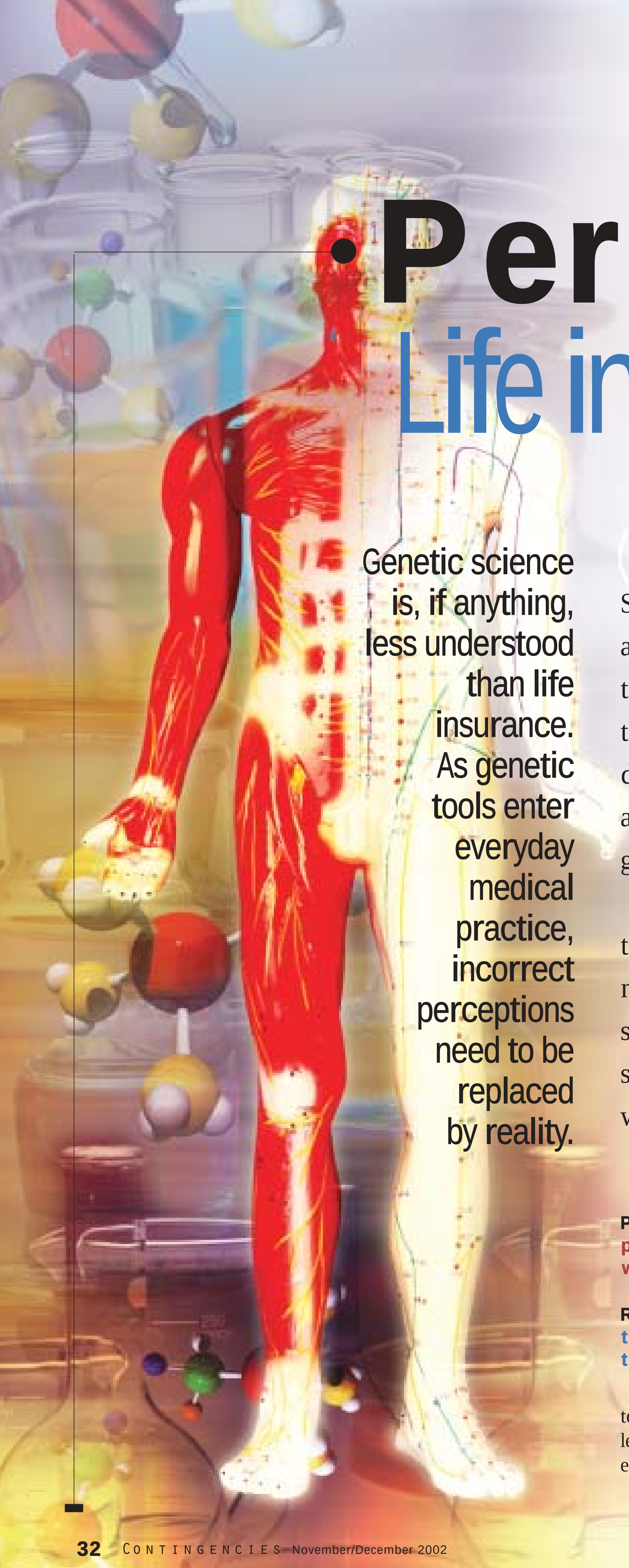

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Perception
Life insurance and

By Arnold A. Dicke

Genetic science is, if anything, less understood than life insurance. As genetic tools enter everyday medical practice, incorrect perceptions need to be replaced by reality.

While a majority of people in the United States and Canada are covered by life insurance, many don't understand its mechanics or the economic realities that constrain and motivate insurance companies. Even fewer understand the role of genes in human biology and the kinds of information that can be gleaned from their study.

Not surprisingly, when the public is forced to consider the effects that increased use of genetic information would have on the life insurance industry and the availability of life insurance, perceptions surface that are at variance with biological, economic, and legal realities.

PERCEPTION: An individual who tests positive for a gene linked to a specific disease will inevitably contract that disease.

REALITY: With few exceptions, a positive genetic test indicates an increased probability, but not certainty, of developing such a disease.

Only in the past 10 years has it become possible to design tests that examine genetic material for abnormalities that may lead to disease at a later date. Even when abnormalities are present, however, the emergence of disease isn't certain.

For example, the increased risk *over a lifetime* of breast can-

vs. Reality
Genetic Testing

cer associated with abnormalities in the BRCA1 and BRCA2 genes is equal to the lifetime increase attributable to high blood pressure, smoking, or being male. Of course, over shorter periods, such as the decade including her late 30s and early 40s, a woman with either of these genetic abnormalities is at much greater risk than another woman without them. (An excellent reference on this subject is Dr. Martin Engman, "The Mortality Risk Associated with BRCA1, BRCA2, and Huntington Disease Gene Carrier Status: The Results of Markov Modeling," American Academy of Insurance Medicine Annual Meeting, October 1998.)

Nevertheless, this is a clear-cut example of a disease associated with a genetic condition that doesn't always occur. In fact, the connection between the expression of genetic abnormalities, as well as the interplay between environment and genetic composition, and the ultimate development of disease is complex.

PERCEPTION: Life insurance companies will cancel coverage or raise premiums if harmful medical conditions are revealed by genetic tests.

REALITY: Voluntary individual life insurance cannot be canceled once it's issued, and premium increases are either prohibited or tightly restricted.

Because the purpose of life insurance is to pay a benefit at death, the value of a policy would be greatly diminished if deterioration in the health of the insured, which often precedes death, were grounds for policy cancellation. Thus, most life insurance is sold on a *non-cancelable* basis. Non-cancelable policies cannot be canceled, and the premiums for such policies cannot be increased.

Some forms of coverage, particularly group life coverage, are issued on the slightly less restrictive *guaranteed renewable* policy format. Guaranteed renewable policies can't be canceled, but premiums can be increased for an entire class of policies under certain circumstances.

Even non-cancelable policies can be terminated, or can have death benefits denied during the first two policy years, for misrepresentation of pertinent facts.

Anti-selection caused by asymmetrc information has the potential of leading to the financial insolvency of the insurer, and the insurer's inability to fulfill its promises to policyholders.

PERCEPTION: Insurance companies would benefit from requiring applicants to take genetic tests and to reveal results of genetic tests already performed.

REALITY: To prevent anti-selection due to information asymmetry, insurers may indeed require applicants to reveal results of tests already performed, but would not benefit economically from requiring all applicants to take DNA-based tests.

Life insurers only require a test as part of the application if the "protective value" of the test is greater than its cost. In other words, the cost of providing the test, which is borne by the life insurance company, must be balanced by a comparable reduction in the cost of death benefits. If a test were able to determine with certainty that a person would die in the near future, the test would be of extreme value and would always be ordered at any reasonable cost.

But this is hardly ever the case. In particular, tests based on the applicant's DNA are currently quite expensive, and the reduction in average death claim costs the insurer might expect from broad use of these tests isn't nearly as high as the cost of the tests themselves.

The most compelling reason for an insurer to introduce a new underwriting requirement, whether that requirement is a genetic test or some other non-genetic information, is to protect the company against the negative effects of "information asymmetry."

Information asymmetry—the possibility that a prospective insured may have information about his or her prospects for longevity that is not available to the insurance company—is of great concern to insurers. It gives the prospective insured an unfair advantage.

Without equal access to such information, the insurer would be likely to assign the insured to a more favorable risk class than otherwise would be the case. Since such persons presumably would have a considerably higher probability of dying in the near future, the cost of providing them with coverage would be higher than for others in that risk class. The applicant, having the information, is likely to realize that the insurance is a very good bargain indeed. Consequently, the misclassified applicant would purchase not only insurance that he or she might not have purchased at the rate that would have been offered if the information had been available, but also in larger amounts.

This effect is especially troublesome in the case of life insurance, since the amount of coverage is, in principle, unlimited, although companies usually have internal rules that set limits on life insurance purchases. Left unchecked, the anti-selection caused by asymmetric information has the potential of leading to the financial insolvency of the insurer and, consequently, the inability of the insurer to fulfill its promises to other policyholders.

PERCEPTION: Life insurers' increased use of the results of genetic testing would cause more people to be denied life insurance.

REALITY: The use of genetic tests would not have a uniform effect on the availability of life insurance—some people could gain greater access to coverage or lower premium costs, while others with specific genetic conditions could see reduced access to coverage or higher premium costs.

For some genetically related conditions, the results of genetic tests could affect the outcome of an application for life insurance.

Polycystic kidney disease (PKD) is an *autosomal dominant* condition, meaning that the offspring of individuals that carry the gene for PKD have a 50 percent chance of inheriting it. This condition has its onset when the person is in his or her 20s or 30s.

Currently, for a person with a family history of PKD, extra premium would probably be required to cover the mortality risk associated with the increased probability that the proposed insured carries a gene for PKD. If the applicant is over 30, the extra premium charge would probably be considerably less if no markers of PKD are found and there are no symptoms or laboratory findings that suggest underlying kidney disease.

If the results of genetic testing were available, it would be possible to determine if the prospective insured has the PKD gene. If the person doesn't have the gene, standard or preferred rates could be available, depending on whether the individual has other characteristics that impact life expectancy.

The second example is *hemochromatosis*, a disease affecting iron storage in the body that can result in deposits of iron in the liver, pancreas, and heart muscle. This can potentially lead to cirrhosis, diabetes, and congestive heart failure.

This condition can be controlled by regularly donating blood to lower total body iron stores before damage occurs to the vital organs. The individual, in the absence of other ratable characteristics, could be offered standard rates. In this case, the effect of genetic testing is early detection and control before end organ damage can occur. With the information provided by genetic testing, more policies could potentially be issued at standard or preferred rates.

A third example is *hereditary nonpolyposis colon cancer* (HNPCC, or Lynch syndrome), a hereditary condition that can lead to early death. The Lynch I syndrome involves early-onset colon cancer. If the condition is detected before onset, the entire colon can be removed prophylactically. When this is done, an applicant for life insurance that is otherwise qualified could receive standard rates. In the case of the Lynch II syndrome, multiple organs may develop cancers and the individual may be uninsurable.

If genetic test results were available to life insurers, those without the gene would be able to receive life insurance based on their other underwriting characteristics and, in many cases, would qualify for standard or preferred rates.

PERCEPTION: Recruiting participants for genetic research studies is difficult because people fear they will become uninsurable.

In this case, perception can actually become reality. If a person fears loss of insurability, he or she may refuse to take genetic tests, whether for research or as part of a personal health profile. In addition to educating people about the safeguards already provided by state and federal laws and regulations, it would be helpful to develop a solution that is more direct and that is capable of changing the perceptions that people hold about insurance and genetic testing.

One possible solution—purely conceptual at this time—is genetic testing insurance. The concept of genetic testing insurance is attributed to Prof. Alexander Tabarrock in an April 1996 *National Underwriter* article. It's based on the observation that when a person takes a genetic test, if a negative result causes loss of insurability, the genetic test itself has the characteristics of an insurable event. Under genetic testing insurance, a premium would be paid each time a genetic test is taken, and those test subjects with unfavorable results would receive the right to buy a certain amount of insurance at standard rates.

In order to price such coverage, insurers would need data about the likelihood of unfavorable outcomes of the genetic test and the cost of providing the desired insurance coverage for those found to have the genetic condition. Thus, before genetic testing coverage for a specific condition could even be priced, a significant volume of tests for the condition would have to be carried out, and individuals having the condition would have to be observed over a period of years. Also, the coverage would be affordable only if the test were administered to a large group of people, only a small percentage of whom are expected to have the condition.

Thus, at this time, genetic testing insurance is nothing more than an interesting academic idea whose economic viability isn't known. It is mainly attractive as a gedanken (thought) example of how the insurance mechanism acting in a free marketplace could conceivably provide a solution for those who are concerned about insurance availability because they've inherited a genetic condition.

Other possible solutions have also been investigated, including risk adjustment mechanisms, state-run pools, and similar ideas. Each has advantages but also significant drawbacks.

PERCEPTION: Limiting the use of genetic tests would result in preservation of the status quo in life insurance.

REALITY: The impact of limiting the use of genetic tests in life insurance underwriting will depend on the definition of genetic testing used; such limitation could also thwart beneficial innovation.

Genetic testing can be narrowly or broadly defined. Narrowly defined, genetic tests are those tests that are based on the presence or absence of specific genetic abnormalities. If tests based on the *end-products* of such genes are included, the definition is broadened enormously.

Genes impact the body by orchestrating the production of proteins. For example, the production and metabolism of cholesterol is under the control of several proteins, which, in turn, are controlled by genes.

The impact of limiting the use of genetic testing depends on the definition used. If narrowly defined, the impact would be confined mainly to individuals who have a family history of a particular genetic condition but do not actually have the gene. Unless genetic tests are permitted, some of these individuals wouldn't be able to receive the rates for which they'd qualify if the results of genetic tests were available.

Under the broad definition of genetic testing, commonly used tests, such as the tests for cholesterol, would be included. If the use of these common tests were limited, the advantages of preferred underwriting, and even the underwriting that existed for decades before preferred underwriting, would be rolled back.

Preferred underwriting is the most recent example of how the overall cost of life insurance to the public can be reduced by introducing a refinement of underwriting classes. Under preferred underwriting, the previously existing standard class was subdivided based on evidence of reduced risk, such as low cholesterol levels and good driving records. Individuals with the best results were offered the lowest premium rates. Those with the worst acceptable results under these new criteria, but who would otherwise have been rated as standard, formed the "residual standard class."

Many observers expected that as rates for those qualifying for preferred classes were reduced, there would be a proportional increase in the rates offered to the residual standard class. But this didn't happen.

For one typical company, the premium for the best preferred class was reduced by 37 percent over the years 1990 to 1997, while the premium for the residual standard class stayed almost level. Thus, preferred underwriting resulted in reduced premiums for preferred classes *but no increase for standard classes*.

What could explain this? One possible explanation is that without the information provided by the new criteria, the actuaries who priced the policies had to be conservative and put in a large "risk premium." When they were provided with more information about each individual that allowed more refined underwriting classes, the overall risk premium could be reduced. Reduction in the risk premium, in turn, reduced the overall cost of life insurance to the public.

Would this same result occur if genetic testing were permitted in conjunction with life insurance applications? Current genetic tests don't provide the kind of information that would allow a significant overall reduction in implicit risk premiums. Moreover, most conditions with implications for longevity result from a complex interplay of environment and genetic disposition. But considering the constant progress in this field, the possibility that future tests may allow improved classification of mortality risks can't be summarily dismissed.

To a life insurer, genetic tests look much like any other medical test. However, the public hasn't yet come to see genetic tests in this light. Because the tests are new, and because they involve information unique to each individual, many fear these tests.

Despite these understandable fears, those who develop or influence the development of life insurance policies can't adequately serve the public without attempting to understand the implications of allowing the routine use of genetic tests, and separating, to the extent possible, perceptions from realities. ●

ARNOLD A. DICKE IS SENIOR VICE PRESIDENT AND CHIEF ACTUARY FOR ING RE'S INDIVIDUAL LIFE AND HEALTH OPERATION IN DENVER. THIS ARTICLE DOES NOT REPRESENT THE VIEWS OF THE AMERICAN ACADEMY OF ACTUARIES, THE AUTHOR'S EMPLOYER, OR ANY OTHER ORGANIZATION.