge claim assessors. In the case of “heart attack” one of the claim event criteria is “elevated cardiac enzymes.” These have traditionally been tests such as CK/MB estimations which can identify an acute infarction. Troponin-T, a relatively new test which indicates cardiac necrosis, is now performed as well as, and sometimes instead of CK/MB. There is some doubt if the presence of Troponin-T is always indicative of an actual infarction, and disagreements between claimants and claim assessors have already occurred regarding whether an abnormal Troponin-T test satisfies one of the DD claim criteria. Similarly, the Prostate Specific Antigen (PSA) test, which, if suitably abnormal, could indicate either cancer of the prostate or benign prostatic hypertrophy, may be deemed by an aggressive claimant as adequate proof (i.e., without biopsy and histologic evidence) of the presence of malignancy. However, reference to the Cancer definition above will show that not only are “lesser” prostatic cancers excluded but that histology is also necessary. This is a good example of how claim event criteria can be configured to anticipate and, to a large extent, accommodate diagnostic advances which may be detrimental to the success of a DD product. It also demonstrates the need to assess claims strictly in terms of the event definitions. Even so, claim assessors have to walk a very fine line - one which is rendered even finer by market developments.

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## Market Developments

No matter the industry, every company seeks market advantage. The DD product began with four to six “core” dread events. Market pressures have pushed up the number. Some are merely ancillary to the core products; others, such as Multiple Sclerosis and Alzheimer’s Disease, are completely unrelated. The greater the number of claim events, the greater and more complex the definitions and event criteria and, in many cases, the degree of subjectivity of assessment. A number of “new” events are also moving away from the necessity that a DD event be of an immediate life-threatening nature, which is not to be encouraged as there are other products (disability, health, and long term care insurance) deliberately tailored for these events. Unbridled competition within the industry also has a tendency to dilute claim event criteria, inadvertently undermining the very strengths of the product concept and putting untoward pressure on claim assessors and underwriters, and thus negating any initial marketing advantages. Claims then become excessive and slower to process, and underwriting overly cautious.

For claim assessors, changes to the range of events offered over the years can complicate matters at claim stage. This can take two forms - the addition of new claim events, and changes in event criteria. A DD product rarely remains static but can change rapidly in response to experience and market demand. Because additional claim events may be covered under new policies and claim criteria may have changed as the product evolved, claim assessors are strongly advised to abide by original policy conditions and should not automatically assume that present definitions and criteria apply. In practice, many companies may retroactively cover policyholders for additional events included in newer policies, usually if these events do not involve a premium increase, and occasionally when event criteria are altered. Claim assessors must exercise extreme caution here: in the absence of any company instructions to the contrary, bearing in mind that “harsher” or more comprehensive criteria cannot be unilaterally imposed on an existing policy without prejudicing the policyholder, the original terms and conditions of a policy always form the basis of the insurance contract.

## Misrepresentation

This can be innocent or intentional, and there are numerous grey areas. Misrepresentation can be instigated by either the company - the insurance representative may misrepresent the extent or nature of the cover - or the applicant. In many cases, claim assessors and underwriters will discover that misrepresentation by the applicant was quite unintentional. But all insurance policies are contracts and applications for insurance are actually tenders for the purchase of an insurance contract. Misrepresentation can

render a contract invalid. Claim assessors have the task of detecting and dealing with misrepresentation after the fact, sometimes many years later, when it is virtually impossible to prove it satisfactorily. Because of legal and other cost considerations, as well as the introduction of non-contestable clauses in various markets, it is far better to investigate suspected misrepresentation during the tendering process, i.e., at application stage, because this is usually when misrepresentation occurs. This is where underwriters play an extremely important role.

## UNDERWRITING CONSIDERATIONS

Underwriters perform risk selection, placing each risk in a category commensurate with its profile. This applies to every kind of insurance product available. Yet DD products have largely been given a bad name by underwriters. To understand this, one must return to the early days of DD when the rush to launch the product meant that underwriters were left to fend for themselves. In retrospect, this poor reputation was really unwarranted. DD has proved easier to underwrite than disability and health covers, and guidelines for DD underwriting are now available. For example, CLUE, the electronic underwriting manual of The Cologne Re, provides loadings and other tools for DD risk assessment.

### Basic Underwriting Approaches

Because DD is linked to the mere occurrence of a specified disease, and because these diseases should be of a life-threatening nature, there is a strong correlation between occurrence and mortality. Accordingly, underwriters can use life ratings as a starting point. This is to be recommended because many DD covers are riders to life policies. In general, life risks assessed at an extra mortality in excess of +150% are marginally acceptable for DD. Those in excess of +200% require declination. Such high loadings usually indicate a systemic disease, thereby increasing the likelihood that a DD may occur. Actual DD loadings are not expressed as percentages of extra mortality but as percentage increases in premium, as in disability income insurance. As long as DD claim events are of a life-threatening nature, the correlation between incidence and mortality will assist an underwriter in formulating a DD loading.

In assessing risks in terms of life ratings, one should always bear in mind the exact DD events covered, as these may vary from company to company. Underwriters must also be aware of the event definitions and criteria. Even when DD underwriting loadings are available, such loadings must be viewed relative to the actual covers offered by a company. For example, a company which offers only Cancer and Accident event covers need not concern itself with coronary artery disease ratings. Definition phraseologies might also differ from company to company, and

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underwriters must then perform company-specific underwriting actions.

DD risk selection also utilises exclusion clauses other than those general to all policies. These special exclusion clauses can involve the removal of a certain event from the contract, e.g., cancer, when it is otherwise impossible to offer a loading. Exclusion of events of a systemic nature, such as coronary artery disease or diabetes mellitus, is not recommended. Other exclusion clauses may be structured to meet specific contingencies, or could involve an extension of claim criteria or a stricter event definition. Such flexibility is useful but should be used solely if declination is the only other option. Underwriters who apply too many exclusions will come across two major constraints: claim assessment procedures become unwieldy and difficult, and administration systems may not be able to cope with lengthy amendments to standard DD terms and conditions. In DD, exclusion clauses should be the exception rather than the rule.

As in life and disability covers, exclusion clauses are usually applied for non-medical conditions, i.e., occupations, avocations, and geographical location. Unlike life and disability insurance, it is possible to impose an exclusion clause based on an applicant's occupation, e.g., exclude the "Burns" event for a fireman. Again, it is advisable not to be too liberal with exclusion clauses.

### Waiting Periods

Many newer DD products incorporate a waiting period. Only on the expiry of this waiting period will valid claims be paid. There is no reason why underwriters cannot utilise and refine this concept as an event-specific temporary exclusion clause, e.g., "no claim under Event X will be admitted for three years after policy inception," if it is felt that Event X may be imminent. This should be done with caution in view of the constraints above.

DD policies are sold as riders to life covers ("acceleration" DD products that pay part of the death benefit at occurrence of a covered DD event) and as stand-alone policies. Underwriters are advised not to differentiate between the two. There is no need to do so, other than that one would generally expect a higher degree of antiselection with stand-alone policies. However, antiselection may also occur with acceleration products. For example, if covered dread diseases are truly life-threatening (as they should be), consumers who view themselves at high risk for both death and a non-fatal disease may hedge their bets by purchasing an acceleration DD product, especially since the introduction of DD "reinstatement" or "buyback" options.

### Underwriting as a Function of Claim Assessment

Underwriters search for abnormalities (both actual and potential) and for anomalies. The most important question

an underwriter can ask is "Why has this type of person applied for this type of policy?" DD cover, being expensive, is especially deserving of this question, and a satisfactory answer will do much to facilitate any later claim assessment. Because underwriters and claim assessors have objective event definitions in common, there is little to separate the two functions. Underwriters are in the fortunate position of being proactive in their evaluations and should do all they can to assist claim assessors. This is particularly important because genuine claimants will have suffered a significant degree of trauma and should therefore receive prompt claim assessment and settlement. If a risk is properly investigated at outset, valid claims can usually be dealt with rapidly. Experience has shown that rapid claim settlement is a very powerful marketing tool and should never be underestimated. Underwriting should also do its utmost to ensure that potentially dubious applications will not overload the claim process at a later stage.

### Family History

This is just as much a concern for DD as it is for other products, more so perhaps because death or physical disablement is not a prerequisite for a claim. The usual assessment procedures are valid, e.g., serum cholesterol estimations when there is a family history of coronary artery disease, blood glucose and hemoglobin A1c for diabetes, and so on. Underwriters who know their particular life markets know which indicators to look for and which tests to perform. The effect of genetic testing on DD as a whole is still unknown. Space considerations preclude a discussion of this topic, but underwriters will undoubtedly learn to handle it as they have other developments in medicine thus far. It is fortuitous that underwriting requirements for DD tend to be more extensive than for life cover alone, as underwriters are able to request and obtain more information for selection purposes. The sales force and marketing divisions should be made aware of this to avoid complaints. Underwriters for their part should not abuse this advantage.

### Antiselection

The degree of antiselection varies from market to market, and underwriters within each market know how it is done and by whom. Genuine DD applicants have a certain profile. Underwriters may not be consciously aware of this profile, but, given enough experience, they usually spot suspicious applications. When in doubt, it is worth repeating the question "Why has this type of person applied for this type of policy?" Every effort should be made to identify potentially fraudulent applications because, as discussed earlier, it is very difficult to contest these at claim stage. Questions should be asked as to total amount of DD cover in force and intended. Financial underwriting must be performed, beginning with an estimation of premium as a per-

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centage of disposable income. The higher the percentage, the greater the risk of antiselection. However, as demonstrated above, antiselection may be of an innocent nature - the sales force may be pushing DD at all costs and cutting corners, especially in a new market. Finally, companies incur considerable expenses from early lapsation and repeated "switching" (from one DD insurer to another), and underwriters should be on guard against these possibilities.

### Number of Claim Events

The number of claim events can slow underwriters down, especially if they diverge from truly life-threatening illnesses. Whereas claim assessors are faced with a single event, underwriters must examine them all. When different diseases have to be loaded, underwriters must determine the extent of overlap, if any, and whether the combination should be assigned the sum of these loadings, a loading over and above this, or merely the highest suggested rating. What, for example, is the final loading for an applicant who has mild hypertension and a tremor possibly indicative of a nervous disorder? Should any nervous disorder events be excluded? Is the loading for one event sufficient to cover both, on the basis that either might lead to only one of two dissimilar events? In general, one would marginally rate up the highest loading and leave it at that, but no hard and fast rules can be given. Underwriting manuals such as CLUE provide very useful

guidelines. The number of claim events offered by a company should not be exaggerated because underwriting will then suffer. Fortunately, good sense has usually prevailed, and the average number of events is well within the capabilities of an experienced underwriter.

### CONCLUSION

Because of the objective nature of the claim criteria, underwriting and claim assessment are far easier for DD than for other living benefits covers such as health and disability insurance. The speed and ease with which DD products have been adopted in so many international markets are proof of this. Furthermore, DD is an extremely versatile product. If actual experience, coupled with underwriting and claims feedback, reveal certain weaknesses, changes to the product, underwriting approach, and claim handling can be instituted almost immediately. Market pressures and opportunities can also be rapidly accommodated. Perhaps the most valuable lesson companies learned after DD was first launched was that success required tight co-ordination and co-operation between all departments - actuarial, administration, underwriting, claims assessment, and marketing. It is a lesson that brought claim assessors and underwriters together as a creative unit, possibly for the first time, hence the joint approach of this article.

## CRITICAL ILLNESS INSURANCE IN THE UNITED STATES

Lisa Hayes

General & Cologne Life Re America

Critical illness insurance has been a topic of discussion at regional and national meetings in the United States. The product sells well in other countries. Why not here? Despite the fact that many people are talking about it, not many companies are developing a product. The concept is very exciting, yet in this period of flat or declining life insurance sales, the progression from concept to product is slow and filled with uncertainty. How is critical illness insurance priced and underwritten? Should the definitions be very restrictive in order to have a lower price, and would that lead to disagreements at claim time? Or, should the definitions be more liberal and priced accordingly?

### Cologne Life Re Critical Illness Product Survey

To find out what US companies were thinking about critical illness products, The Cologne Life Re conducted a survey during the latter part of 1997. The survey was

sent to approximately 150 companies across the US. We received nearly 100 responses. Of those that responded, 17 companies reported they currently had or were in the process of developing a critical illness product. An additional 13 companies were considering future development. A brief summary of the results follows.

- Development of a critical illness product was largely due to demand from internal marketing departments.
- The most popular formats were a rider to an individual life policy and an individual stand-alone policy. Overall, critical illness riders were more common than stand-alone products.
- Sales and consumer demand for the product were generally below expectations. It was too soon to assess profitability since some companies only recently introduced the product.
- Results were evenly split with regard to agent accep-

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tance of critical illness products that had already been introduced.

- The target market was individuals aged 40 to 44 years with an average income of under US\$M0,000. The average face amount was US\$75,000.
- Maximum coverage ranged from US\$25,000 to US\$1,000,000. The minimum issue age was typically 18 to 20 years with a maximum issue age of 64 or 65 years.
- If offered on a group basis, the minimum number of eligible employees ranged from 3 to 50. Coverage was usually on a voluntary basis.
- Most products were reinsured. Those products not reinsured typically had lower maximum coverage amounts available.
- Reasons cited for why critical illness products were not being considered included lack of knowledge, poor fit within the portfolio, and uncertainty about the regulatory environment.

Of course, this was just a small snapshot of the market and not all companies with a critical illness product were contacted. One sentiment echoed by several companies was the desire for a large insurer to enter the market. Presumably, this would generate greater awareness about the product, i.e., a large company would spend more money on advertising, training the sales force, etc.

### Group Sales of Critical Illness Products

Many US insurers who have developed critical illness products are introducing them through worksite marketing. The target market is the employee who purchases benefits on a payroll deduction basis. Face amounts are typically under US\$100,000 and coverage is based on how many dollars per week the employee chooses to pay. Worksite marketing of critical illness insurance (i.e., products marketed at the worksite but purchased by individual employees rather than the employer) is a natural distribution channel for an employee base that is becoming accustomed to receiving fewer benefits through a traditional employer paid health plan, and thus having to supplement coverage. Most products are accelerated benefit riders to a life policy.

### Regulatory Environment

The regulatory environment for critical illness insurance can be challenging. Companies find that they cannot get approval in all 50 states. A few states won't even consider approval of a policy. Other states can make the filing process very difficult. Some states won't approve a policy if there are any family history questions. One state

won't allow a policy to be sold if the applicant doesn't have traditional health (medical expense) coverage. There are additional objections to waiting and/or survival periods. It is not unreasonable to assume that a policy may only be approved in roughly 35-40 states. Some of the problems may be due to regulators' unfamiliarity with the product. As more companies attempt to file for approval of new policies, the approval process will surely become less onerous. To circumvent some of these problems, the product could be designed as a cancer policy with other covered conditions (e.g., heart attack, coronary artery bypass surgery, stroke, etc.) added as riders. Another option is the Multiple Employer Trust (MET) plan which could secure approval in up to 15 states without having to wait for each individual state to approve the policy. Of course, each of those solutions may generate another set of problems.

### Tax Status

The tax status of benefits received is also in question. Unfortunately, the Internal Revenue Service (IRS) does not specifically address this issue. Therefore, insurers are left to their own interpretations as to whether or not benefits are taxable. A company might consider asking for a private letter ruling from the IRS to clarify benefit taxability.

### Life policies

Generally, payments that accelerate the benefit from a life insurance policy (e.g., an acceleration rider) would not be taxable if the recipient is deemed to be either terminally or chronically ill. "Terminally ill" is defined as an individual who is expected to die within 24 months. "Chronically ill" is defined as an individual who is unable to perform at least two activities of daily living, and limitations are placed on use of insurance proceeds for a chronically ill person. Neither of these definitions fits most requirements under which an insured would receive a critical illness benefit.

### Health policies

Benefits received from a health policy are most likely not taxable if the premiums are paid by the insured.

### Summary

Critical illness coverage is definitely gaining in popularity. With the aging of the population, there is increasing awareness that disease may be debilitating but not necessarily fatal. Thus, a critical illness policy can address a very real need by providing a one-time infusion of capital when illness threatens income and generates unplanned expenses. As more and more companies recognize this fact, many will choose to add critical illness insurance to their product portfolios.

# INTERNATIONAL CLAIMS EXPERIENCE FROM DREAD DISEASE PRODUCTS

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The analysis of mortality and morbidity claims experience is an old tradition in the various branches of life insurance, as proven by numerous publications by the Society of Actuaries and the Institute of Actuaries. More recently, this type of investigation has been extended to include Dread Disease products. When Dread Disease products were first introduced, they were originally priced on the basis of sparse population data. Statistics from various markets often had to be combined in order to obtain a sufficient basis for pricing. Thus, claims experience is used to check the adequacy of both pricing models and statistics used in the pricing of Dread Disease products. The ultimate aim of this process is to obtain tables based on actual experience.

## Heterogeneity of Data in Claim Surveys

Dread Disease products vary much more from company to company and according to geographical region than other insurance products. This is due to differences in the diseases insured and their medical definitions. Other product features, such as type of policy or waiting period, can vary too. This disparity makes it difficult to compare data on products from different companies when producing a survey on claims experience. Inevitably, differences that can have a significant effect on claims experience have to be neglected. Different exclusions in the definition of cancer, for example, can lead to disparities in the number of claims due to cancer. Because of the complexity of the product, differences in medical underwriting or claims handling between various companies can have a much greater impact on claims experience in Dread Disease than in life business.

Other factors also hinder the compilation and interpretation of claims experience. Dread Disease is a relatively new product and the volume of policies sold (and as a consequence the number of claims) is still quite low in many markets. For policies which have been in effect for only a few years, possible antiselection and positive selection in the underwriting process can play an important role. Even for markets like the United Kingdom where Dread Disease policies have been sold for twelve years, it will take some time until market penetration and maturity of the portfolios have reached a point where derivation of reliable pricing statistics might be achieved.

## Sources for this Claims Analysis

In addition to claims experience published in the articles

and brochures listed in the references, we used experience provided to The Cologne Re by insurance companies in the United Kingdom, Germany, and Austria. These were the only three European countries for which we had data. Claims from the United Kingdom made up 95% of the claims from these three countries. For South Africa, data were obtained from the report by The Actuarial Society of South Africa cited in the references, and statistics derived from The Cologne Re portfolio for South Africa.

## Market Coverage of this Survey

Claims experience from the United Kingdom, Germany, Austria, South Africa, Australia, Japan, Taiwan, Singapore, Malaysia, Indonesia and Hong Kong was analysed for this study. Data cover different periods of time between 1989 and 1996. For other countries we either could not obtain sufficient information or the volume of Dread Disease policies sold to date was too low to produce a significant number of claims. The percentages of business or claims paid by markets used in this survey are as follows:

- Germany, Austria, South Africa, and Japan - No information was available on the proportion of claims or business for the period examined.
- United Kingdom - The "Preliminary Report into UK Critical Illness Experience 1991-95" estimates that about 60% of all claims during the period examined were covered by that investigation.
- Australia - About 38% of the lump sum insurance market by new annual premiums was covered by the report "Critical Illness Experience in Australia 1994-97."
- Asia - The new business premium market share of companies participating in the claims survey in Asia was estimated to vary from 70% for Taiwan to almost 100% for Singapore.

## Analysed Claims and Breakdown of Claims

In several Asian markets, Total and Permanent Disability is already covered by standard death policies. As the United Kingdom is the only market in our survey where this benefit is covered as a Dread Disease and data on claims were available to us, we did not include these claims in this survey.

We limited the scope of this survey to claims breakdown by gender, duration, age, and cause for each claims experience

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examined. Additionally, the proportion of all claims in a given market to all claims examined in this survey is provided (Table 1). This allows a better statistical assessment of data from all markets. In several cases claims experience does not provide information on all categories included in the breakdown.

### Diseases Covered

The number of diseases covered varies with the claims experience examined. While the three Japanese companies in this survey cover only the three “core diseases” (cancer, heart attack, and stroke), there are companies in Hong Kong, Malaysia, Singapore, the United Kingdom, and Australia which cover over 30 diseases. The breakdown by cause takes into account which diseases were offered by the majority of companies and which produced the largest claims.

### Claims Analysis

#### *Claims breakdown by market, gender and duration*

In Table 1, the breakdown of claims paid by market, gender and duration is shown. Omission of figures means that no information was available. The breakdown of claims paid by market illustrates the proportion of claims paid for the particular market relative to all claims paid in this survey. The column “Gender” gives the percentage of male claims paid for the particular market. Duration is defined as the period of time elapsed between inception of the policy and claims notification. We distinguished between claims made in the first year of the policy, the second year of the policy and thereafter.

**Table 1.** Percentage of claims paid for the markets covered by this survey

	Claims breakdown by				
	Market	Gender (Male)	0+	1+	2+
United Kingdom	31.3	61.7	26.2	23.6	50.2
Germany	0.9	—	—	—	—
Austria	0.9	—	—	—	—
South Africa	3.4	83.3	17.4	19.6	63.0
Australia	3.2	61.5	16.4	28.7	54.9
Japan	31.4	51.0	74.0	20.2	5.8
Taiwan	7.9	40.0	65.0	35.0	—
Singapore	10.7	44.0	32.0	68.0	—
Hong Kong	4.8	52.0	28.0	72.0	—
Malaysia	5.5	57.0	47.0	53.0	—

South Africa: The percentage of South African claims among all claims in this survey and the breakdown by gender were based on statistics from The Cologne Re. Data on claims duration were taken from the report by The Actuarial Society of South Africa cited in the references. Japan: Data on gender was taken from Nippon Life and Sumitomo Life, data on duration from the survey by Sumitomo Life.

Taiwan, Singapore, Hong Kong and Malaysia: Data on duration was split into the categories 0+ and 1+.

The breakdown by market reveals that the data used for our survey is dominated by claims experience in the United Kingdom and Japan. This was taken into account when analysing the breakdown by cause.

The breakdown by gender shows that, with the exception of South Africa, claims are almost equally distributed between men and women. As we do not have information on a breakdown of the number of policies on which these numbers were based, we can not draw any further conclusions. However, the greater discrepancy between the two genders in South Africa than in other markets may be caused by the very high incidence of coronary artery disease in South Africa compared with other countries. On the other hand, cancer, the leading cause of Dread Disease claims in women, is less frequent in South Africa for both men and women.

When analysing the breakdown by duration, one must remember that the claim portfolios have very different structures. For example, the bulk of policies included in claims data from Asian markets were in their first or second year, and thus a distribution with a very large percentage of claims in the first year was to be expected. Additionally, the existence of a waiting period can influence the distribution of claims paid by duration: due to the large percentage of early first year claims in their study, Sumitomo Life decided to introduce a waiting period. South Africa and Australia are markets where claims experience stretching over several years and split by calendar year was available. Due to the positive selection effect of underwriting, a lower than average percentage of claims should be expected for the first policy year, which was the case in these two markets. This result remains unchanged if we examine the temporal distribution of all claims occurring in policies of the same underwriting year. The percentages for the United Kingdom are aggregate values for all years covered by the claims experience in this market. Thus, no conclusions on the effects of positive or negative selection can be derived from UK numbers given for duration in Table 1. However, the “Preliminary Report into UK Critical Illness Experience 1991-95” includes results that appear to display a strong positive selection for duration 0.

#### *Claims breakdown by age*

About 85% of all claims are made by persons aged between 30 and 60, with the highest share of claims being for persons in their forties. This coincides with the age group targeted by the marketing of Dread Disease products. The average age at claim notification is likely to increase with time as portfolios mature. Among older policyholders, the share of claims paid is lower for women than for men. This reflects the different incidence rates of Dread Diseases for men and women.

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*Claims breakdown by cause*

The Figure displays claims experience by cause. “Japan” data represents experience of the three Japanese companies, “Asia” combines the four other Far Eastern markets, and “Europe” includes the United Kingdom, Germany, and Austria. The aggregate worldwide experience does not include the Japanese data because, in contrast to other markets, claims from Japan are based on only the three core diseases, and thus inclusion of these data would distort the disease proportions due to their large share of all claims considered.

The data displayed in the Figure show that claims from the non-core diseases form only a small fraction of all claims. Compared to the percentage in the other regions, claims for multiple sclerosis are much more common in Europe. A possible explanation is the fact that the regional incidence of multiple sclerosis is linked to the distance of the region from the equator: the European countries considered in this survey are much farther from the equator than the other countries in the survey from which we have data on multiple sclerosis claims.

In the countries used for this study, claims due to paralysis or kidney failure were much more common in Asia than in other countries with claims from these causes. We have found no suitable explanation for this. Apart from these observations, this Figure offers no statistically significant results. The same is true if we examine

male and female claims separately (not displayed).

The three core diseases of cancer, heart attack, and stroke are the only conditions that are covered in all claims data in this survey. We analysed the proportion of each disease relative to the other two by region. The results are displayed in Table 2.

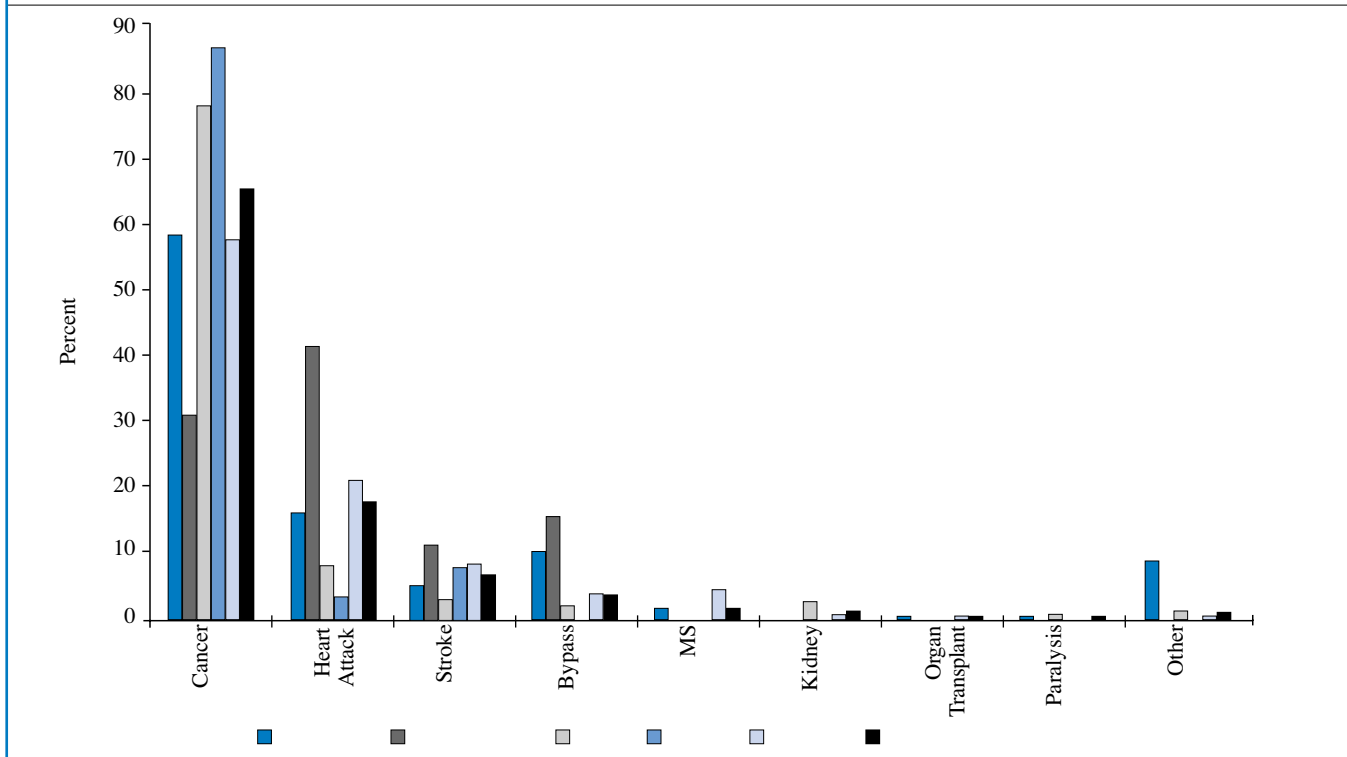
**Table 2.** Proportions of the three core diseases relative to each other

Region	Cancer	Heart Attack	Stroke
Europe	65.9	24.5	9.6
Australia	73.9	18.9	7.2
South Africa	36.9	49.7	13.4
Asia	87.2	8.3	4.5
Japan	86.9	5.1	8.0

Table 2 reflects the following known facts:

- With the exception of South Africa, cancer is the leading cause for Dread Disease claims in the countries examined.
- The proportion of claims due to heart attack is very low in Asian countries compared with other parts of the world.
- In South Africa, heart attack is the leading cause for Dread Disease claims, occurring about twice as frequently as in other countries with a Western culture.

**Figure.** Claims paid by cause



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## Summary

Like most other surveys on Dread Disease claims experience, this one suffers from the heterogeneity of data as described above. Besides confirming facts already known, the study also documents the higher proportion of claims due to kidney failure or paralysis in Asia vis-à-vis Europe or Australia. This is a new discovery regarding worldwide claims distribution and warrants further investigation. Some new details in this respect may emerge from claims experience presently being compiled by The Cologne Re for Asia. When completed, this exposure related experience will replace the 1996 survey in Asia as the most comprehensive survey on Dread Disease claims worldwide and, in contrast with the previous study, will contain policies with durations longer than two years.

## References

1. The Critical Illness Healthcare Study Group (P. Davies, et al.). Preliminary report into United Kingdom individual critical illness experience 1991-95. October 1997.
2. A.C. Mak, MEc, FIAA. Critical illness experience in Australia 1994-97. October 1998.
3. Dr. H. Kitara, et al. (Nippon Life). On DD (term and whole) and DD term riders, and on the effect of the introduction of a waiting period of 90 days.
4. Dr. Yokoyama. On DD claims and payments at Sumitomo Life. December 1996.
5. Dr. K. Kawawabe, et al. (Asahi Life). On statistics and analysis of DD claims at Asahi Life. December 1996.
6. Dr. D. Nieder, et al. Dread disease insurance claims survey in Asia. May 1996.
7. The Actuarial Society of South Africa. Continuous statistical investigations. Dread disease investigation 1991-1994.

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