

Program on the Analysis of the Seasonality of Birth

Some of the general background for this problem is reviewed in the attached notes.

The general program of analysis is:

1. To seek out sources of physical information on the seasonal distribution of births with respect to other factors such as region, maternal age and reproductive history, paternal occupation, health and other performance of the newborn, and so forth.

2. The next problem is to unravel these very extensive and quite complicated data. For this purpose we are developing computer routines for the rapid and perceptive analysis. We have already gotten well into the first stage of such an analysis, that is the conventional use of the computer with written programs for producing printed outputs of statistically analyzed charts, tables and graphs. This approach has already shown some interesting correlations between maternal age and seasonality of birth, and the discrepancies in birth season of children who have been admitted to institutions for the mentally retarded. We are about to acquire similar information on the statistics of selected individuals such as the roster of American scientists in an effort to investigate the realities of historical claims of statistically significant discrepancies in the distribution of birth months of such populations.

3. Probably the most important variable has never been investigated properly, namely the effect of the cultural background of the parents on the seasonality of birth. Some evidence for this, mainly a departure from the sharp seasonal peak in September, has been seen in data we have been able to acquire from the California Department of Public Health, and we are actually seeking additional information along these lines. The Italian data should be especially informative in this regard.

4. We then have to consider a range of biological and cultural hypothesis with regard to the mechanisms by which the seasonal cycle is established. The very sharp differences between the European cycles, which peak in early Spring, and the American cycles, which peak in September, make it difficult to invoke a simple climatic, biological interpretation. A possible approach to separating these variables is the comparison of the birth seasonality of native and non-native mothers living in the same region in the United States. There is already substantial indication of such a discrepancy.

5. In view of Stone and Shaw's evidence of seasonal variation in ABO blood group antibodies, the possible interaction of birth season with natural selection in the ABO system has come up. We have, therefore, started to examine the seasonality of birth among blood donors of different blood type, data available in some frequency from a group of blood banks, and also have so far some limited information giving the blood types of the entire families. On the later point the obstetrical services of the U.S. Naval hospitals have some very useful information which we are now collecting with their cooperation. If there are any real effects of season on ABO selection this would probably be the most exciting and biologically consequential outcome of this research.

At the next stage in the utilization of computers, we are setting up to allow for a much more dynamic interaction between the investigator and the data, that is to make it possible for him to review the entire file of information stored on a magnetic tape while sitting at a console subject to his own direct interrogation, and display of responses on an oscilloscope screen. Quite apart from the importance of such a development for the analysis of expensive statistical information, this is certainly the most promising approach to the extensive use of computers in scientific work generally.

Several aspects of these investigations should be of particular interest to the Syntex Laboratories as they are, of course, to ourselves.

1. If environmental factors that vary with the season really alter the risks of birth or conversely the expectation of performance of the off-spring, this would be a major finding for human biology from the standpoint of the optimal planning of families.

2. We might expect to get useful insight into factors underlining reproductive biology and sexual activity in man; for example, whether there remain vestiges of seasonal variations in either female or male fertility, or both such as is characteristic of mammals.

3. The immunological investigations would be very pertinent to the role of immunological factors in human fertility.