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BIOSTATISTICS AND MEDICAL INFORMATICS IN INDIA

An interesting development had occured in the Delhi University College of Medical Scienced in India. This college has set-up first ever Division of Biostatistics and Medical Informatics as a culmination of the sustained efforts of A. Indrayan, a member of the Biometric Society, to improve quality of medical research in that institution.

The Division has a small but motivated technical staff numbering only 7 including two faculty members, and just 4 PCs. Though the primary focus of its activities is biostatistical consultation and computation but many other computer based services are also provided. These include graphics, databases on Indian health indicators, search of medical literature through MEDLARS node, e-mail for international consultation, and preparation of technical posters for conference presentation. These are in addition to the routine programmes indigenously developed for computerization of pay-roll, library circulation, laboratory reporting, health record of families served by the field centres of

the institution, and academic record of the students. The twin activities - first concentrating on biostatistical assistance and the second on other computer based services - have helped each other to grow synergistically.

Establishment of the Division is a result of deliberate attempts during past one decade to inculcate perception among the medical fraternity of the institution that statistical methods indeed help them to manage uncertainties which unfailingly appear in medical practice. The orientation that the complement of uncertainty is measured by probability, that the impact of uncertainties can be minimized by adopting an appropriate design of investigation, and that valid decisions can still be taken despite uncertainties, has greatly helped to convince the medical researchers about the relevance of biostatistical methods. They are seeking assistance in increasing number and going back statisfied about the enhanced quality of their work.

Facilities such as database on health indicators, e-mail and MEDLARS search help the Division to remain in close contact with the medical researchers - thus providing additional opportunity to understand their need and their language. The interaction helps both the sides. The Division becomes more responsive to their needs and the researchers become more appreciative of the services available. Also, the quality improvement in research due to this interaction is more than the sum of the individual effect of each service. When the medical researchers come for MEDLARS search, they sometimes go back educated on the statistical aspects of their work and vice-versa. In a developing country like India, where funds are severely restricted, a central facility such as this Division can be considered as an example of efficient utilization of resources.

The Division has services for the non-researchers as well. The students are regularly provided updated information on health indicators. Their record on periodic tests and term examinations is maintained which is used for internal assessment. Locally developed computer-aided lessons including on elementary statistical methods are available for teachers and students. Activities such as students' academic record and pay-roll have helped to earn the goodwill of the administration.

The health database assiduously built up by the Division has age-gender wise information on more than 30 indicators for each State of India for urban and rural areas separately as much as available since the year 1971. India rarely had a system of collection of health data before 1971. Various organizations and systems were set-up in the sixties and seventies to collect and publish different kinds of statistics. Important among them are Sample Registration System for data on mortality and fertility, Survey of Causes of Death (Rural), Central Bureau of Health Intelligence, Crime Records Bureau for data on crimes, suicides and accidents, National Nutritional Monitoring Bureau, Evaluation and Intelligence division to publish Yearbook on family welfare activities and cells in the ministries for Report on water supply and sanitation services. Decennial census, of course, has always been there which provides the counts on total population, age-gender and urban/rural distribution, and the literacy levels. This list is not exhaustive but it is clear that there are multiple agencies dealing with different aspects of health and its correlates. The Division scanned nearly 200 reports and transferred relevant data on to a computer. Now a comprehensive database has been built up at one place. This is regularly updated. The database has become an importance resource for teaching and research.

Among the projects that the Division is intimately involved are evaluation of blood pressure recorded by pulse oximeter, impact of increased risk awareness in patients of sexually transmitted diseases, field trial on effect of iron fortified salt on haemotological profile of children, influence of pollution on lung functions of factory workers, and the determinants of child survival, growth and development. These projects are in collaboration with various departments such as anaesthesia, community medicine, pathology and physiology. Funding agencies are apex organizations such as W.H.O., UNICEF and the Indian Council of Scientific and Industrial Research.

The Division of Biostatistics and Medical Informatics also has focussed programme of research of its own. The current work is on epidemiological cartography and development of an index of health suitable for Indian conditions. The work on the former was recently presented in IBC'94 at Hamilton (Canada) as a contributed paper and as a seminar at the Division of Biostatistics and Epidemiology of the U.S. Food and Drug Administration and at the U.S. National Center for Health Statistics. The project on index of health now has collaboration with South East Asia Region Office of W.H.O. and is inspired by the Human Development Index of the U.N.D.P. and by the Disability Adjusted Life Years (DALYs) proposed in the 1993 World Development Report of the World Bank. The Division is also trying to develop a better method to assess clinical agreement between two methods of quantitative measurement. The existing methods based on the limits of agreement and the intra-class correlation coefficient have merits but do not fulfill the complete desiderata.

Among the activities proposed to be undertaken is synthesis of the fragmentary literature available on levels of various clinical measurements in Indian subjects. Examples of these measurements are blood presure, serum glucose, serum proteins and heamoglobin levels. No national survey has ever been carried out to delineate the 'normal levels' of these measurements in different segments of Indian population. However, reports of various small scale studies are available in the literature. The plan is to computerize the results on their frequency distribution, mean, median, S- and percentiles as much as reported alongwith the methodology adopted for measurement, details of the population covered, sample design and sample size, and the analysis undertaken on inter-group differences and on the associative factors. These then would be statistically synthesized in the hope to indentify the levels generally seen in healthy subjects of different age, gender, nutrition status, etc., as well as in the subjects suffering from various diseases. This exercise is expected to provide base line information on medical parameters of various segments of Indian population. This baseline is not available so far. After gaining experience, a similar exercise can later on be taken up on the etiological factors for diseases such as cancers, diabetes, infarction and psychosomatic disorders. Implementation of these ambitious plans may further demonstrate the relevance of biostatistical methods in fulfilling the informatics needs of the medical fraternity.

The Division welcomes collaboration with national and international organizations and institutions so that more useful work can be undertaken and better quality can be delivered. Those interested may contact :

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