

## Summary

This article described three heuristics that are employed in making judgments under uncertainty: (i) representativeness, which is usually employed when people are asked to judge the probability that an object or event A belongs to class or process B; (ii) availability of instances or scenarios, which is often employed when people are asked to assess the frequency of a class or the plausibility of a particular development; and (iii) adjustment from an anchor, which is usually employed in numerical prediction when a relevant value is available. These heuristics are highly economical

and usually effective, but they lead to systematic and predictable errors. A better understanding of these heuristics and of the biases to which they lead could improve judgments and decisions in situations of uncertainty.

## References and Notes

1. D. Kahneman and A. Tversky, *Psychol. Rev.* **80**, 237 (1973).
2. ———, *Cognitive Psychol.* **3**, 430 (1972).
3. W. Edwards, in *Formal Representation of Human Judgment*, B. Kleinmuntz, Ed. (Wiley, New York, 1968), pp. 17–52.
4. P. Slovic and S. Lichtenstein, *Organ. Behav. Hum. Performance* **6**, 649 (1971).
5. A. Tversky and D. Kahneman, *Psychol. Bull.* **76**, 105 (1971).
6. ———, *Cognitive Psychol.* **5**, 207 (1973).
7. R. C. Galbraith and B. J. Underwood, *Mem. Cognition* **1**, 56 (1973).
8. L. J. Chapman and J. P. Chapman, *J. Abnorm. Psychol.* **73**, 193 (1967); *ibid.*, **74**, 271 (1969).
9. M. Bar-Hillel, *Organ. Behav. Hum. Performance* **9**, 396 (1973).
10. J. Cohen, E. I. Chesnick, D. Haran, *Br. J. Psychol.* **63**, 41 (1972).
11. M. Alpert and H. Raiffa, unpublished manuscript; C. A. S. von Holstein, *Acta Psychol.* **35**, 478 (1971); R. L. Winkler, *J. Am. Stat. Assoc.* **62**, 776 (1967).
12. L. J. Savage, *The Foundations of Statistics* (Wiley, New York, 1954).
13. B. De Finetti, in *International Encyclopedia of the Social Sciences*, D. E. Sills, Ed. (Macmillan, New York, 1968), vol. 12, pp. 496–504.
14. This research was supported by the Advanced Research Projects Agency of the Department of Defense and was monitored by the Office of Naval Research under contract N00014-73-C-0438 to the Oregon Research Institute, Eugene. Additional support for this research was provided by the Research and Development Authority of the Hebrew University, Jerusalem, Israel.

# Rural Health Care in Mexico?

Present educational and administrative structures must be changed in order to improve health care in rural areas.

Luis Cañedo

The present health care structure in Mexico focuses attention on the urban population, leaving the rural communities practically unattended. There are two main factors contributing to this situation. One is the lack of coordination among the different institutions responsible for the health of the community and among the educational institutions. The other is the lack of information concerning the nature of the problems in rural areas. In an attempt to provide a solution to these problems, a program has been designed that takes into consideration the environmental conditions, malnutrition, poverty, and negative cultural factors that are responsible for the high incidences of certain diseases among rural populations. It is based on the development of a national information system for the collection and dissemination of information related to general, as well as rural, health care, that will provide the basis for a national health care system, and depends on the establishment of a training program for professionals in community medicine.

The continental and insular area of Mexico, including interior waters, is 2,022,058 square kilometers (1, 2). In 1970 the population of Mexico was 48,377,363, of which 24,055,305 persons (49.7 percent) were under 15 years of age. The Indian population made up 7.9 percent of the total (2, 3). As indicated in Table 1, 42.3 percent of the total population live in communities of less than 2,500 inhabitants, and in such communities public services as well as means of communication are very scarce or nonexistent. A large percentage (39.5 percent) of the economically active population is engaged in agriculture (4).

The country's population growth rate is high, 3.5 percent annually, and it seems to depend on income, being higher among the 50 percent of the population earning less than 675 pesos (\$50) per family per month (5). The majority of this population lives in the rural areas. The most frequent causes of mortality in rural areas are malnutrition, infectious and parasitic diseases (6, 7), pregnancy complications, and

accidents (2). In 1970 there were 34,107 doctors in Mexico (2). The ratio of inhabitants to doctors, which is 1423.7, is not a representative index of the actual distribution of resources because there is a great scarcity of health professionals in rural areas and a high concentration in urban areas (Fig. 1) (7, 8).

In order to improve health at a national level, this situation must be changed. The errors made in previous attempts to improve health care must be avoided, and use must be made of the available manpower and resources of modern science to produce feasible answers at the community level. Although the main objective of a specialist in community medicine is to control disease, such control cannot be achieved unless action is taken against the underlying causes of disease; it has already been observed that partial solutions are inefficient (9). As a background to this new program that has been designed to provide health care in rural communities, I shall first give a summary of the previous attempts that have been made to provide such care, describing the various medical institutions and other organizations that are responsible for the training of medical personnel and for constructing the facilities required for health care.

---

The author is an investigator in the department of molecular biology at the Instituto de Investigaciones Biomédicas, Universidad Nacional Autónoma de México, Ciudad Universitaria, México 20, D.F. This article is adapted from a paper presented at the meeting on Science and Man in the Americas, jointly organized by the Consejo Nacional de Ciencia y Tecnología de México and the American Association for the Advancement of Science and held in Mexico City, 20 June to 4 July 1973.