

The following study reports on the occurrence in 1955 in California of births with cleft lip or cleft palate. The data were analyzed for a number of factors associated with these conditions.

A STUDY OF CLEFT LIP AND CLEFT PALATE BIRTHS IN CALIFORNIA, 1955

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IN TERMS of frequency, cleft lip and cleft palate rank high on the list of congenital deformities. Unfortunately, however, little is known regarding the etiology of these malformations, and there is even disagreement as to their frequency of occurrence and their relationship to such elements as heredity and environmental factors.

In order to determine the occurrence of these conditions in California and possibly to shed some light on other factors which might be associated with them, a study of children born during 1955 with cleft lip and cleft palate in California was undertaken jointly by the Division of Dental Health and the Bureau of Records and Statistics of the State Department of Public Health.

In addition to the above reasons for the study, it is also contemplated that the data might be used in designing a follow-up study of these children to examine factors in relation to their rehabilitation. Possible factors to be studied include type, cost, and method of obtaining treatment. It is possible that a study will be done to determine the role which heredity plays as a causative factor.

Method of Study

Information was obtained from all 1955 California birth certificates which

mentioned cleft lip and cleft palate or any synonymous terms. This information appeared on the certificate under the heading "describe any congenital malformation." The other information used in this study, e.g., sex, age of mother, race of child, and birth weight from the birth certificates was also taken.

It is realized that the utilization of birth certificates as a source of data has shortcomings, the primary one being that it is not possible to determine with any degree of accuracy the completeness of reporting. It is believed, however, that since the great majority of these cases are observable at birth, reporting is undoubtedly more complete than for most other congenital malformations. Further, even though reporting is not complete, few of the conclusions drawn from the data will be affected to any significant degree.

Table 1—Cleft Lip and Cleft Palate Births per 1,000 Live Births in Selected Areas

Area	Year	Rate/1,000 Live Births
California	1955	1.18
Hawaii ¹	1940	1.98
Wisconsin ²	1944	1.30
Pennsylvania ³	1949	1.31

Table 2—Cleft Lip and Cleft Palate Births by Sex and Type of Condition in Selected Areas

Type of Condition by Area	Number of Births	Per cent	
		Male	Female
Cleft lip and/or palate, total			
California	368	54	46
Denmark ⁴	625	62	38
Ontario ⁵	634	60	40
Pennsylvania ³	751	56	44
Cleft lip and palate			
California	155	58	42
Denmark	360	71	29
Ontario	316	63	37
Pennsylvania	278	54	46
Cleft lip only			
California	102	60	40
Denmark	138	65	35
Ontario	195	65	35
Pennsylvania	292	67	33
Cleft palate only			
California	111	44	56
Denmark	127	34	66
Ontario	123	45	55
Pennsylvania	181	41	59

The analysis which follows consists primarily of a comparison of the cleft lip and cleft palate live-birth population with the total 1955 California live-birth population. In addition, comparisons are made within the cleft lip and cleft palate group, such as determining the sex distribution by type of condition.

Findings and Discussion

Incidence—Of the 313,164 live births occurring to California residents in 1955, 368 cases of cleft lip, cleft palate, or both were reported. This is a ratio of one case per 851 live births or 1.18 cases per 1,000 live births. Table 1 shows the rate per 1,000 live births for this condition found in previous studies of birth certificates in other areas.

As can be seen the Wisconsin and Pennsylvania rates are quite similar to California's. The differences which do exist could quite easily be due to differences in reporting. Hawaii's rate, however, is considerably higher. Whether or not this is a real difference or due to method of reporting could not be ascertained.

By Sex and Condition—Of the 368 cases reported in California, 200, or 54 per cent, occurred among males and the remaining 168 cases, or 46 per cent, among females. Since only 51 per cent of the total live births in the state in 1955 were males, this bears out the findings in other studies which indicate a higher incidence of this developmental defect in males. A higher percentage of males than females had cleft lip and palate and cleft lip only, whereas a higher percentage of females had cleft palate only. In this respect also, the results are similar to three studies for which comparable data are available. These appear in Table 2.

By Race—It has been postulated that race might be a significant factor in the occurrence of cleft lip and palate. Since race is recorded on the California birth certificates, a comparison of the racial distribution of the total California births with the cleft lip and palate cases was made. The results appear in Table 3.

The percentage of cleft lip and palate births occurring among Negroes is considerably less than the percentage of Negro births to total births (3.5 per cent compared to 6.9 per cent). This difference is statistically significant, with a probability of less than one in a hundred that it could have occurred by chance alone. There is no significant difference for white and other racial groups.

Age of Mother—Blair and Ivy⁶ have felt that maternal age might also be a factor associated with the occurrence of cleft lip and palate, with older mothers more likely to have children born with

these conditions. A comparison of the age distribution of mothers of cleft lip and palate cases with the total California births indicates that there is a slight association between maternal age and these anomalies. The distribution of births in California by age of mother appears in Figure 1.

While slightly less than 10 per cent

of the mothers for all California births were over 35 years of age, 13.3 per cent of the mothers of cleft lip and palate cases were over 35. The difference is statistically significant. ($p < 0.05$)

Prematurity—Numerous studies have clearly pointed out that mortality rates and the occurrence of congenital malformations are higher for premature

Table 3—Total Live Births and Cleft Lip and Cleft Palate Birth by Race, California, 1955

Race	Total Live Births		Cleft Lip and Palate Births	
	Number	Per cent	Number	Per cent
Total	313,164	100.0	368	100.0
White	282,812	90.3	341	92.7
Negro	21,532	6.9	13	3.5
Other	8,820	2.8	14	3.8

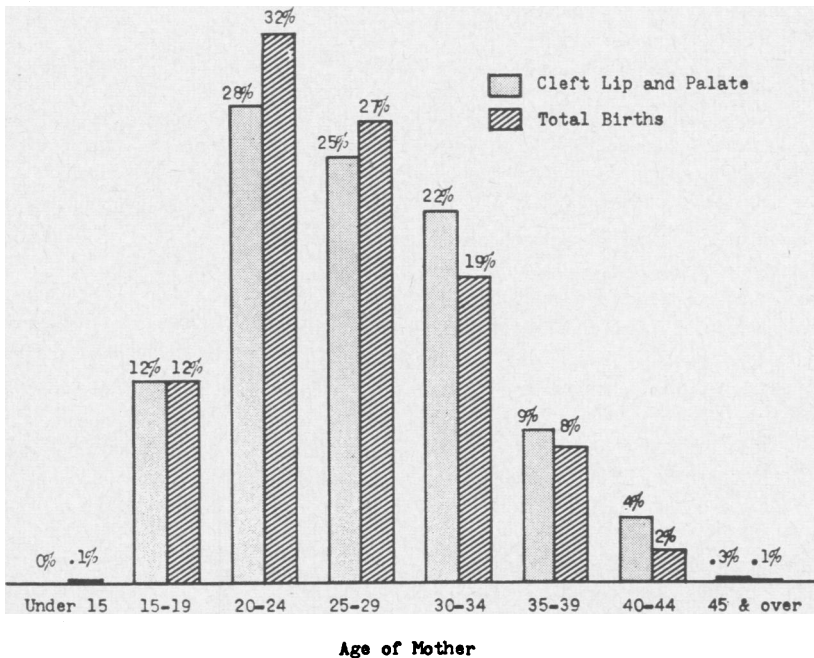


Figure 1—California Live Births and Cleft Lip and Cleft Palate Births by Age of Mother, 1955

Table 4—Total Live Births and Cleft Lip and Cleft Palate Births by Birth Weight, California, 1955

Birth Weight	Total Live Births		Cleft Lip and Palate Births	
	Number	Per cent	Number	Per cent
Total	313,164	100.0	368	100.0
Premature	22,604	7.2	70	19.0
Under 2 lb 4 oz	1,666	0.5	5	1.4
2 lb 4 oz—3 lb 4 oz	1,936	0.6	5	1.4
3 lb 5 oz—4 lb 6 oz	4,265	1.4	11	3.0
4 lb 7 oz—5 lb 8 oz	14,737	4.7	49	13.3
Mature (Over 5 lb 8 oz)	290,560	92.8	298	81.0

births.^{7,8} (In California a premature birth is defined as one in which the newborn weighs 5 pounds 8 ounces or less.)

As shown in Table 4, 7.2 per cent of the total live births in California were classified as premature, while 19.0 per cent of the cleft lip and palate cases were premature. If prematurity were not an associated factor, we would have expected only 26 premature births in the 368 cases instead of the 70 which actually occurred. These results are highly significant statistically. ($p < 0.000001$)

Other Congenital Malformations—In addition to cleft lip and palate, other congenital malformations were found in 67 of the 368 cases. These 67 cases had a total of 127 other malformations. Malformations of the bones and joints were most common, comprising 36 per cent of the 127, followed by defects involving the nervous system and sense organs, representing 22 per cent of the total. The types of malformations appear in Table 5.

Deaths Occurring to Cases—A search of death records was made in order to determine the number of the 368 cleft lip and cleft palate cases that died within the first six months of life. The results appear in Table 6.

Considering the high rate of prematurity and the number of other congenital malformations in the group, it is not surprising to find a high mortality rate. Death occurred to 57 (15 per cent) of the cases within the first six months of life; 77 per cent of these 57 died before the 28th day of life. Eleven per cent of the deaths were coded to cleft lip and palate, 61 per cent to multiple congenital malformations, with the remainder distributed among various other causes. Of these six cleft lip and palate cases, two had operations for this condition and died

Table 5—Other Malformations Found in Cleft Lip and Cleft Palate Cases, California, 1955

Type of Malformation	Number	Per cent
Total	127	100.0
Bone and joint	46	36.2
Nervous system and sense organs	28	22.0
Genitourinary system	13	10.2
Digestive system	7	5.5
Circulatory system	4	3.1
Other	29	22.8

Table 6—Deaths* Occurring to Cleft Lip and Cleft Palate Cases by Age at Time of Death and Cause, California, 1955

Age at Time of Death	Total Deaths	Cause of Death		
		Cleft Lip and Palate	Multiple Congenital Malformation	All Other Causes
Total, Under 6 months	57	6	35	16
Under 28 days	44	3	29	12
1-6 months	13	3	6	4

* Within six months of birth.

within two weeks. Death from any complication of surgery could have been coded to this cause.

Summary

The Division of Dental Health and the Bureau of Records and Statistics of the California State Department of Public Health studied the 1955 California birth certificates mentioning cleft lip or cleft palate. An analysis of the data resulted in the following:

1. Of the 313,164 live births in California in 1955, 368 of the birth certificates mentioned cleft lip or cleft palate. This is a ratio of 1.18 cases per 1,000 or 1 per 851 live births.
2. A higher percentage of males than females had cleft lip and palate and cleft lip only; a higher percentage of females had cleft palate only.
3. 92.7 per cent of the cases were white, 3.5 per cent were Negro, and 3.8 per cent were members of other races. Comparing these percentages with the total live births, it was found that the percentage of Negro cases was significantly lower than the percentage of total Negro births in the state.
4. The percentage of cases occurring to mothers 35 years of age and over was significantly higher than the percentage of total births to mothers over 35.
5. The percentage of premature births in the cleft lip and cleft palate group far exceeded the percentage of prematures in

the total live birth population (19 per cent of the cases, 7 per cent of the total births).

6. Of the 368 cases, 67 had other congenital malformations mentioned on the birth certificate. The 67 had a total of 127 malformations in addition to cleft lip and cleft palate.
7. Fifty-seven of the 368 cases died within the first six months of life; 44 died within the first month. Only six of the deaths were coded to cleft lip and cleft palate.

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