



Genetics and Life Insurance

A position paper by the Life Insurance Association, Singapore

1 Introduction

- 1.1 Research and developments in the field of human genetic science will have profound consequences. Not least, it raises concerns for the use of and access to genetic information. In particular, there are perceptions that genetic testing will be seized upon by insurers as a powerful tool to identify those with a favourable genetic profile. Put the other way around, it is assumed that insurers will seek to exclude those whose genetic makeup has some abnormality, thereby creating a 'genetic underclass'.
- 1.2 These concerns are based more on speculation than upon fact but, nonetheless, the Association acknowledges that these concerns need to be addressed.
- 1.3 In reality, there is little reason to suppose that the proportion of the population that can be accepted for insurance will suffer as a result of advances in genetic science. Historic evidence shows that advances in medical knowledge have consistently contributed to improvements in mortality and a broadening of access to insurance. Certainly, insurers have no interest in narrowing the market for their products. On the contrary, they have every reason to welcome advances that improve the effectiveness of health management and make life insurance more affordable for all.
- 1.4 We believe that it is far more likely that a better understanding of the interaction between genetic makeup and environmental influences will have a positive impact on management and treatment which will result in further improvements in mortality.
- 1.5 If one accepts that premise, there is a clear coincidence of interest between life insurers and society as a whole in the successful development of genetic technology.
- 1.6 Section 3 of this paper sets out the industry's position on the question of access to genetic information. However, in order to put these views in context, we first explain the philosophy that underpins life insurance pricing. Section 4 explains the statistical basis of life insurance pricing and indicates how medical evidence is used in the pricing process. Section 5 gives a brief international perspective and the overall conclusions are set out in Section 6.

2 Basic Philosophy of Risk Classification in Life Insurance

- 2.1 The foundations of life insurance pricing are rooted in the pooling of broadly homogeneous risks. The aim is to achieve broad equity between the premiums paid and the risk borne by the pool.
- 2.2 In theory it would be quite possible grant universal access to insurance and charge common premiums regardless of the heterogeneity of the risks being borne. However, in practice, such a system would only work where there is compulsion to participate or where individuals remain in ignorance of the cross-subsidies involved. Otherwise, there would be the risk of spiralling costs as those with the greatest expectation of claim would have a greater incentive to buy whilst the younger and healthier members of the population would turn their backs on insurance.
- 2.3 The fact that purchasing decisions in a voluntary system of insurance are not random makes some form of screening a necessity. Thus distinguishing between, as distinct from discriminating against, applicants is a fundamental and necessary part of the pricing process
- 2.4 In Singapore (in common with many of the established insurance markets around the world) the principal criteria for risk classification are age, gender and smoker status. The vast majority of applicants – probably around 95% - will be accepted on terms which are 'standard' for their age, gender and smoking status. (Note that this does not mean that 95% of the population is insurable at standard terms. Some, by virtue of their age or state of health, may be discouraged from making an application.)
- 2.5 The groups into which risks are classified may change over time and will be influenced by views of what is or is not thought to be significant or politically or socially acceptable. 50 years ago it is quite likely that no distinction would be made between the genders because, at that time, the number of women in the insured population was relatively few. On the other hand, there have been moves within the European Community to outlaw gender distinctions on the grounds that this is inconsistent with legislation on equality.
- 2.6 It is clear that the system of risk classification is by no means perfect or immutable and even within these groups there will be differences in expected mortality or morbidity. It would be possible to expand the number of risk groups so that each is yet more homogeneous. However, in practice, insurers will take account of the cost and difficulty of obtaining further objective measures that would be necessary to refine the basic classification process. Furthermore, in a market the size of Singapore, there may be very limited commercial merits in seeking to refine the classification of standard risks if, in the process, this limits the 'target' population to numbers that may be quite modest in absolute terms.
- 2.7 Apart from the basic risk classification criteria there are, of course, other factors which have a bearing upon the price of insurance and, indeed, upon insurability. Most obvious amongst these are the state of health and the medical history of the applicant. Hazardous occupations and pursuits may also affect the terms on which insurance may be offered. These are factors which very clearly have an impact on the likelihood of claim.

- 2.8 For this reason, insurers will seek information about the health and medical history of the applicant before accepting life or health insurance risks. The disclosure of relevant information is a pillar of the principle of *utmost good faith* upon which life insurance is based. Without the obligation of disclosure, the asymmetry of information between the applicant and the insurer would result in 'adverse selection' – meaning that those who have an indication of current or potential health problems would be more likely to buy insurance. This would lead to cross-subsidy between individuals presenting entirely different risk profiles – and ultimately to ever-increasing costs of insurance.
- 2.9 Evidence of the impact of asymmetry of information can be found from a number of sources. For example, in the early 1980s a number of UK insurers experimented with the granting of life insurance protection for mortgages with little or no investigation of the health status of the applicant. The theory had been that the very act of committing to a mortgage was a sufficient indication that the applicant thought that he or she was in good health. However the tracking of claims showed that the claim rate in the early years of such policies was 70% higher than in comparable policies that had been 'normally' underwritten^[1]. The experiment was short lived!
- 2.10 Another study in the United States^[2] followed 148 cognitively normal people participating in a randomized clinical trial of genetic testing for Alzheimer's disease. It was found that those who tested positive were 5.76 times more likely to have altered their plans for long-term care insurance. It was concluded that if genetic testing for Alzheimer's risk assessment becomes common, it could trigger adverse selection in long-term care insurance.
- 2.11 The extent of the health information that is obtained in the application process will depend upon the age of the applicant and the level and nature of the cover that is being sought. A significant proportion of applications are accepted on the basis of answers to questions in the application form. Where the level of cover being sought exceeds a certain point, the applicant may be required to undergo a medical examination. For yet larger sums assured, additional tests – such as chest X-ray or ECG – may be required. As a general rule, the older the applicant, the lower will be the trigger point for additional medical information.
- 2.12 Each insurer will specify its own precise requirements for medical information. Competitive pressures mean that there is a high degree of convergence but differences in detail remain.
- 2.13 If the information received is unremarkable, the applicant will be accepted on standard terms for the appropriate risk group. If not, the insurer will consider:
- Whether the deviation from the standard risk group is sufficiently small that standard terms can be offered nonetheless
 - Whether the risk can be accepted subject to an extra premium or, in the case of certain health insurances, subject to specific exclusions
 - Whether the acceptance should be postponed. (This is usually where the outcome of a particular condition is expected to become clearer within a specified time frame – for example pending the outcome of a course of treatment or impending surgery.)
 - Whether the application should be declined.

- 2.14 Family history, *in isolation*, will not generally result in adverse acceptance terms for life (mortality) risks. There will, of course, be exceptions in the relatively rare cases of inherited monogenic conditions. However, family history may be one factor that is considered amongst others if it is relevant to the prognosis for other conditions that exist. For example, if the applicant has a history of heart disease, family history, along with other factors such as build, smoking habits etc. will be taken into account in deciding the terms of acceptance.
- 2.15 Family history does assume greater importance in the acceptance of *Critical Illness* risks. This is a class of business where the trigger for a claim is the *diagnosis* of one of a specified list of conditions regardless of how advanced the condition is at the point of diagnosis. A person with a vulnerability to a condition with known familial links is more likely to undergo regular screening (which we, hasten to say, is an unequivocally positive thing). Nevertheless, such a person is more likely to buy insurance after obtaining a positive test result. In addition, the fact remains that the individual is not only more likely to claim but is also likely to claim earlier because there is an improved chance that any problems will be recognized at an early stage of development.

3 The question of access to genetic information

- 3.1 Given the understandable sensitivities around the highly personal and familial nature of genetic information, questions are raised about the access that should be given to this information. These questions apply, *inter alia*, to insurers.
- 3.2 The Association fully understands that the link between genetic profile and the predisposition to disease is not well understood. Certainly, there is very little knowledge of the link between multifactorial genetic defects and other behavioural and environmental factors. We expect that it may be some time before even those who are experts in the field of genetics are able to predict, with confidence, the impact of a specific genetic profile upon mortality or morbidity
- 3.3 As a result, today's reality is that very few genetic disorders have a known significance that can be quantified and which, *in the absence of other risk factors*, would warrant special treatment in acceptance terms. The exceptions are the well-known but relatively rare monogenic disorders. That being so, the results of a genetic test would, arguably, add little of value that could not be obtained by questions about family history.
- 3.4 For this reason, insurance companies in Singapore do not seek and, for the foreseeable future, have no intention of seeking, genetic tests as a tool for screening life insurance applications.
- 3.5 Nevertheless, one must draw the distinction between the active use of genetic tests as a routine tool for screening insurance applications and the more passive requirement to disclose the result of a test that has been conducted for some entirely different purpose.
- 3.6 We welcome and support Recommendation 22 of the report by the Bioethics Advisory Committee in which the Committee urges discouragement of genetic testing services outside of the framework of the healthcare

profession. It would be a concern if the availability of proprietary tests were to encourage inappropriate insurance buying decisions based on unjustified fears or, conversely, to discourage purchase out of a misplaced sense of security. It would be of yet greater concern if the availability of proprietary tests went hand-in-hand with immunity from the obligation to disclose the results or, even, to declare that the test had been taken.

- 3.7 As noted in paragraph 2.8, asymmetry of information opens the risk of an unfair cross-subsidy in favour of those who are not required to disclose information. In terms of genetic test results, this may be of limited significance in the short term but could have more serious consequences if genetic technology establishes a place in mainstream medical practice. It would seem that this is already becoming a reality. According to the United Kingdom Genetic Testing Network, it has evaluated and approved some 300 tests as being relevant to clinical practice ^[3].
- 3.8 The impact of withholding information and the associated problems of adverse selection would become more acute where genetic technology leads to advancements in diagnosis of life threatening conditions that are not matched by improvements in treatment.
- 3.9 The Association is also concerned that, in this rapidly developing science, the perceptions and understanding of what constitutes 'genetic information' or a 'genetic test' will change over time and that meanings assigned to those terms could, in future, have unforeseen and unintended implications for any restrictions on access to such information.
- 3.10 For these reasons, the Association would be very concerned if the principle of withholding genetic test information were enshrined as a right. There would be even greater concern if restrictions were extended to other related information such as family history.
- 3.11 The Association does not subscribe to the view, expressed by some, that 'genetic disadvantage' is inherently a case for special treatment. Each one of us will have scores of genetic 'flaws' and we are all, to an extent, a hostage to our genetic make up.
- 3.12 It is perfectly natural that when it comes to issues of rights of a disadvantaged group, public sympathies will be with the individual rather than a large corporation. However, it must be remembered that rights of one group are almost invariably balanced by the responsibilities that are transferred to another. Thus, if those with a genetic disadvantage were exempted from paying the appropriate price for their insurance cover, the cost of the subsidy would fall upon other policyholders – i.e. upon individuals and not upon large corporations. That being so, there must be doubt whether, in a voluntary and private system of insurance, it is equitable or sustainable to guarantee access to insurance for the genetically disadvantaged (however they may be defined) whilst denying a similar privilege to those disadvantaged by a clinically diagnosed condition.
- 3.13 We note the conclusions of the Australian Law Reform Commission ^[4]:
- "Giving more favourable underwriting treatment to applicants because of the genetic basis of their disease creates an arbitrary distinction between individuals according to the source of their ill health or disability. It is not clear why a person suffering from a cancer that is (currently) not known to be genetically linked should be treated less favourably than a person suffering from a cancer that is. It is for these reasons that the Inquiry rejects the idea of 'genetic exceptionalism'..."*

- 3.14 The Association is mindful of the benefits to society of the successful development of genetic technology and the place of research in that development. The industry would not wish to discourage tests that would be of potential benefit in the health management of individuals or to stand in the way of research participation.
- 3.15 Yet we are concerned that the barriers which insurance is said to pose to research are overstated and a further example of the ascendancy of perception over reality. For example, we have no evidence to suggest that fears for the implications for life insurance prevent individuals from participation in cancer screening examinations.

4 The statistical basis of life insurance pricing

- 4.1 Wherever possible, the statistics that underpin life insurance pricing are drawn from observation of the experience of a relevant insured group. The Society of Actuaries of Singapore produces regular mortality studies based upon data collected from the life insurance companies operating in Singapore.
- 4.2 By virtue of the different segments of the market in which they operate, the mortality experience of individual companies will differ one from another. However, most are likely to use the industry study as a starting point for their pricing of risks for the standard risk groups.
- 4.3 The assessment of risks that fall outside of the standard risk groups by virtue of the state of health or medical history of the applicant is an art – or a science – that has developed significantly over the latter half of the 20th century. Before that time, any history of significant illness was likely to have resulted in declinature. Since then, the boundaries of acceptance – albeit at special terms – have been steadily expanded to encompass applicants who may have some quite significant medical conditions.
- 4.4 Neither individual companies nor, indeed, the Singapore market as a whole will generate sufficient data to quantify the impact on mortality or morbidity of the full range and combination of medical conditions that may be encountered. Nevertheless it would be wrong to assume that the underwriting of these medical risks is arbitrary or capricious.
- 4.5 In arriving at the terms that may be offered for risks that are not acceptable at standard terms, insurers will rely upon:
- The professional judgement of the insurers' underwriters and medical officers and, in many cases,
 - The underwriting manuals produced by the major reinsurance companies.
- 4.6 A substantial research effort goes into the production of reinsurers' underwriting manuals. These manuals are considered to be proprietary information and a source of competitive advantage so their underlying research is not put to public scrutiny. It is acknowledged that many of the recommended ratings do not have a basis of scientific evidence of the rigorous standards that might be expected in academic research. Nevertheless, reinsurers do take account of such authoritative longitudinal studies as are available. Where there are no recognized studies available, the recommended ratings will be based upon the judgement of the reinsurers'

medical officers – in most cases with the advice of specialists in the relevant field.

4.7 Moreover, as noted by Daykin et al ^[5],

“It also needs to be borne in mind that insurers are taking risks for the long-term future. Statistical evidence from the past may be a guide, but it is only that. Insurers have to take risks and accept uncertainty and it should be recognized that the underwriting process has to reflect such realities.”

4.8 It is indeed a practical complication that if one traces the impact of a particular impairment over periods that can extend for 20, 30 years or more, the applicability of that data to similar periods into the future will be overtaken by the changes in treatment that will have taken place.

4.9 As a result, it is inevitable that there will be conditions where medical opinion would agree that there is an adverse impact on mortality or morbidity - even if the statistical information to quantify, in precise terms, the extent of the deviation from ‘normal’ is lacking.

4.10 In a competitive market, the pressure will be on underwriters to offer the best possible terms that are consistent with sound underwriting practice.

4.11 In extrapolating the challenges of assembling relevant data to the study of the impact of genetic abnormalities, it is again worth noting the comments of Daykin et al ^[5]:

“It is important to realise that genetic epidemiology yields results years or even decades after the disease-causing genes have been discovered in the laboratory. Since we are now just at the stage of identifying genes, it should be no surprise that epidemiology is sparse, at least compared with the demanding requirements of actuarial models. Moreover, most studies address medical questions and they follow the reporting conventions of medical statistics”

They went on to note that one of the specific problems was:

“Study populations are often small, so only a few figures are reported (median survival times, lifetime penetrances and so on).”

4.12 The implication is that the data available is not sufficiently detailed to derive the parameters required for actuarial modeling. As a result, it will take a long period of observation before the industry is able to develop objective measures of the significance of predictive genetic knowledge

5 An International Perspective

5.1 In 1997, the Council of Europe adopted a Convention for Protection of Human Rights and Dignity of the Human Being with regard to the Application of Biology and Medicine. Article 11 of the Convention states *“Any form of discrimination against a person on the grounds of his or her genetic heritage is prohibited.”* Article 12 limits the use of genetic test to healthcare and research linked to healthcare.

5.2 Only a few European countries, for example, Austria and Belgium, have reached for the statute book and imposed legislation to prevent insurers from obtaining or using genetic test results ^[6].

- 5.3 The UK has not ratified the Convention but there is an agreement between government and the insurance industry to have a moratorium on the use of genetic test results other than in specific circumstances ^[7].
- 5.4 In the USA, the responsibility for insurance supervision lies principally with the 50 state insurance departments. 16 states have introduced measures that restrict insurers' ability either to use or obtain genetic information. At the federal level, genetic non-discrimination bills were introduced that would have had the effect of limiting insurers' access and use of genetic information. However, the driving force behind the proposed legislation was the paramount importance of access to private medical insurance. There appears to be support for the industry's view that life insurance, disability income and long-term care be treated separately from health insurance. To date, none of these bills has been passed into law ^[6].
- 5.5 In both Canada^[8] and Australia^[9], insurers have confirmed the policy that they would not require applicants to undergo a genetic test although applicants are required to disclose results of tests taken for other purposes.

6 Conclusions

- 6.1 The Association sees positive benefits from the development of genetic technology and has no wish to inhibit the research effort.
- 6.2 We believe that fears of the emergence of a 'genetic underclass' are based more on poorly-informed speculation than upon fact.
- 6.3 Insurers have no intention to seek genetic tests as a part of the screening process for life or health insurance applications.
- 6.4 The bigger question arises over the access to genetic test results carried out for another purpose. We underline the fact that the industry has much greater interest in accepting business than turning it away unless there is good reason to do so. As with any other medical information, genetic information would only adversely affect insurance terms if there is evidence linking the information to the claim trigger.
- 6.5 We acknowledge that, at this point, the numbers of tests that have proven and quantifiable relevance are relatively few. Nevertheless, genetic research is progressing rapidly and will continue to progress in directions that we cannot accurately predict. In the light of this uncertainty, the Association would have concerns if the principle of withholding genetic test information were to be enshrined as a right.
- 6.6 We refer again to the conclusions of the Australian Law Reform Commission ^[4].

"In the light of these considerations, the Inquiry has formed the view that a departure from the fundamental principle underlying the market in voluntary, mutually rated personal insurance in Australia, namely, equality of information between the applicant and the insurer, cannot be justified at this time."

6.7 The Association holds the view that, in preference to restrictions on access which may prove inappropriate in the longer term, a more positive approach would be to engage in a dialogue with the Bioethics Advisory Committee or such other body or bodies as may be appropriate with the objective of:

6.7.1 Improving education in the wider community to allay commonly held misconceptions. In this way, the perceived barriers to research, posed by insurance, may be put into clearer perspective

6.7.2 Establishing codes of conduct for use of genetic test information by insurers, and

6.7.3 Improving education within the industry to ensure fairness and transparency in the use of genetic test information.

7 Acknowledgement

7.1 A number of sections of this paper rely heavily on the work of J. Lockyer, P. G. Brett, S.A. Hannington, J.A.N. Lockyer, A.S. Macdonald and J.J. Woods in the paper, "Genetic Science and its Implications for Life Insurance"^[10]

8 References

- [1] Institute and Faculty of Actuaries: Continuous Mortality Investigation Reports No. 11
- [2] C.D. Zick et al (2005): Genetic Testing for Alzheimers disease and its impact on insurance buying behaviour, *Health Affairs v24, No.2*
- [3] UK Genetic Testing Network (2005): NHS Directory of Molecular Genetic Testing
- [4] Australian Law Reform Commission ALRC 96 (2003) Essentially Yours: The Protection of Human Genetic Information in Australia.
- [5] C. D. Daykin et al (2003): Genetics and Insurance – Some Social Policy Issues, *British Actuarial Journal 9 IV, 2003*
- [6] J. Buerger, A. Regenauer: Genetic Testing and Insurance – A global view, 2nd edition, *Munich Re publication*
- [7] HM Government (UK) and Association of British Insurers (2005): Concordat and Moratorium on Genetics and Insurance
- [8] Canadian Life and Health Insurance Association Inc. (2000): Genetic Testing: Industry Position
- [9] Investment and Financial Services Association Ltd. (2002): Life Insurance and Genetic Testing in Australia
- [10] J. Lockyer et al (1998) : Genetic Science and its Implications for Life Insurance, *Transactions of 26th International Congress of Actuaries, Vol. 3.*