

# Nutrition Surveillance in Arizona: Selected Anthropometric and Laboratory Observations Among Mexican-American Children

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**Abstract:** A nutrition surveillance system in public health clinics is providing data for patient care and program planning. Through this system, Arizona's Mexican-American population has been shown to differ from other ethnic groups seen in clinic. Anemia and

low height-for-age are significant problems in the Mexican-American population. Over-nutrition, in the form of overweight and high cholesterol, is also a problem among the Mexican-American clinic population. (Am. J. Public Health 66:151-154, 1977)

The Arizona Public Health Program has been collecting nutritional data on the state's population since 1970, when the National Center for Disease Control provided funds to pilot a system of surveillance. The CDC Surveillance System, instituted in 1974 on a full scale, uses data collected as part of a health care system. The data are systematically analyzed to evaluate the ongoing nutritional status of a target population. The population group is small enough to allow for program planning in a specific area. Surveillance data can also be used to identify individuals who are at risk and in need of follow-up. In general, target populations are similar to the groups identified by major nutritional surveys as the most poorly nourished: the young, the poor, and the rural minorities.

## Method

The Arizona Nutrition Bureau designed a five-pronged program to mesh with the existing health care system. The program includes screening, monitoring, referral, food delivery, and the training of community health workers. The cut-off values and methods used to collect selected aspects of the data are described in Table 1.

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**TABLE 1—Selected Reference Values, Cut-Off Points and Methods Used in Arizona Nutrition Surveillance Program**

Hemoglobin (1)		
Age	Cut-Off Point	
6-23 months	<10 gms/100 ml.	
2-5 years	<11 gms/100 ml.	
6-14 years	<12 gms/100 ml.	
15 & over (female)	<12 gms/100 ml.	
15 & over (male)	<13 gms/100 ml.	
Serum Cholesterol (2)		
Under 18 years	>160 mg. %	
18 years and over	>200 mg. %	
Growth (3)		
0-24 months (4)	Low ht. for age	<5th percentile
	Low wt. for ht.	<5th percentile
25-215 months (5)	Excess wt. for ht.	>95th percentile

(1) Cyanmethemoglobin method read on site by community health worker using premeasured cyanmethemoglobin standard, photoelectric colorimeter and chemistry wheel. See references 1 and 2 for standards.

(2) Capillary blood sample drawn into 200 lambda micro-pipette and spun down in field. Community health worker saws tube at interface between cells and serum, seals, labels, and dispatches to central laboratory. Cholesterol determined by Wybenga method (Dow laboratories). Standard adapted from Framingham study<sup>3</sup> for adults, with value for children extrapolated.

(3) Length measured on infant boards if under 2 years, in standing position without shoes if over 2 years; recorded to nearest 1/8 inch. Weight measured with shoes and outer clothing removed; recorded to nearest 1/4 pound. (On children under 2 years head circumference is also measured.)

(4) See references 4 and 6.

(5) See references 5 and 6.

The point of entry into this health care system is the county health department clinic which serves primarily mothers and children. A nutrition team (public health nutritionists-community health workers) completes the initial screening, which includes height, weight, head circumference, hemoglobin, hematocrit, and serum cholesterol. All 2-5 year olds are screened.

Secondary screening includes measurement of blood pressure and completion of a questionnaire on cardiovascular disease risk factors such as family history and smoking. Socioeconomic information is taken for counseling purposes. A 24-hour dietary recall estimates protein, iron, calcium, vitamins A and C, cholesterol, fat, and empty calories based on standard measuring units of foods in 18 food groups. Results of these secondary measurements will not be discussed in this report.

Having assessed the problem, the nutritionist and community health worker together develop a patient care plan for each client found by screening to be at unusual nutritional risk. The client is seen at home, and other family members are encouraged to undergo screening. The plan includes intensive diet counseling in the family setting. The meaning of the screening values is explained and behavioral changes (simple modifications one at a time) are suggested within the person's ethnic and cultural framework. Reevaluation of the anthropometric and biochemical values as well as the patient's diet and food practices is scheduled. The patient care plan also includes the necessary referrals, utilizing com-

munity resources according to the patient's unique problems, e.g. legal aid service, day care facility, extension program, etc.

Those clients who are eligible by age, residence, and nutritional risk, are provided vouchers to buy specific nutritious foods through the USDA-funded Special Supplemental Food Program For Women, Infants & Children (WIC). All eligible pregnant or lactating women and children under five years old receive the entire complement of screening and follow-up services in addition to the WIC foods. Hopefully nutrition education closely tied to food delivery enhances the benefits of the WIC Program, and exerts effects even after the client is no longer eligible to receive the food supplement.

Indigenous community workers who actually carry out the screening and monitoring processes are trained and supervised by public health nutritionists and nurses.

### Population

The Mexican-American population whose nutritional status is assessed in Arizona made up 47.8 per cent of the 13,000 people seen in county health department clinics in 1974. The American Indian population will not be considered in this report. Of the non Indian, non Mexican-American clinic population, about two-thirds are white and one-third black. Only 1-2 per cent are Oriental.

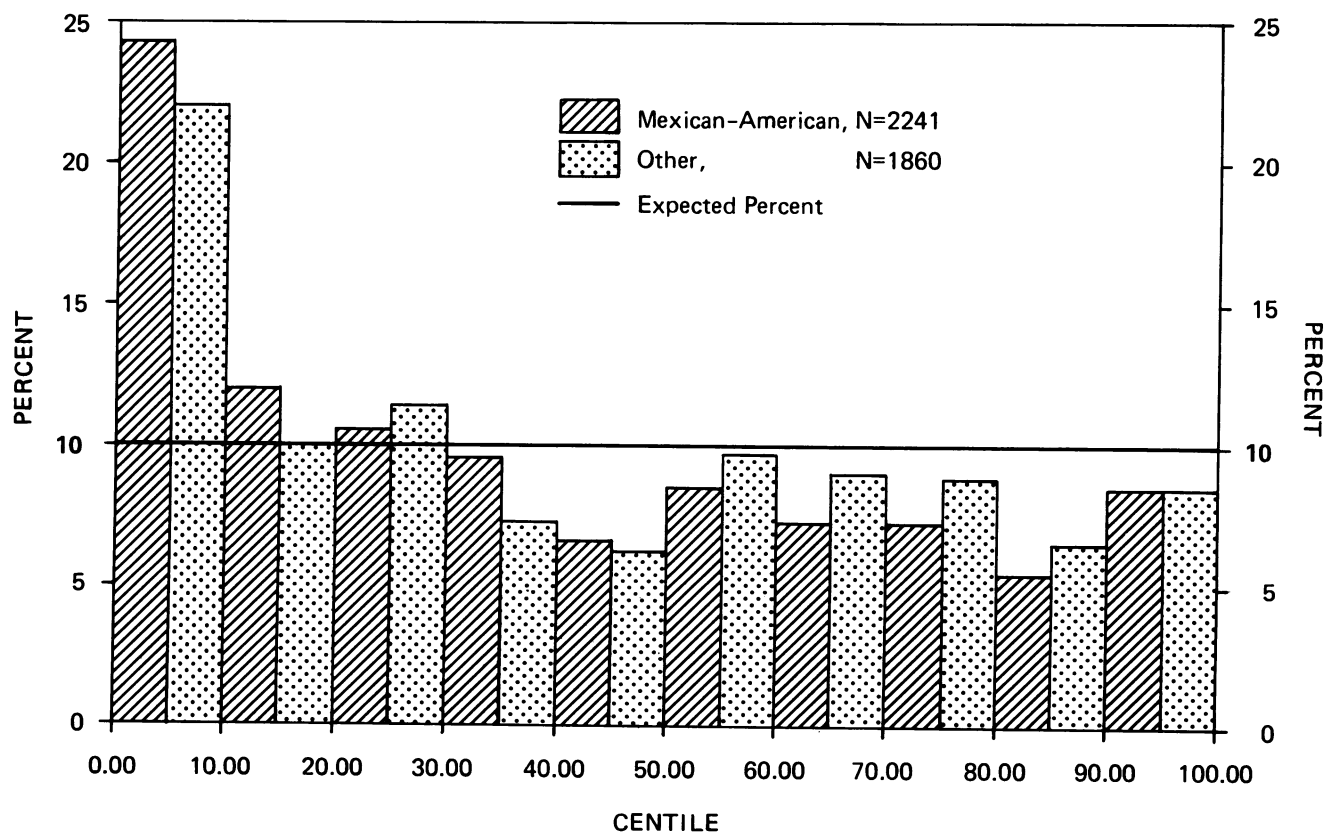


FIGURE 1—Percentage Distribution of Children 2-5 Years of Age by Ht/Age Centiles, Arizona Nutrition Surveillance, 1974

Ninety per cent of the population was under 6 years old with an equal distribution of boys and girls. This is not a randomly selected population, so the data presented here should not be extrapolated to all Mexican-Americans in Arizona. The public health clinic population is generally a lower-income, higher-risk group than the total population.

**Results**

The number of children two to five years old is large enough (2,241) to look at in detail. Figure 1 shows the height-for-age distribution of children two to five years old. The horizontal line at 10 per cent represents the way the reference population would be plotted. One can quickly see that Arizona's clinic population has an overabundance of short stature children. The ruled bar is the distribution of Mexican-American children; the dotted bar reflects all others seen in clinics in Arizona except American Indians. The difference in short stature between these two population groups is not

statistically significant. Both groups are shorter than expected, with over 22 per cent less than the 10th percentile height-for-age. Fifteen and nine tenths per cent of Mexican-American 2-5 year olds and 13.8 per cent of 2-5 year olds in other ethnic groups are below the 5th centile.

Low weight-for-height did not appear to be a problem. In the two to five year old age group, 4 per cent of the Mexican-American children are underweight while 5.5 per cent of the two-to-five year olds in other ethnic groups are underweight.

At the other end of the spectrum, weight-for-height greater than the 95th percentile is more of a problem in the Mexican-American population than in the rest of the population. In the two-to-five year old population, 13.3 per cent of the Mexican-Americans are overweight while 8.9 per cent of other ethnic groups are overweight (Figure 2). The difference is significant statistically.

Twenty and eight-tenths per cent of the Mexican-American 2-5 year olds had hemoglobin readings below 11 gm/100 ml. Anemia is a problem in all population groups, but it is a

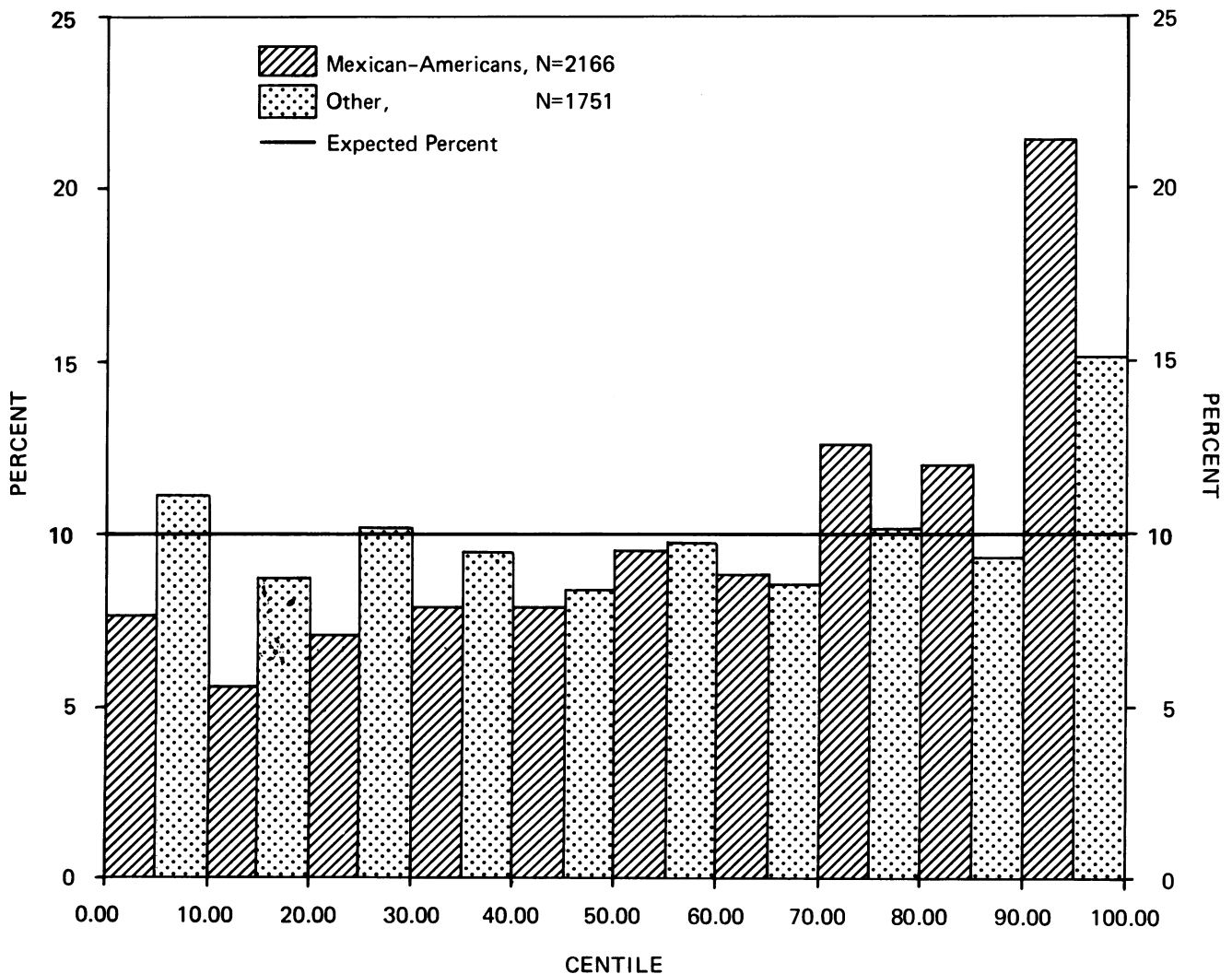


FIGURE 2—Percentage Distribution of Children 2-5 Years of Age by Wt/Ht Centiles, Arizona Nutrition Surveillance, 1974

significantly greater problem in the Mexican-American population. The rest of the 2-5 year old population shows a level of anemia of 16.6 per cent.

Of the 294 Mexican-American children whose serum cholesterol was tested, 165 (56.1 per cent) have a reading greater than 160 mg per cent. This is somewhat less than that of the other ethnic groups (61.3 per cent with elevated serum cholesterol). Children with even higher risk, a serum cholesterol over 200 mg per cent, make up 12.2 per cent of the Mexican-American population and 16.2 per cent of the other ethnic groups. Mean serum cholesterol of Mexican-Americans was 167 compared to 171 for other ethnic groups.

### Discussion

Other studies substantiate some of the problems identified in Arizona Mexican-Americans. A collaborative bi-national survey of the nutritional status of 1,960 pre-school children in Douglas, Arizona and Agua Prieta, Sonora was carried out by Boyer.\* The low-income population in Douglas is 88 per cent Mexican-American. The study population was selected from a stratified random sample of families. Sixteen per cent of the low income children in Douglas were found to have a low hemoglobin level. Forty-nine per cent of the low income population and 34 per cent of the high socioeconomic groups were found to have serum cholesterol levels above 180 mg per cent; the mean serum cholesterol were 178 mg per cent in the low-income group and 173 mg per cent in the high.

A study of 170 pre-school Mexican-American children in San Ysidro, California<sup>7</sup> found one-third of the children with short stature. Another study on the lower Rio Grande Valley of Texas<sup>8</sup> also showed a high percentage of children below the third percentile height-for-age.

Both of these latter studies also identified underweight as a problem, while we found that overweight rather than underweight was a problem. The fact that one of the earlier studies was based on a border population and the other on a migrant population may explain this difference. Additionally, our group represents those individuals who have access to recently instituted nutritional programs, and may indicate that such programs have been beneficial to the nutritional status of Mexican-Americans.

\*Boyer, Kenneth M., et al: A Bi-national Nutritional Survey on the U.S.-Mexico Border. 1973. Unpublished.

The high serum cholesterol levels came as a surprise when first discovered in the Douglas, Arizona study. A level of 50 per cent of the population with elevated serum cholesterol may seem to be an artifact of data analysis. But considering that one-half of our nation's population dies from coronary heart disease, and that the prevalence of coronary disease is greatest in the lower socioeconomic groups, these figures may have meaning.

Approaching public health nutrition through a health care delivery system enables planners to assess the status of the population first before trying to intervene. Changes in program planning and setting of priorities have occurred because of what the surveillance data showed. With the serum cholesterol data before us, we were encouraged to reevaluate our assumptions about the Mexican-American diet.

The traditional vision of a Mexican-American diet of beans three times a day has not been found to be true, especially since the advent of the food stamp program. Eggs, chorizo, lard, and soda pop and other sweets make significant contributions to the Mexican-American diet. The fact that beans and other vegetable proteins do make a significant contribution to the Mexican-American diet may explain the finding that the Mexican-Americans show a lower level of elevated serum cholesterol than do other ethnic groups.

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