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#### References

1. R. W. Hart, D. A. Neumann, R. T. Robertson, Eds., *Dietary Restriction: Implications for the Design and Interpretation of Toxicity and Carcinogenicity Studies* (ILSI Press, Washington, DC, 1995), and references therein.
2. G. N. Rao and J. Huff, *Fund. Appl. Toxicol.* **16**, 617 (1991).

### Genetic Discrimination: Actuarial Aspects

As a policy spokesman for the actuarial profession, I would like to respond to the 20 October Policy Forum "Genetic discrimination and health insurance: An urgent need for reform" by Kathy L. Hudson *et al.* (p. 391). While the Policy Forum highlights certain theoretical concerns and proposes regulatory restrictions, the impact of genetic information on insurance rates and availability is in some cases exaggerated, and the impact of the restric-

tions on the voluntary insurance market, and on the risk classification system that is one of its essential elements, is largely ignored.

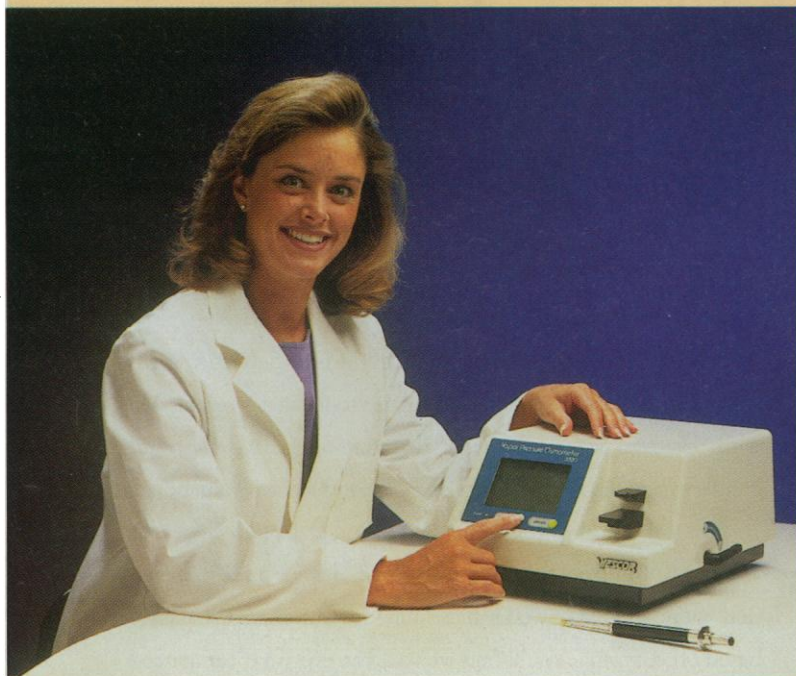
Actuaries have found that risk classification serves three primary purposes in the design of financial security systems: it promotes fairness, it permits economic incentives to operate and encourages widespread availability of coverage, and it protects the soundness of the financial security system. As a basic principle, any sound risk classification system should reflect cost-of-insurance differences based on relevant risk characteristics.

Clearly, individuals with certain genetic traits may have risk characteristics that would result in increased claim costs. The Policy Forum refers to the risk-sharing function of insurance. The main goal of insurance risk-sharing is to allow individuals subject to an unpredictable risk to pool resources, so that the individuals who, on a random basis, may suffer the effects of the insured event will receive the benefit of the pooling mechanism, which will in turn be appropriately paid for by other members of the class. If all the insured in a class face a roughly comparable probability of loss, they will be willing to pay a premium equal to their expectation of loss.

There is a great temptation to use insurance as a means of providing subsidies. Subsidies may, in some cases, be warranted; but trying to collect them through insurance tends to create incentives on the part of both the insured and insurers that warp the insurance mechanism, reduce the availability of coverage, and in some cases even threaten the soundness of the insurance system.

The Policy Forum suggests that genetic information is "distinct from other types of medical information" and suggests that the appropriate response to the availability of genetic information is to ban its use in the determination of health insurance rates and insurability, at least. Genetic information is often costly to obtain, and the benefits of reduced claim costs may not be commensurate with the cost of obtaining the information on the numerous applicants screened every day by insurance companies. Many genetic factors are related to long-term tendencies that are likely to result in an increased, but not unaffordable, rate—if the appropriate risk factors are used. Special situations, such as the reticence of persons to become involved in certain studies because of the fear of insurance restrictions, can probably be handled by special coverages or other techniques.

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**Response:** The Policy Forum did not include specific predictions about the impact of genetic information on insurance availability and cost. It did provide data on the current impact: survey results showing 22% of individuals from families with genetic disorders have been discriminated against and case studies in which individuals have been treated unfairly by insurers on the basis of genetic information. The concern of the National Action Plan on Breast Cancer (NAPBC) and the National Institutes of Health—Department of Energy Working Group on Ethical, Legal, and Social Implications is shared by many. A majority of Americans (86%) are very or somewhat concerned that insurers or employers might use genetic test results to discriminate (Harris Poll No. 34, 1995). The U.S. Congress is also concerned about this issue. On 15 November, Senator Mark Hatfield (D-OR) introduced the "Genetic Privacy and Nondiscrimination Act of 1995" (S. 1416), which would prevent

discrimination by employers and insurers on the basis of genetic information.

Dicke argues that the Policy Forum ignores the impact of the recommendations on the system of risk classification. The current system takes into account the risk of diseases whose genetic components are not yet identified—these risks are spread. Retaining a system of spreading these risks need not be detrimental to industry. In fact, a number of states have already enacted laws to prevent the use of genetic tests to restrict access or increase health insurance rates. Such a law has been in place in Wisconsin for 5 years, and we are unaware of any adverse effects on the insurance industry in that state.

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#### Corrections and Clarifications

In note 17 (p. 805) of the report "Superior parietal cortex activation during spatial attention shifts and visual feature conjunction" by M. Corbetta *et al.* (3 Nov., p. 802), the Charles A. Dana Foundation and NIH grant NS32979 should have been credited with support.

In the Random Samples item "Scientists as managers" (3 Nov., p. 741), Alan Merten's name and e-mail address were spelled incorrectly. Merten can be reached at merten@johnson.cornell.edu.

In the report "Aberrant subcellular localization of BRCA1 in breast cancer" by Yumay Chen *et al.* (3 Nov., p. 789), the amino acid position of the putative nuclear localization signal NKLRKRKRRP was given incorrectly. The correct position for the signal is amino acids 500 to 508.

#### Letters to the Editor

Letters may be submitted by e-mail (at science\_letters@aaas.org), fax (202-289-7562), or regular mail (Science, 1333 H Street, NW, Washington, DC 20005). Letters will not be routinely acknowledged. Full addresses, signatures, and daytime phone numbers should be included. Letters should be brief (300 words or less) and may be edited for reasons of clarity or space. Beginning in October 1995, our previous policy of consulting with all letter authors before publication will be discontinued.

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