

## Risk Classification in Life Insurance: Current Controversies

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Article abstract

On trouve, dans le travail de M. David Cummins, un excellent aperçu de certains aspects de l'assurance sur la vie. Comment les assurés sont classés au point de vue de la tarification, en tenant compte du risque de mortalité que présentent la femme et l'homme ayant le même état de santé et les mêmes occupations; comment réagissent ceux qui prétendent qu'il n'y a pas lieu de faire une différence quelconque entre les sexes, tant au point de vue assurance-vie que rentes viagères ? Et cela, même si la statistique reconnaît un taux de mortalité différent. Nous avons pensé que le lecteur lirait cette étude avec intérêt. Elle a été présentée à l'Université Laval au cours d'un colloque tenu à Québec les 13 et 14 mai 1980.

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## Risk Classification in Life Insurance: Current Controversies

by

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*On trouve, dans le travail de M. David Cummins, un excellent aperçu de certains aspects de l'assurance sur la vie. Comment les assurés sont classés au point de vue de la tarification, en tenant compte du risque de mortalité que présentent la femme et l'homme ayant le même état de santé et les mêmes occupations; comment réagissent ceux qui prétendent qu'il n'y a pas lieu de faire une différence quelconque entre les sexes, tant au point de vue assurance-vie que rentes viagères? Et cela, même si la statistique reconnaît un taux de mortalité différent. Nous avons pensé que le lecteur lirait cette étude avec intérêt. Elle a été présentée à l'Université Laval au cours d'un colloque tenu à Québec les 13 et 14 mai 1980.*



### **Introduction**

Life insurance companies have long classified applicants for insurance according to the companies' assessment of expected mortality rates. Thus, old-

er people pay higher rates for life insurance than younger people, males pay more than females, and those with heart disease or other major impairments pay more than those in good health. The companies also reserve the right to reject an application for insurance on the grounds that the applicant's probability of death is so high as to be uninsurable.

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For many years, state laws not only permitted this practice but in fact encouraged it. The law generally holds that fair discrimination is permitted and only unfair discrimination is illegal. A classification system discriminates fairly if all individuals with similar characteristics pay the same rate, e.g., all male applicants age 35 with no serious health problems should be charged the same premium per unit of coverage. Fair discrimination implies that rates should reflect the expected loss and expense costs of issuing the policy. A classification system is unfairly discriminatory if rate differences exist which do not reflect loss or expense differences. For example, rebating, i.e., reducing the expense component of the premium for some policyholders but not for others, would be unfairly discriminatory.

Recently, the traditional rationale for classification and some of the principal classification factors have come under attack by legislatures and the courts. An important area of controversy involves alleged sex discrimination, e.g., giving female participants in a pension plan smaller monthly benefit payments in recognition of longer female life expectancy. Insurance companies have also been attacked for charging higher rates or refusing coverage for (a) genetic deficiencies affecting particular racial or ethnic groups (e.g., sickle cell anemia, which affects blacks); (b) handicaps such as blindness and mental retardation; and (c) other factors such as sexual preference, a criminal record, etc. While most of these challenges are motivated by a desire to achieve social equity, in some cases the implications of the proposed changes for the operation of the insurance markets and the effects that the changes would have on other policyholders have not been given adequate consideration. The purpose of this paper is to examine the issue of risk classification in life insurance, to set forth criteria for a valid classification system, and to evaluate some of the key arguments that have been used in the classification controversy.

### ***Reasons for Classification***

Insurance is based on the principle of pooling, i.e., every policyholder is charged a premium and the resulting pool of funds is distributed among those who incur losses. For example, consider a life insurance company that issues \$1,000 one-year term insurance policies to 100,000 people. If the death rate per year is two per thousand (probability of death = .002), 200 deaths will occur during the year and the company will have to pay out  $200 \times \$1,000$  or \$200,000. To obtain funds to make these payments, the company charges each policyholder an equal share of the total death claims. Thus, each policyholder

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pays \$200,000 ÷ 100,000 or \$2 for insurance coverage. By paying the premium of \$2, each member of the group has purchased a guarantee that the company will pay \$1,000 to his or her beneficiary if death should occur. Thus, the policyholder has reduced the financial uncertainty facing the beneficiary due to the contingency of premature death. The value received is the insurance company's promise to pay and the resulting reduction in financial uncertainty; it is not necessary to collect in order to benefit from the insurance coverage.

If insurance were compulsory and only one insurance company existed, classification of risks would not be necessary. Everyone would pay an equal share of the total claims each year regardless of his or her probability of loss. This, in fact, is precisely what occurs under many social insurance programs. For voluntary coverages provided in competitive insurance markets, on the other hand, classification becomes a necessity. If everyone were charged the same premium rate, those with low loss probabilities would be subsidizing those with high loss probabilities. People in the former group would be inclined to drop their coverage, while those in the latter group would demand more insurance than they would if coverage were priced fairly (this is the phenomenon of *adverse selection*). This process would lead to an increase in the average loss probability of the pool and to further withdrawals by the policyholders with relatively low loss probabilities. The ultimate result could be the insolvency of the pool. Thus, companies would be forced to adopt classification in order to maintain the economic viability of the pool.

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The development of underwriting classifications in a free market is accentuated by competitive considerations. If no classifications or only crude classifications were in use, some companies would begin to offer lower rates to policyholders with lower loss probabilities. The motivation would be a desire to expand their market share and thus to increase profits at the expense of companies with less refined class systems. The latter companies in turn would be forced to adopt classification refinements or face the prospect of market decline and potential insolvency. The process would continue until all identifiable factors associated with loss probabilities had been identified and reflected in the class system.

In practice, there are limitations on the degree of refinement that can be achieved in an underwriting classification system. For example, information on certain factors may be too expensive or difficult to obtain. In this case, the cost of gathering the information might exceed the premium reduction that could be offered to those insureds not affected by the factor in question. Hence, no competitive advantage would be gained from knowledge of the factor and the system would not be revised. Another type of limitation on classification refinements is social acceptability, i.e., some factors may be deemed by society to be unacceptable even though they may be associated with demonstrable differences in loss costs. An example is the use of race as an underwriting variable.

A final reason for the development of underwriting classifications is the desire to achieve equity among policyholders. It may be considered inequitable or unfair for policyholders with widely differing loss probabilities to pay the same rate even if no adverse economic consequences result from this practice. Thus, companies may develop classifications in order to be perceived as fair by their policyholders. Certain types of classifications may be encouraged or prohibited by society through the legislative or judicial process in order to achieve equity goals which would not be realized through the operation of the insurance markets.

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To summarize, there are three principal motivations for the development of underwriting classifications: (1) to prevent adverse selection; (2) to compete effectively; and (3) to achieve equity or fairness among policyholders.

### ***Criteria for an Acceptable Classification System***

In order to accomplish these goals, underwriting classifications must satisfy certain criteria. Most of these criteria are the subject of general agreement among the parties with an interest in the insurance markets. Others, however, are considered important by some groups but not by others. This section outlines the criteria which are mentioned most frequently and indicates briefly the areas where controversies have developed.

*Separation.* According to the separation criterion, classes should be sufficiently different in expected losses to warrant the establishment of separate premium rates. Separation between two classes is present if there is a practically and statistically significant difference between the mean or expected losses of the two classes. If adequate separation is present, the likelihood of misclassification is small, i.e., it is unlikely that a policyholder in one class will have an expected loss comparable to the majority of policyholders in some other class. Some degree of overlap between classes is inevitable; the separation criterion simply requires that the overlap be minimized.

*Homogeneity.* It would be impossible to design a classification system in which all policyholders in a particular class have exactly the same expected losses. The best that can be achieved is to design classes so that the expected losses of class members are relatively homogeneous. If this is done, the class system will be equitable and the likelihood that a competitor can further subdivide the classes will be small. Figure 1<sup>(1)</sup> illustrates homogeneous and heterogeneous classes. In case 1, the top panel in the figure, homogeneous classes are illustrated. Here the difference in expected losses between the best and worst risks in each class is relatively small and most policyholders in each class have approximately the same expected losses. In case 2, on the other hand, a wide

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<sup>(1)</sup> Voir page 118.



divergence exists between the best and worst risks in each class. The separation criterion also is violated because a substantial amount of overlap is present between the two classes.

*Feasibility.* The information required to administer the class system should be reliable and obtainable at a reasonable cost. Some criteria, such as the number of miles driven in auto insurance, would provide excellent separation and a high degree of homogeneity but would be difficult for companies to verify without incurring unreasonably high costs. Likewise, until recently, smoking was viewed as unreliable for life insurance classification even though it has a major impact on the probability of death.

*Incentive value.* A good classification system should provide incentives for loss prevention. Thus, in fire insurance, premium discounts for devices such as sprinkler systems have encouraged policyholders to undertake loss prevention activities. Unlike the preceding criteria, incentive value is a desirable but not a necessary requirement for acceptable underwriting classification.

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*Social acceptability.* Nearly everyone agrees that underwriting criteria should satisfy the criterion of social admissibility or fairness. At the present time, the following are broadly acceptable social considerations:

- (a) the classification system should not discriminate unfairly among policyholders with similar expected losses,
- (b) the system should not differentiate at all on the basis of race, color, religion, or national origin, and
- (c) personal privacy should be maintained as much as possible.

The principal source of controversy is whether specific classification factors such as sex are or are not socially admissible.

In judging social admissibility, some critics of the present class system advocate the use of the criteria of *causality* and *controllability*. According to the former criterion, there should be a causal link between an underwriting factor and expected loss costs. It is not sufficient, according to this argument, merely to demonstrate a statistical linkage. This view holds that sex is inadmissible as a classification factor in auto insurance because it is merely a convenient proxy for causative variables such as number of miles driven and aggressive behavior. Since sex proxies rather than measures the underlying causal factors, those who are misclassified through the use of this variable have been treated unfairly. The proxy approach is thus equivalent to stereotyping and hence is inadmissible.

Most actuaries and underwriters do not believe that causality should be a criterion for admissibility. They argue that any classification factor will misclassify some policyholders and that it is no more or less unfair to be misclassified according to causal criteria than it is to be incorrectly classified by proxy variables. Maximum fairness is achieved by using variables which have the

highest statistical correlation with expected losses. Thus, the admissibility criterion should be correlation and not causality.

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The controllability argument holds that it is inequitable to use classification factors which are beyond the policyholder's control. Proponents of this view maintain that factors such as weight (for a particular height class) are controllable and hence admissible for life insurance classification. Other factors such as handicaps and sex are not controllable and hence are inadmissible. The controllability argument is perhaps the least persuasive used by the critics of the present classification system. Carried to its extreme, it would suggest that factors such as age and congenital heart disease are inadmissible even though they are clearly related to mortality rates and do not seem inequitable to most people. The controllability criterion seems to be more expedient than rational. Its widespread use to judge the fairness of underwriting factors would threaten the existence of the classification system in its present form.

### ***Risk Classification in Life Insurance***

The underwriting system presently in use by most life insurance companies in North America is the *numerical rating system*. This system, which was introduced in 1919 by Arthur Hunter and Oscar Rogers of the New York Life Insurance Company, is based on the premise that most underwriting factors have a measurable impact on the probability of death. Thus, mortality studies can determine the extra mortality that may be anticipated from each major factor, and these mortality figures can be assigned precise numerical values.

The system defines an average risk the rating of 100 percent. Positive values known as debits are added to the basic rating for unfavorable underwriting factors, while deductions (credits) are made for favorable factors. The final percentage rating for any particular applicant determines whether the company will accept that applicant for insurance and, if so, whether he or she will be charged a standard or substandard premium rate. Usually, risks with ratings up to 120 or 125 percent are issued policies at standard rates, while those with ratings over 500 or 1000 percent are considered uninsurable. In between are the various substandard categories. Some companies use as many as sixteen substandard classes, while others use as few as six.

Life insurance companies maintain extensive underwriting manuals which give debits for a wide range of medical impairments. Ratings also are assigned for personal factors such as drug and alcohol abuse, for certain occupations, and for dangerous hobbies. As an example of the ratings, consider Table 1<sup>(1)</sup>, which gives the debits and credits for height and weight used by a major insurance company. For a male who is 5 feet, 10 inches tall, the table indicates

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<sup>(1)</sup> Voir page 120.

that the average weight is 170 pounds. A person of average weight would be given neither a debit nor a credit. A male of this height who weighs 230 pounds, on the other hand, would be given a debit of 40 points. If no other favorable or unfavorable factors are present, this individual would be given a mortality rating of 140 percent, 15 points above the upper boundary of the standard class.

The numerical rating system is not intended to apply as an absolute standard in life insurance underwriting. Rather, it is designed for use as a guide to be supplemented by the judgment of experienced underwriters. Reflecting this fact, many of the impairments listed in medical underwriting manuals are assigned a range of debit values such as 10 to 50 rather than a single numerical rating. The underwriter is free to assign an appropriate value from the range depending upon the facts of the case under consideration.

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The system promotes consistency among underwriters and permits routine cases to be handled by underwriters without extensive experience or training. It is less helpful for substandard risks with high ratings (above 200 percent), and for these cases underwriting judgment plays a primary role. The system has been criticized for using out-of-date or sparse statistical data to arrive at some of the numerical ratings. In addition, its accuracy has been questioned for cases characterized by multiple medical impairments. For these cases, the appropriate total debit may be greater or less than the sum of the debits applying to the individual impairments, and the system provides little guidance in this regard.

Another problem is that ratings for some impairments are not statistically based but have been assigned on the basis of underwriting judgment. This feature has been the source of considerable criticism, and legislation or regulations have been promulgated in some states requiring that underwriting ratings not be used unless supported by valid statistical data. Company people point out that such requirements could have an adverse effect on insurance availability. They contend that there is little doubt that some impairments are related to higher mortality even though adequate statistical data have not yet been accumulated. Many companies would be willing to issue policies to people with these impairments on an experimental basis provided they can obtain a reasonable, judgmentally based increase in the premium. Writing policies on this basis would permit the companies to gather sufficient statistical information to revise the ratings for the impairment in the future. Laws requiring statistical justification for ratings require in effect that companies incur losses in order to obtain these data. Thus, such laws are likely to diminish the use of experimental underwriting and aggravate availability problems.

As an example of a potentially controversial factor, consider diabetes. The underwriting guidelines used by most companies for this impairment are quite complex, consisting of a basic rating supplemented by additional debits (and, in some cases, credits) for factors affecting particular cases. Usually, the



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basic ratings depend on the age of the insured and the length of time the disease has been present. The basic ratings for six major companies are summarized in Table 2 for a selection of age and duration ranges. The ratings range from 125 to 200 debit points. If these ratings are correct and if companies were required to accept diabetics at standard premium rates, the degree of subsidy provided to each case by those in the standard class would be significant. If substandard ratings also were permitted for other impairments, the subsidy could become noticeable in the aggregate.

### 112 *The Sex Discrimination Issue*

The underwriting factor which has caused the most controversy in recent years is sex. There is a clear and substantial difference in the mortality rates for males and females, and the difference in life expectancy is approximately seven years. Accordingly, females have long received lower annuity payments per dollar contributed and, since the 1950s, have been charged lower rates for individual life insurance.

**Table 2**  
Diabetes Ratings Used by Six Major Companies  
(Selected Ages and Durations)

Company	Age at Issue	Duration of Disease (Years)	Number of Debits
A	21-25 <sup>a</sup>	6-10	200-150
	31-35 <sup>a</sup>	6-10	100
B	20-24	7-12	200 <sup>b</sup>
	30-34	7-12	200
C	20-34	c	150
D	21-25	6-10	200
	31-35	6-10	125
E	26-35	6-12	200
F	25-34	7-14	150

<sup>a</sup>Age at diagnosis.

<sup>b</sup>A flat extra premium charge of \$7.50 per \$1000 of insurance also is levied.

<sup>c</sup>Duration debits are assigned separately. No additional debits are assigned for duration of 10 years or less, 50 debits are assigned for durations of 11 to 15 years, etc.

Within the past five years, there have been a number of court cases argued in the United States charging that unequal benefits and/or contributions for female pension plan participants are unfairly discriminatory. In one key case, *City of Los Angeles, Department of Water and Power v. Manhart*, the U.S. Supreme Court ruled that an employer cannot require unequal pension plan contributions for similarly situated male and female employees. In other cases, the courts have ruled that pension plan benefits cannot be differentiated by sex. The Teachers Insurance and Annuity Association (TIAA), which manages the pension plans of most colleges and universities in the United States, has announced that it will shift to a unisex or merged gender mortality table for all benefits arising out of contributions made after the middle of 1980 (approximately). This is a major development because TIAA is the defendant in several of the key court cases and previously had vigorously resisted any movement to unisex tables. Although most of the court activity has involved pension plans, bills have been introduced in both houses of the U.S. Congress that would bar the use of sex (as well as race, color, religion, and national origin) as a classification factor in any type of insurance.

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Because of the importance of the sex discrimination issue and its potential implications for deliberations involving other underwriting factors, it is of interest to review the major arguments that have figured in the debate. This section provides a brief summary of each of the major arguments. The reader should be aware that the issue is extremely complex and that it is not possible to convey fully the subtleties of the arguments in a brief summary. Thus, the following should be considered an overview or brief introduction to the topic. An effort is made to present both sides of each argument, and few of the author's own opinions have been expressed.

*Equal Benefits or Equal Contributions.* Federal law requires and neither side in the annuity controversy denies that men and women should receive equal pay for equal work. Nor is there any controversy regarding whether the economic value inherent in a pension plan constitutes compensation. The issue in the annuity controversy is the proper way to measure the value of this component of compensation.

The view of the proponents of sex differentiated benefits is that employer contributions are the appropriate measure of compensation. Thus, an employer who contributes equal amounts to a pension plan for similarly situated men and women is not engaging in discrimination. It is not discriminatory at retirement to provide differentiated benefits because the differentiation reflects statistically significant differences in mortality and the *present values* of the benefits of similar male and female employees are equal. Hence, female employees receive exactly the same economic value as their male counterparts and are not the subject of discrimination. In fact, any other approach would discriminate against males.

Economic theory provides some support for this viewpoint. The economic view is that labor is a factor of production and that firms should purchase this and other factors of production until the point where the addition to revenue resulting from the last unit of each input (the marginal revenue) is equal to the cost of that unit (the marginal cost). Clearly, the cost of the component of compensation represented by the pension plan is the employer's contribution to the plan and not the amount of the benefit that ultimately is paid to the employee. If men and women perform equally on the job, economic theory implies that the cost of a unit of male labour and a unit of female labour should be the same. If they are not, the firm has an incentive to hire male rather than female employees.

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The opponents of sex differentiated benefits argue that actuarial present values are irrelevant to the female pension plan participant. Rather, the relevant measure of economic value is the amount of the monthly pension benefit received after retirement. This and not the actuarial present value determines the standard of living of the female participant after retirement, and a system which permits unequal post-retirement standards of living for males and females who have held equivalent jobs is unfairly discriminatory. In addition, as noted below, the opponents do not concede that sex differentiated mortality tables should be used to measure actuarial present values.

Proponents of sex distinct benefits counter the standard of living argument by pointing out that it amounts to the establishment of a needs test for retirement benefits. The application of a needs test is contrary to the concept of a capitalist economy where rewards are supposed to reflect one's contributions, not needs. Furthermore, if a needs test is to be applied, it makes no sense to limit the test to recipients of single life annuities. The plan participants who receive the lowest monthly benefit per dollar of pension plan contribution are those who elect joint and survivor annuities. The needs test approach would say that they should receive benefits at least equal to those of single life annuitants because their annuities are supporting two persons rather than one.

The fallback position for the opponents is to argue that the equal contributions v. equal benefits controversy tends to obscure the real issue, that is, why do equal contributions lead to unequal benefits? The answer is clear — unequal benefits result from the use of sex distinct mortality tables. Consequently, the more important question is whether the use of such tables should be permitted.

*Individuals, Classes, and the Overlap Theory.* The opponents of sex distinct benefits contend that the generalization that women live longer than men is true for women as a class, but is not necessarily true for individuals. No one can say for certain how long a particular individual will live. Thus, the treatment of individual women as if they definitely have longer life expectancies than the average male constitutes stereotyping and hence is unfairly discriminatory. As the Supreme Court noted in *Manhart*, "Even a true generali-

zation about the class is an insufficient reason for disqualifying an individual to who the generalization does not apply.”

To the proponents of separate mortality tables, this argument reflects a lack of understanding of the principles of insurance. They point out that in any class of insureds, including annuitants, it is impossible to determine a priori who will and who will not benefit from the insurance. Thus, in a group of life annuitants, some will die after receiving only a few payments, while others will survive to collect far more than their original contributions. This does not mean that the former group has been discriminated against unfairly. The classification process involves the separation of individuals into relatively (but not perfectly) homogeneous classes which are characterized by statistically significant differences in average loss costs. Equity requires only that the classification process be relatively accurate and that each person within a given class be treated the same. As sex is an accurate and stable classification variable, its use is sound insurance practice and should not be forbidden.

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The opponents to sex differentiation do not concede that sex satisfies the statistical criteria for an acceptable underwriting factor. In particular, they contend that sex discrimination does not lead to classes characterized by adequate homogeneity. If one considers 100,000 males and 100,000 females reaching age 65 at the same time and evaluates the pattern of deaths predicted by standard sex distinct mortality tables, there is a significant amount of overlap between the deaths. This pattern is shown in figure 2<sup>(1)</sup>. The figure reveals that about 80 percent of the male deaths can be paired with female deaths that occur approximately contemporaneously. Hence, 80 percent of the females are discriminated against because 20 percent of the female deaths cannot be matched with male deaths.

The counter-argument is that the comparison is meaningless because it ignores basic insurance principles. The value received from an annuity is the guarantee that one cannot outlive one's annuity benefits. The value of that promise is bound up in the actuarial present value of the annuity, a figure which depends on sex in a statistically significant manner. The matching approach has no relationship to the risk transfer that is reflected in the annuity and thus has no meaning in insurance terms.

Even assuming that matching makes sense, other matching schemes exist which do not support the case for equal benefits. For example, one could match the first man to die with the first woman to die, the second with the second, and so on. The woman corresponding to each man is some distance to the right along the horizontal axis and thus would receive more total benefits if the periodic payments were equal. Also revealing is an overlap chart comparing deaths for a group of 100,000 males age 60 with a similar group age 65. Here, the over-

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<sup>(1)</sup> Voir page 119.

lap is 81 percent. A similar result obtains when one compares females age 60 with females age 65.<sup>1</sup> If one accepts the overlap theory, it also would suggest that benefits should not be differentiated by age (e.g., in the case of early retirement), a proposition which has not been accepted even in government programs such as social security.

The more enlightened opponents of sex distinctions in annuities concede some of the deficiencies of the overlap theory. They conclude that "the argument's only valid implication for the attribution of group characteristics to an individual is both obvious and important: not all women live longer than all men, some women do not live as long as the average man, and some men outlive the average woman. This is why the Supreme Court felt that even if generalizations about a group were true, they should not be controlling."<sup>2</sup>

*Analogies with Other Classification Factors.* Two other important issues are raised by the opponents of sex differentiated benefits: (1) smoking and other health-related factors, which may be as important as sex in predicting longevity, are ignored in determining annuity benefits; and (2) factors that make sense actuarially are not necessarily supportable from the point of view of social equity. Like race, sex fails the latter test.

The counter-argument with respect to health-related factors is that information on these factors is unreliable at ages 65 and above and would be too costly to obtain. Utilizing medical underwriting in employee benefits plans would eliminate much of the cost savings which makes these plans attractive. Furthermore, any particular health factor is unlikely to lead to the same degree of differentiation as age and sex.

A recent actuarial article reveals a weakness in this argument. This article shows that underwriting in individual life insurance based on a simple application question dealing with smoking led to a substantial degree of separation between the mortality rates of admitted smokers and those claiming to be nonsmokers. The authors of this article conclude "that the mortality differentials between smokers and nonsmokers are large enough to validate the separate identification of these two groups for life insurance underwriting purposes... the mortality differentials exceed those between males and females."<sup>3</sup> Although differences do exist between annuity underwriting and life insurance underwriting and the differential between smoker and nonsmoker mortality is

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<sup>1</sup>Spencer L. Kimball, "Reverse Sex Discrimination: Manhart," *American Bar Foundation Research Journal* (Winter 1979): 122-123.

<sup>2</sup>Sydney J. Key, "Sex Based Pension Plans in Perspective: *City of Los Angeles, Department of Water and Power v. Manhart*," *Harvard Women's Law Journal* (Spring 1979): 9.

<sup>3</sup>Michael J. Cowell and Brian L. Hirst, "Mortality Differences Between Smokers and Nonsmokers," forthcoming in the *Transactions of the Society of Actuaries*, proof page 19.



less at advanced ages. These findings suggest that one cannot rely on casual statements about the impracticality of health-related underwriting factors for employee benefit plans.

With respect to the race issue, proponents of sex distinct benefits argue that race is not an unambiguous factor, as is sex. There are several races and numerous people of mixed blood in the American population, making any type of racial classification potentially inaccurate. Furthermore, there is strong evidence that racial differences in mortality disappear when socio-economic conditions are equalized. For sex, however, clear genetic and biological differences seem to exist, "in addition to some differences that are artifacts of the social structure."<sup>4</sup> The counter-argument, of course, is that the social unacceptability of neither race nor sex depends upon the accuracy with which these factors can be applied to any particular individual.

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### **Conclusion**

The issue of sex discrimination in pension plans is being resolved in favor of equal periodic benefits. However, the future of sex differentiation in individual life insurance, annuities, and other insurance products has yet to be resolved. Furthermore, there is no indication that the classification controversy will end when the sex issues are settled. Numerous legislative and regulatory actions already have been taken regarding the use of other types of classification factors such as genetic diseases and handicaps. If the sex controversy is any guide, these issues may be raised and resolved more rapidly than many have anticipated. In some cases, the insurance industry has been wrong, and certain factors should be eliminated from the underwriting process. In others, however, legitimate underwriting factors are at stake, the loss of which would destabilize insurance markets and jeopardize the private insurance industry in its present form. A prudent approach for the industry to take would be to eliminate voluntarily the suspect classification factors and to develop sound arguments for retaining those that are statistically and socially legitimate. As the sex controversy has demonstrated, actuarial arguments alone will not be sufficient.

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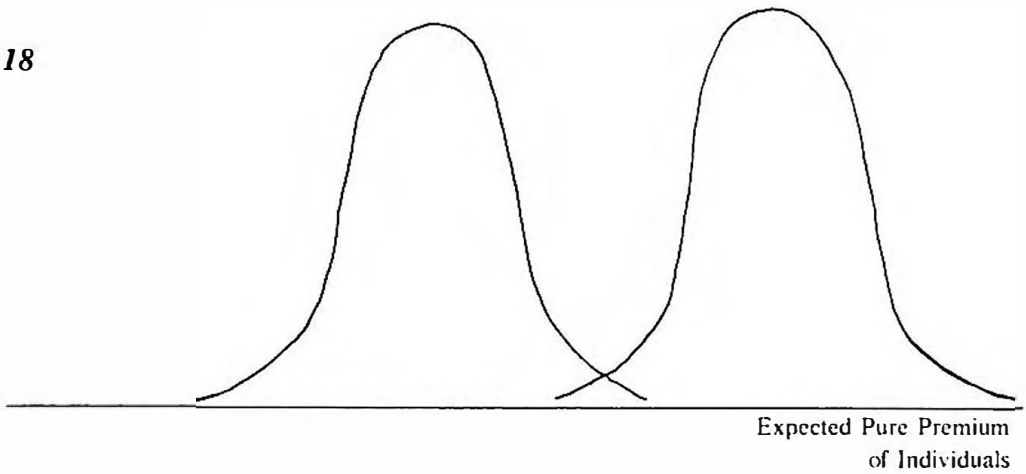
<sup>4</sup>Kimball, *op.cit.*, p. 113.

**Figure 1.**

**Comparison of Variance Between  
Homogeneous and Heterogeneous Classes**

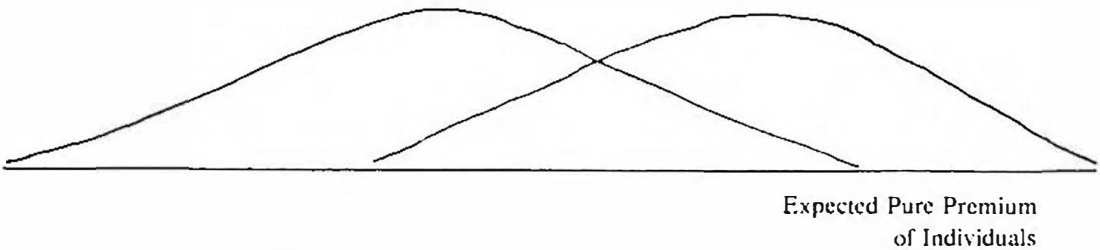
**Case 1 : Low Variance and  
High Homogeneity**

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**Comparison of Variance Between  
Homogeneous and Heterogeneous Classes**

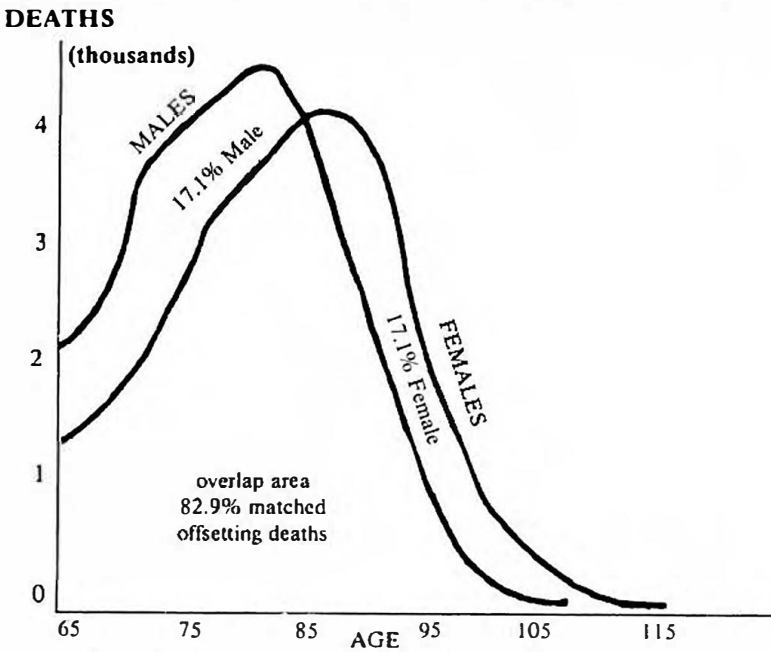
**Case 2 : Hight Variance and  
Low Homogeneity**



*Source : The Massachusetts Division of Insurance*

Figure 2

**MORTALITY DISTRIBUTION of 100 000  
MALES and 100 000 FEMALES ENTERING at AGE 65**



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## TABLE 1 LIFE INSURANCE BUILD CHART

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Height Ft. In.		Underweight Percentages				"Ave" Weight	Overweight Debits																Height Ft. In.																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																		
		30	20	15	10		10	15	20	25	30	35	40	45	50	60	70	80	90	100	125	150		175	200																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																
5-0	0	92	105	111	118	131	151	155	160	164	169	173	177	181	184	191	196	202	206	210	218	223	228	232	241	249	258	265	273	280	287	295	302	310	318	324	332	340	349	359	370	381	394	405	417	429	441	454	467	480	494	507	520	534	547	561	574	588	601	615	629	642	656	670	684	697	711	725	738	752	766	779	793	807	820	834	848	861	875	889	902	916	929	943	956	970	984	997	1011	1024	1038	1051	1065	1078	1092	1105	1119	1132	1146	1159	1173	1186	1200	1213	1227	1240	1254	1267	1281	1294	1308	1321	1335	1348	1362	1375	1389	1402	1416	1429	1443	1456	1470	1483	1497	1510	1524	1537	1551	1564	1578	1591	1605	1618	1632	1645	1659	1672	1686	1699	1712	1726	1739	1753	1766	1780	1793	1807	1820	1834	1847	1861	1874	1888	1901	1915	1928	1942	1955	1969	1982	1996	2009	2023	2036	2050	2063	2077	2090	2104	2117	2131	2144	2158	2171	2185	2198	2212	2225	2239	2252	2266	2279	2293	2306	2320	2333	2347	2360	2374	2387	2401	2414	2428	2441	2455	2468	2482	2495	2509	2522	2536	2549	2563	2576	2590	2603	2617	2630	2644	2657	2671	2684	2698	2711	2725	2738	2752	2765	2779	2792	2806	2819	2833	2846	2860	2873	2887	2900	2914	2927	2941	2954	2968	2981	2995	3008	3022	3035	3049	3062	3076	3089	3103	3116	3130	3143	3157	3170	3184	3197	3211	3224	3238	3251	3265	3278	3292	3305	3319	3332	3346	3359	3373	3386	3400	3413	3427	3440	3454	3467	3481	3494	3508	3521	3535	3548	3562	3575	3589	3602	3616	3629	3643	3656	3670	3683	3697	3710	3724	3737	3751	3764	3778	3791	3805	3818	3832	3845	3859	3872	3886	3899	3913	3926	3940	3953	3967	3980	3994	4007	4021	4034	4048	4061	4075	4088	4102	4115	4129	4142	4156	4169	4183	4196	4210	4223	4237	4250	4264	4277	4291	4304	4318	4331	4345	4358	4372	4385	4399	4412	4426	4439	4453	4466	4480	4493	4507	4520	4534	4547	4561	4574	4588	4601	4615	4628	4642	4655	4669	4682	4696	4709	4723	4736	4750	4763	4777	4790	4804	4817	4831	4844	4858	4871	4885	4898	4912	4925	4939	4952	4966	4979	4993	5006	5020	5033	5047	5060	5074	5087	5101	5114	5128	5141	5155	5168	5182	5195	5209	5222	5236	5249	5263	5276	5290	5303	5317	5330	5344	5357	5371	5384	5398	5411	5425	5438	5452	5465	5479	5492	5506	5519	5533	5546	5560	5573	5587	5600	5614	5627	5641	5654	5668	5681	5695	5708	5722	5735	5749	5762	5776	5789	5803	5816	5830	5843	5857	5870	5884	5897	5911	5924	5938	5951	5965	5978	5992	6005	6019	6032	6046	6059	6073	6086	6100	6113	6127	6140	6154	6167	6181	6194	6208	6221	6235	6248	6262	6275	6289	6302	6316	6329	6343	6356	6370	6383	6397	6410	6424	6437	6451	6464	6478	6491	6505	6518	6532	6545	6559	6572	6586	6599	6613	6626	6640	6653	6667	6680	6694	6707	6721	6734	6748	6761	6775	6788	6802	6815	6829	6842	6856	6869	6883	6896	6910	6923	6937	6950	6964	6977	6991	7004	7018	7031	7045	7058	7072	7085	7099	7112	7126	7139	7153	7166	7180	7193	7207	7220	7234	7247	7261	7274	7288	7301	7315	7328	7342	7355	7369	7382	7396	7409	7423	7436	7450	7463	7477	7490	7504	7517	7531	7544	7558	7571	7585	7598	7612	7625	7639	7652	7666	7679	7693	7706	7720	7733	7747	7760	7774	7787	7801	7814	7828	7841	7855	7868	7882	7895	7909	7922	7936	7949	7963	7976	7990	8003	8017	8030	8044	8057	8071	8084	8098	8111	8125	8138	8152	8165	8179	8192	8206	8219	8233	8246	8260	8273	8287	8300	8314	8327	8341	8354	8368	8381	8395	8408	8422	8435	8449	8462	8476	8489	8503	8516	8530	8543	8557	8570	8584	8597	8611	8624	8638	8651	8665	8678	8692	8705	8719	8732	8746	8759	8773	8786	8800	8813	8827	8840	8854	8867	8881	8894	8908	8921	8935	8948	8962	8975	8989	9002	9016	9029	9043	9056	9070	9083	9097	9110	9124	9137	9151	9164	9178	9191	9205	9218	9232	9245	9259	9272	9286	9299	9312	9326	9339	9353	9366	9380	9393	9407	9420	9434	9447	9461	9474	9488	9501	9515	9528	9542	9555	9569	9582	9596	9609	9623	9636	9650	9663	9677	9690	9704	9717	9731	9744	9758	9771	9785	9798	9812	9825	9839	9852	9866	9879	9893	9906	9920	9933	9947	9960	9974	9987	1001	10014	10028	10041	10055	10068	10082	10095	10109	10122	10136	10149	10163	10176	10190	10203	10217	10230	10244	10257	10271	10284	10298	10311	10325	10338	10352	10365	10379	10392	10406	10419	10433	10446	10460	10473	10487	10500	10514	10527	10541	10554	10568	10581	10595	10608	10622	10635	10649	10662	10676	10689	10703	10716	10730	10743	10757	10770	10784	10797	10811	10824	10838	10851	10865	10878	10892	10905	10919	10932	10946	10959	10973	10986	11000	11013	11027	11040	11054	11067	11081	11094	11108	11121	11135	11148	11162	11175	11189	11202	11216	11229	11243	11256	11270	11283	11297	11310	11324	11337	11351	11364	11378	11391	11405	11418	11432	11445	11459	11472	11486	11499	11513	11526	11540	11553	11567	11580	11594	11607	11621	11634	11648	11661	11675	11688	11702	11715	11729	11742	11756	11769	11783	11796	11810	11823	11837	11850	11864	11877	11891	11904	11918	11931	11945	11958	11972	11985	11999	12012	12026	12039	12053	12066	12080	12093	12107	12120	12134	12147	12161	12174	12188	12201	12215	12228	12242	12255	12269	12282	12296	12309	12323	12336	12350	12363	12377	12390	12404	12417	12431	12444	12458	12471	12485	12498	12512	12525	12539	12552	12566	12579	12593	12606	12620	12633	12647	12660	12674	12687	12701	12714	12728	12741	12755	12768	12782	12795	12809	12822	12836	12849	12863	12876	12890	12903	12917	12930	12944	12957	12971	12984	12998	13011	13025	13038	13052	13065	13079	13092	13106	13119	13133	13146	13160	13173	13187	13200	13214	13227	13241	13254	13268	13281	13295	13308	13322	13335	13349	13362	13376	13389	13403	13416	13430	13443	13457	13470	13484	13497	13511	13524	13538	13551	13565	13578	13592	13605	13619	13632	13646	13659	13673	13686	13700	13713	13727	13740	13754	13767	13781	13794	13808	13821	13835	13848	13862	13875	13889	13902	13916	13929	13943	13956	13970	13983	13997	14010	14024	14037	14051	14064	14078	14091	14105	14118	14132	14145	14159	14172	14186	14199	14213	14226	14240	14253	14267	14280	14294	14307	14321	14334	14348	14361	14375	14388	14402	14415	14429	14442	14456	14469	14483	14496	14510	14523	14537	14550	14564	14577	14591	14604	14618	14631	14645	14658	14672	14685	14699	14712	14726	14739	14753	14766	14780	14793	14807	14820	14834	14847	14861	14874	14888	14901	14915	14928	14942	14955	14969	14982	14996	15009	15023	15036	15050	15063	15077	15090	15104	15117	15131	15144	15158	15171	15185	15198	15212	15225	15239	15252	15266	15279	15293	15306	15320	15333	15347	15360	15374	15387	15401	15414	15428	15441	15455	15468	15482	15495	15509	15522	15536	15549	15563	15576	15590	15603	15617	15630	15644	15657	15671	15684	15698	15711	15725	15738	15752	15765	15779	15792	15806	15819	15833	15846	15860	15873	15887	15900	15914	15927	15941	15954	15968	15981	15995	16008	16022	16035	16049	16062	16076	16089	16103	16116	16130	16143	16157	16170	16184	16197	16211	16224	16238	16251	16265	16278	16292	16305	16319	16332	16346	16359	16373	16386	16400	16413	16427	16440	16454	16467	16481	16494	16508	16521	16535	16548	16562	16575	16589	16602	16616	16629	16643	16656	16670	16683	16697	16710	16724	16737	16751	16764	16778	16791	16805	16818	16832	16845	16859	16872	16886	16899	16913	16926	16940	16953	16967	16980	1699