PUBLIC HEALTH REPORT

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PKU Testing

CALIFORNIA IS ONE OF 38 states that currently have legislation on testing for phenylketonuria (PKU). Implementation of the California law is somewhat unique in that the usual channels of medical care and laboratory services do the testing of newborns that is required, rather than a single or several central laboratories under state sponsorship as is the practice in many other states. Here the state and local health departments record the results of testing and the number and kind of services provided.

In 1966, in excess of 90 per cent of California's 330,000 newborns had blood phenylalanine determinations performed. There were 1,162 infants with positive results (that is, 4 mg or more per 100 ml) on their first test, a rate of about three positives per 1,000 tests. Approximately 90 per cent of these were retested as the regulations require and 162 were positive on the second test. Of these 162 infants with two positive tests, 16 were eventually found to be phenylketonuric. These figures indicate that there is an acceptably low number of false positive tests—that is, positive test results in the absence of the disorder. Follow-up to arrive at a definitive diagnosis, when the initial positive result has alerted the physician to this possibility, is often difficult but has been carried out in California at a high level of completeness.

Through testing in the first half of 1967 an additional 12 cases in approximately 150,000 births have been discovered. In the first half of 1966, 2,805 infants were reported as discharged who, for various reasons, had not had the test. This represented approximately 2 per cent of the births. Reports for the first half of 1967 indicate that only 1,155 infants (less than 1 per cent of the births) were discharged without testing.

The physicians of the state have assumed a central role in the success of this testing program. At the time the testing program was initiated, some anxiety was expressed that infants would be prematurely placed on the restrictive therapeutic diet on the basis of a single screening test result. This has not occurred. The regulations require that a repeat test be performed in all cases in which the first test is positive. Only after a second positive test is the infant eligible for a Crippled Children Services-supported diagnostic evaluation; and only after the best medical judgment has been rendered is the diet prescribed. The physicians of the state have supplied the medical judgment necessary to the proper implementation of the law by separating out the other causes of elevated blood phenylalanine from PKU.

Some anxiety was also expressed that the setting of an arbitrary reporting level (4 mg per 100 ml) might lead to its use as a rigid diagnostic criterion. The experience shows that the true meaning of the positive screening level has been widely recognized. In many instances repeat testing has been performed where the initial test showed a borderline result, thus removing any question of the possibility of PKU. The influence of the time of the test, the feeding history and the type of test are all factors that must be used in the interpretation of these borderline results.

Two infants in whom PKU was ultimately diagnosed had negative initial newborn tests. The first of these, born in 1966, was a term infant tested at three days of age, following breast and bottle feeding for 48 hours. A Guthrie test was read at less than 2 mg per 100 ml. The second infant, born in 1967, was also a term infant whose Guthrie test was reported also as 2 mg per 100 ml on the fourth day of life.

The State Department of Public Health has accumulated an appreciable amount of information about the disorder and the tests used to detect it. This information is available to the medical profession.

A registry with information on the more than 350 patients with PKU currently residing in California has been developed. The Department has also cooperated in a collaborative study of phenylalanine loading tests on infants with high levels, and their parents and siblings. Staff members are participating in a national study on most effective use of the diet.

The effect of this legislation has been an increase in the completeness with which newborns receive PKU screening tests. In a significant number of California-born children, mental retardation has been thus prevented through early diagnosis and treatment. Although controversial at times, the medical knowledge about PKU has been increased decidedly in recent years as the result of newborn screening and treatment of patients with the disorder, and as improved techniques for diagnosis are developed and rapidly introduced into practice.