

and (b) the number of patients involved in 'effective' contact with at least one other patient (Pike and Smith, 1972). Fortran IV subroutines are available for the computations involved.

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Seasonal Variations of Mortality in Dakar and Implications in Public Health Planning. L. M. F. MASSÉ, J. VERDIER, and M. J. LENAN (*Ecole Nationale de la Santé Publique, Rennes*)

In 1951-55 analysis of death records revealed two distinct seasonal patterns of mortality in the city of Dakar (Senegal Republic, West Africa): that for children, excluding newborn infants, showed a peak in the wet season (July, August, September); that for adults and for newborn infants showed two less marked peaks, one during the dry season (February, March, April) and one during the wet season (September, October). These two different patterns of mortality were found, more or less, in all ethnic, cultural, and occupational groups.

With the help of the Population Council an investigation on causes of death was undertaken to ascertain the main causes responsible for these seasonal variations of mortality (Massé, 1966).

Several hospital investigations were carried out to link mortality and morbidity patterns. For the paediatric data two series were analysed, one considering deaths in the paediatric ward, so that comparison with causes of death in Dakar could be made, and another considering the admissions for every disease for which there were enough observations.

The main causes of death of children were malaria, gastroenteritis, toxicosis, and malnutrition as in many other places; but also, diseases of the lung and pleural cavity, bronchitis, tonsillitis, ear and mastoid infection and measles. Data on morbidity yielded very similar results.

Another investigation carried out in 1968 and 1969 on causes of deaths and morbidity showed a very close similarity to that described in the 1951-1955 investigation, in spite of the introduction of control measures.

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Space-time Clustering of Limb Defects in Cardiff. S. LLOYD and C. J. ROBERTS (*Department of Social and Occupational Medicine, Welsh National School of Medicine, Cardiff*)

In Cardiff in 1964-66 there were 14,451 singleton births, of whom 35 had syndactyly, 16 polydactyly, and 6 reduction deformities. When the cases were plotted on a spot map both syndactyly and polydactyly appeared to show spatial clustering. Five of the polydactyly cases came from the list of one general practitioner. (If it is assumed that each of the 130 general practitioners in Cardiff had the same number of patients, the probability of this happening by chance is 1 in 50,000.) Examination of these five cases of polydactyly, however, did not explain the apparent overall spatial clustering.

The problem of determining whether these apparent spatial clusters could have arisen by chance was approached as follows. Five sets of random samples were taken (each of the same size as the limb defects group) and the number of pairs less than 200 metres, 300 metres, 400 metres, and 500 metres apart were calculated for the limb defects group and for each of the random samples. A significance value was given to the observed number of pairs of limb defects satisfying each of the critical distances, assuming that its null distribution is Poisson with a mean estimated by the mean number of pairs of random samples satisfying the same critical distance. For all the values of critical distances the test was significant.

Space-time interaction was studied using Knox's method. In none of the time-space categories set up *a priori* was there a significant excess of observed over expected pairs, although there was some suggestion that the proportion of pairs close together in time increased as they became closer in space.

Aggregation of the defects by social class is an unlikely explanation of our findings since the social class distribution of limb defects was similar to that of all singleton births in Cardiff. However, common ethnic or genetic factors (relatives with affected genes may live close to one another) or external agents (e.g., drugs or diet) could produce a spatial distribution similar to that described in this paper. These possibilities are being examined.

Maternal x-radiation and Chromosome Abnormalities in Subsequent Conceptions. EVA D. ALBERMAN (*Department of Public Health, London School of Hygiene and Tropical Medicine*)

This investigation was planned to discover whether x-radiation of the ovaries causes genetic risk to subsequent conceptions.

The estimated cumulative x-ray dose received by the ovaries of a group of mothers subsequently delivered of an abortus of abnormal chromosome constitution proved to be significantly higher than that received by mothers subsequently delivered of normal babies, and than that received by mothers having abortions of normal chromosome constitution. Similarly, the pre-conception ovarian dose received by mothers of children with Down's syndrome was slightly higher than that received by control mothers of children with other severe handicaps. The x-radiation appeared to enhance the effect of ageing on the ovum and, independently of ageing, the greatest effect seemed to be when the radiation had occurred long before conception.



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