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A Research Note: The Changing Pattern of Births 1900-1989

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Absent medical intervention, the number of births on any day of the week should be random; 1/7 of all births should take place on each day. Medical intervention, which allows choice of the day of birth by either the patient or, more likely the physician or the hospital, might change this pattern. Those births which are induced, or scheduled Cesarean sections might change this pattern.

The random pattern would be changed by the nature of the traditional work week. Physicians, like the rest of the society, should prefer to perform scheduled procedures on weekdays. Hospitals are also likely to prefer staffing in this way. Thus, induced births should happen more from Tuesday to Thursday and scheduled Cesarean births also on weekdays. In 1986 21 percent of Oregon births were Cesarean Section. (Oregon Health Division, 1989) An unknown percent of births are induced.

To test this hypothesis, the birthdays of all Kaiser members as of December 31, 1989 were used as a sample. In some cases an exact birthday is unknown (Day of Month = 0). These cases are dropped. This left a sample of 358,227 individuals, with birthdays ranging from 1884 to 1989. Births prior to 1900 are excluded, removing another 1,063 births, leaving 357,164 cases.

Results

The pattern of births is measured in two ways. First, to make any year comparable, the number of births on each day are standardized as in equation 1. This is a relatively weak test. In any given year, the true divisor should be 52/365 or 53/365, depending on the exact number of a given day in a year. Over many years, however, this should not significantly change the pattern.

$$(\text{Births on Day} / (\text{Births in Year} / 7)) - 1. \qquad (1)$$

A second method ranks births by day of week (1 = smallest, 7 = largest number of births). Both measures should result in random distributions.

This is not what is observed. Figure 1 shows Sunday's standardized births from 1900-1989. The pattern prior to 1940 is as expected; random, with substantial fluctuation above and below the mean. Since 1940, and especially since 1960, the pattern is different; fewer births than expected happen on Sunday. Figure 2 shows the same data for Saturday. The pattern is similar, but not as distinct. Fewer births than expected take place on Saturday.

Table 1 shows the ranking of Births by day of the week for each decade.

Table 1
Rank of Births By Decade
1900-1989

Decade	Sun	Mon	Tue	Wed	Thu	Fri	Sat
1900-09	5	7	1	2	4	6	3
1910-19	6	7	2	5	3	4	1
1920-29	6	4	1	3	2	5	7
1930-39	1	2	4	6	5	3	7
1940-49	1	2	7	5	3	6	4
1950-59	1	5	7	4	3	6	2
1960-69	1	4	7	5	3	6	2
1970-79	1	3	7	4	6	5	2
1980-89	1	3	7	4	6	5	2

This graph shows that there are consistently fewer births on weekends, than on weekday. The consistency of Tuesday as the highest day is an interesting phenomenon without an obvious explanation. It may be that when births are induced, there is a sufficient delay that the birth then happens on Tuesday. This would fill available beds, delaying the next available time for scheduled births until Thursday, which is what is observed.

Conclusion

Medical technology is clearly influencing the pattern of births. This may result from hospital management, physician preferences, both, or other unexplained factors. This note only provides evidence that a non-random birth-pattern has become prevalent in the last 40 years.

Bibliography

Center for Health Statistic, Oregon Health Division, Oregon Department of Human Resources (1989). Prenatal Care in Oregon: A Descriptive Analysis, 1977-1986.

Figure 1
Standardized Sunday Births
1900-1989

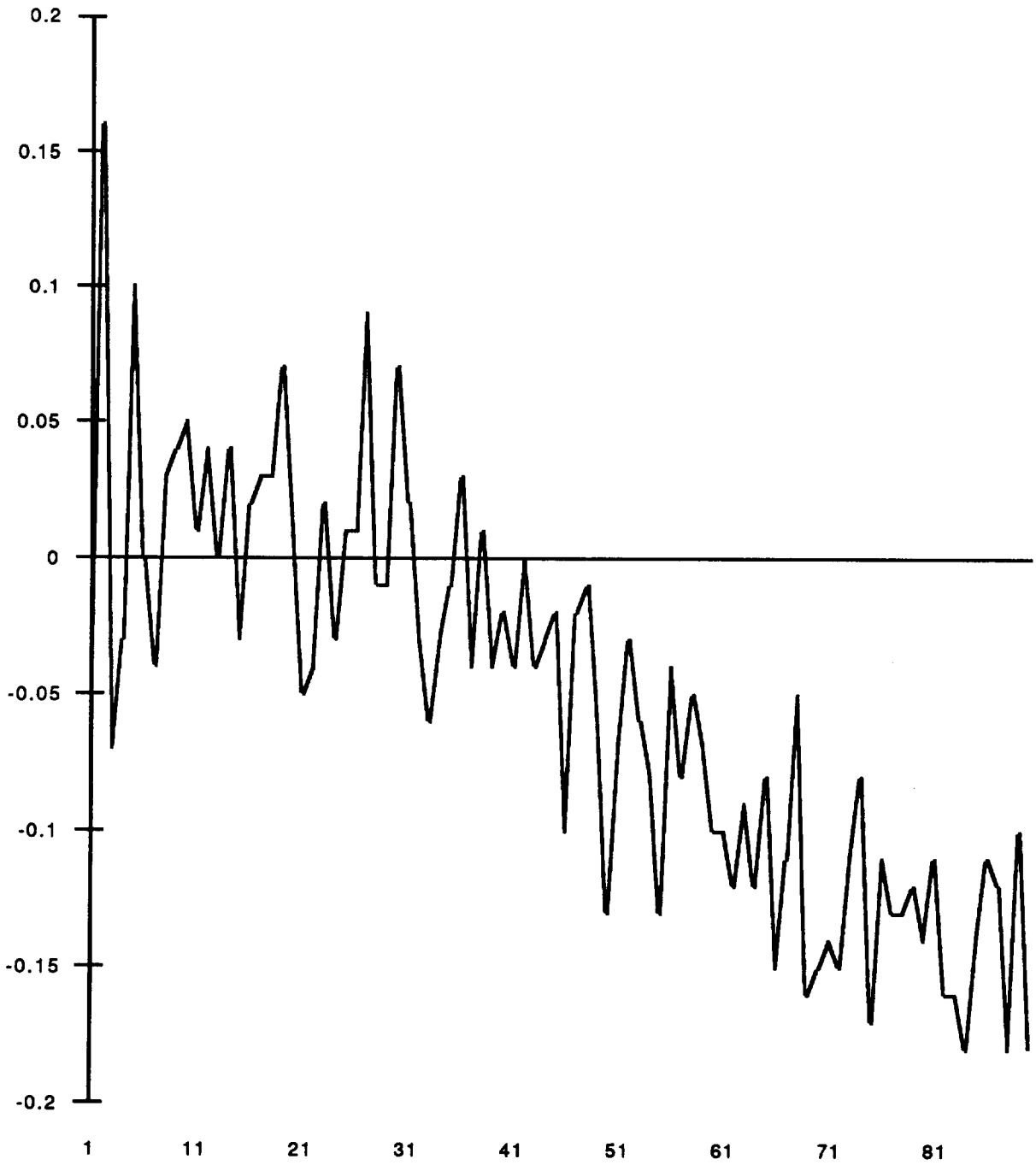
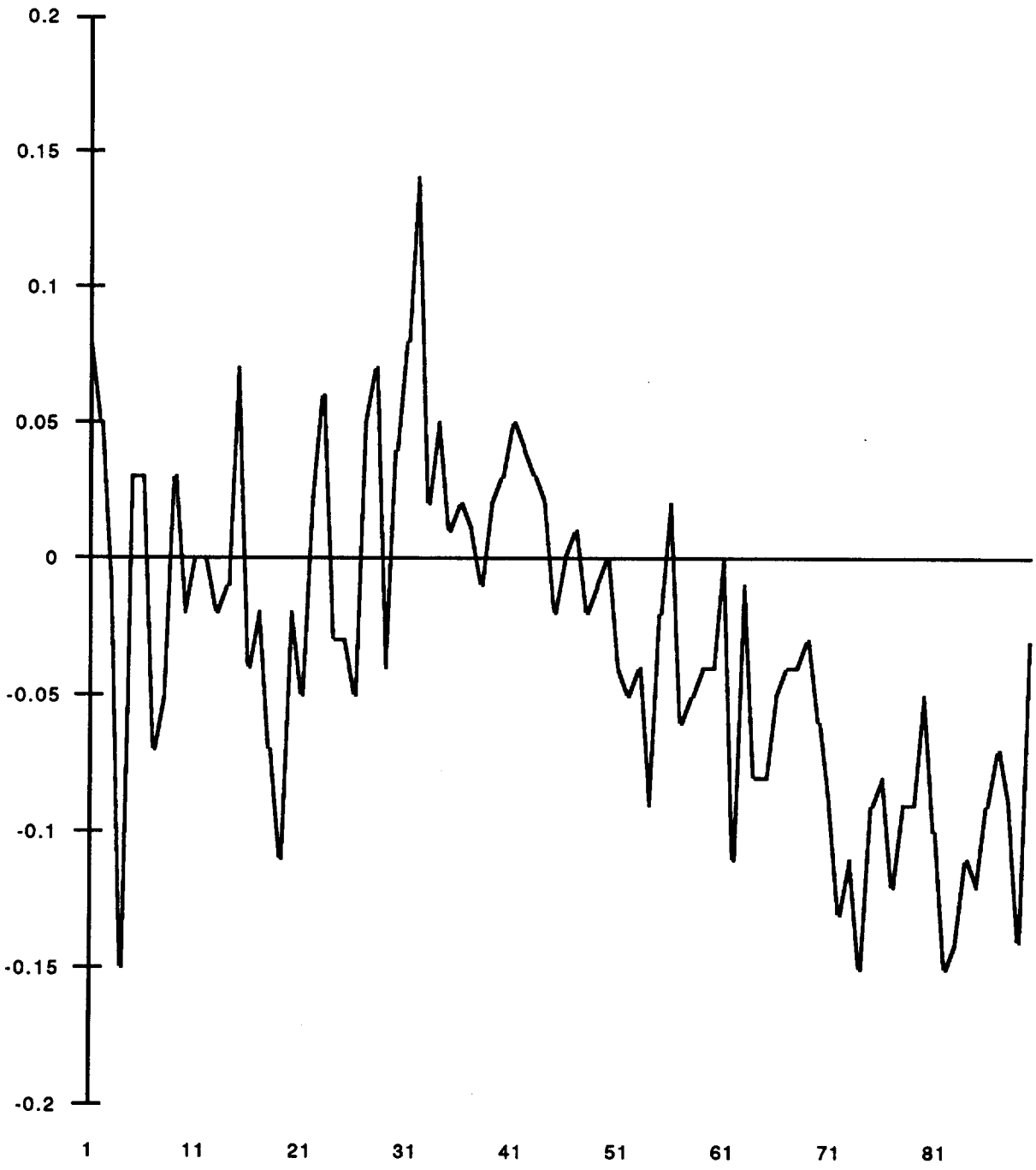
Figure 2
Standardized Saturday Births
1900-1989