A Nutritional Survey of Forty-five Hundred Children on Relief*

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LESS than a year ago the Children's Bureau of Washington, D.C., called a conference to consider the reported increase in malnutrition due to the depression.

This reported increase was based on studies from New York City, Massachusetts rural regions, and a Philadelphia relief group, notwithstanding the fact that a number of public health workers had called attention to the lack of objective standards of nutrition. Others had emphasized the fact that current morbidity statistics did not point to widespread emergency and the writer in a letter dated September 27, 1933, addressed to a member of the Child Health Recovery Committee wrote:

> In conclusion, I might say that it is the opinion of all the workers in the Department that the nutrition of San Francisco children has not materially suffered, and I even could go so far as to say that never before have the families on relief been under such competent medical supervision. Malnutrition may exist in the isolated case of a child whose family is too proud to ask for relief, or in that group of transients whose movements are difficult to check and who are not under adequate supervision, and who are part of the vexatious nonresident problem.

On March 1, 1934, the Emergency Relief Committee of San Francisco changed its policy in administering relief. Prior to that date relief was on a commissary basis, that is, boxes of food were distributed to families, fresh milk was delivered, and in addition a weekly stipend was allowed for the purchase of fresh meat. Beginning the first of March this system was changed to a cash relief basis for a trial period of 6 months. Families on relief received a weekly check with which they were to purchase their own food supply. It was felt by the committee that a survey of the nutritional status of the children who had been on this commissary system for the periods varying from 6 months to 2 years would show whether or not it had resulted in maintaining the nutrition of the recipients of relief. Upon their request the Department of Public Health undertook a systematic measurement and examination of the children of all families on relief.

Until recently standards of nutrition have been extremely unsatisfactory. Estimates of deviation from normal based on a specific weight for age and height are notoriously inaccurate. The A.C.H. Index, recently developed by Franzen & Palmer,[1] gives a satisfactory standard of nutritional status. This index is based on 3 measurements, arm

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girth (A), chest depth (C), and hip width (H). These measurements subjected to two additions, a subtraction and reference to a table, serve to identify children with a marked discrepancy between the amount of soft tissue (muscle and fat) and the amount of bony tissue (skeletal build). Previously to the publication of this work, Pryor & Stolz [2] had submitted a somewhat similar plan to estimate normal weight, using a length-width index based on the height of the child and the width of the iliac crests. This length-width index of body build is used not only to designate types of build but also as a basis for weight prediction, a feature not present in the A.C.H. Index. The bi-iliac diameter divided by the height times 100 gives the length-width index and is a measure of the relative width of the body. The bi-iliac diameter can be measured more accurately than chest width or shoulder width because it is not affected by respiratory movements or changes in posture. This greater accuracy of the bi-iliac diameter can be demonstrated when two observers measure the same children.

Various complicated indices of body build have been advocated, each involving several body measurements of girths and diameters. A comparison of these measurements with the single bi-iliac diameter, each in percentage of height, shows the same classification of body build for each system.

The bi-iliac method was the method of choice because it was more constant, more accurately and more easily measured, and yielded the same results. An added feature was that a control group of California children was available by this system. This control group included 2,000 public school children in San Francisco, Oakland, and San Mateo, 700 clinic patients at University of California Hospital, 300 at Children's Hospital, 300 private school boys, and 60 children in a special survey in Berkeley. The method of procedure was as follows:

Four regional centers were established, one in the main building of the Health Department and two in branch offices in the Mission and Alemany districts, the fourth center was in the North Beach section, the space being donated by the Telegraph Hill Neighborhood Association. Physicians to conduct the survey were furnished by the Emergency Relief Committee. Nurses and clerical force were obtained through the C.W.S.

The Emergency Relief Committee then set about getting the children to appear for examination, which was done through the Relief Visitors who were

We are undertaking a Nutritional Survey or a Health Study of children. Will you send

(Names of Children) .....

to ..... Health Center at

(Address) .....

at ..... on ....
(Time) (Day) (Date)

Carfare will be supplied if necessary. Arrangements have been made with the School Department to excuse the children for those hours.

(Address) .... (Visitor)

FIGURE I

We find that you have not taken advantage of the opportunity afforded by the Board of Health to learn the physical condition of your children. If you were unable to send the children before, have them report to

..... Health Center

at (Address) .....

at ..... on ....
(Time) (Day) (Date)

The School Dept. will excuse the children for those hours. We hope you will coöperate in the interest of your children's health.

District No. .... (Visitor)

FIGURE II

made responsible for referring all children under their supervision to the Nutrition Centers. Postcards (Figure I) were mailed to parents inviting them to bring their children to the Nutrition Center for a physical examination and check-up and giving them definite appointments for the examination. Appointments were made for 50 children for each morning and afternoon session at all of the four centers. Each day names of those children reporting for examination were sent to the Relief Committee. This enabled the Relief

Name				Place and Date of Birth	Sex .....
Address				School	Grade .....
Date				Nationality of Father	
Age				Nationality of Mother	
Bi-iliac Diameter				Illnesses	
Height					
Weight					
Normal Weight					
Variation				Summary	
Muscle Tone					
Posture					
Physical Defects					
Physician					

FIGURE III

TABLE I

SAN FRANCISCO DEPARTMENT OF PUBLIC HEALTH

NUTRITIONAL SURVEY PROJECT—1934

PRESCHOOL GROUP

(Total number of children examined—870)

	Defect	*Alemany*	*Central*	*Mission*	*Telegraph Hill*	*Total*
Condition	Extreme malnutrition	0	0	4	6	10
Skin	Communicable:					
	Impetigo	0	3	3	0	6
	Pediculosis	1	0	1	7	9
	Scabies	0	3	2	0	5
	Ringworm—scalp	0	1	1	0	2
	Ringworm—skin	0	1	0	0	1
	Non-communicable:					
	Not classified	1	4	0	1	6
	Eczema	1	0	7	8	16
	Urticaria	1	0	0	2	3
Orthopedic	Pronated feet	0	0	1	2	3
	Poliomyelitis (post-paralysis)	0	1	0	0	1
	Rachitic condition	0	1	6	1	8
Eye	Defective vision	0	2	1	3	6
	Corrected vision	0	4	1	0	5
	Strabismus	0	0	0	1	1
	Conjunctivitis	0	0	2	0	2
Ear	Defective hearing	0	0	0	0	0
	Chronic otitis media	0	0	0	0	0
Heart	Functional murmur	3	0	3	18	24
	Organic murmur	0	0	2	0	2
	Disturbance of rate	0	0	0	0	0
Lungs	Asthma	0	3	1	4	8
	Bronchitis	0	8	2	4	14
	Tuberculosis suspect	0	2	1	1	4
Teeth	Carious	11	20	45	11	87
	Prophylaxis (alone)	0	0	0	0	0
Mouth, Nose and Throat	Mouth breather	0	2	1	0	3
	Tonsils simple	22	11	66	26	125
	Tonsils infected	8	36	11	28	83
	Glands (cer.)	4	2	9	2	17
Nervous System	Defective mentality	2	0	0	0	2
	Defective speech	0	1	0	1	2
	Chorea	0	0	0	0	0
	Functional nervousness	0	0	0	0	0
Endocrine and Development	Thyroid	0	0	0	0	0
	Pituitary	0	1	0	0	1
	Hydrocephalic	0	0	0	1	1
Miscellaneous	Hernia (umbilical)	2	1	1	2	6
	Hare lip	0	0	0	1	1

Visitors to determine which children did not report and a second post-card (Figure II) was sent to them urging attendance. The response was excellent, over 4,500 children reporting for examination in 7 weeks. The interest and coöperation of the public schools was secured, and a notice was printed in the School *Superintendent's Bulletin* requesting that principals excuse these

children from school upon presentation of their card from the Relief Committee.

After registration, the child was undressed and his weight and height were recorded on the physical examination card (Figure III). He was then presented to the physician who measured the bi-iliac diameter and proceeded to make a careful physical examination including an estimate of the posture and muscle tone expressed as "Good," "Fair," or "Poor." The normal weight and variation from the normal were not calculated at time of the examination. All physical defects found were recorded, and when necessary full notations were made on the reverse side of the child's card describing significant findings. The parent was given a slip of paper (Table IV) on which was indicated the need for medical attention, and was directed to report to the Relief Visitor on whom the responsibility for arranging for such attention had been placed. The Relief Visitor had also been given a duplicate of the form for parents and so was in a position to check on whether or not the physician's directions were being followed. Although the primary objective of the survey was to secure accurate data on the nutritional status of the San Francisco children on relief, the opportunity to do an intensive health promotion project was in this way not lost sight of.

For the purpose of tabulating results the children were divided into two age groups, the preschool group under 6 years and the school group, 6 to 16 years. The defects found among the preschool group were noticeably few. Of 840 children, only 10 were found with extreme malnutrition, estimated clinically. Eight apparently were found in the estimation of nutrition by the measurement method (Table III), corroborating the subjective estimate made by the physician at the time of examination. Without exception these children had never attended a Child Welfare Conference and their feeding and hygienic regimen had at no time been under the direction of a physician. The remainder of the preschool group was remarkably free from defects. Among the school group the outstanding defects paralleled those found in routine school examinations, teeth and tonsils leading. The presence or absence of defects appeared to have no relation to nutritional status. An interesting sidelight on the examinations was that when severe physical defects of heart or lung were reported, check with the school health records invariably revealed identical notations and, in most cases, the child was found to be already under regular medical supervision. A tabulated list of the defects found by districts for each age group is given in Tables I and II.

After the examinations were completed the normal weights were estimated according to the tables furnished by Pryor & Stolz [2] and the variation from the normal calculated by taking

San Francisco Emergency Relief Committee
51 Gough Street,
San Francisco, California

Date .....

Family Name .....

Man's First Name .....

Woman's First Name .....

Address .....

Baby's Name .....

..... M.D.

.....
(Clinic or Health Center)

File No. ..... Visitor .....

FIGURE IV

TABLE II—SAN FRANCISCO DEPARTMENT OF PUBLIC HEALTH NUTRITIONAL SURVEY PROJECT—1934—AGE GROUP 6–16 YEARS

(Total number of children examined—3,645)

	Defects	*Alemany*	*Central*	*Mission*	*Telegraph Hill*	*Total*
Condition	Muscle tone II	307	739	291	380	1,717
	Muscle tone III	35	22	45	127	229
Skin	Communicable:					
	Impetigo	0	6	4	8	18
	Pediculosis	11	0	17	38	66
	Scabies	1	5	10	6	22
	Ringworm—scalp	0	0	2	0	2
	Ringworm—skin	1	1	2	0	4
	Non-communicable:					
	Acne	1	1	6	5	13
	Eczema	3	1	6	5	15
	Vitiligo	0	0	2	0	2
	Allergic	1	0	2	1	4
	Not classified	10	0	0	0	10
Orthopedic	Posture II	340	942	472	447	2,201
	Posture III	87	49	32	124	292
	Scoliosis	3	0	5	0	8
	Pronated Feet	0	0	2	2	4
	Rachitic conditions	8	8	15	0	31
	Poliomyelitis	0	1	2	0	3
Eye	Defective vision	6	18	0	9	33
	Vision corrected	0	1	5	8	14
	Strabismus	0	2	5	7	14
	Conjunctivitis	0	1	0	2	3
	Marginal blepharitis	1	6	3	2	12
Ear	Defective hearing	0	2	1	3	6
	Otitis media chronic)	0	2	0	0	2
Heart	Functional murmur	13	12	6	46	77
	Organic murmur	5	3	3	2	13
	Disturbance of rate	1	1	3	0	5
	Disturbance of rhythm	0	0	1	0	1
Lungs	Asthma	0	2	3	5	10
	Bronchitis	3	7	4	8	22
	Tuberculosis suspect	1	5	3	10	19
Teeth	Carious	282	445	557	220	1,504
	Prophylaxis (alone)	13	2	65	14	94
Mouth, Nose and Throat	Mouth breather	3	15	14	5	37
	Enlarged tonsils	109	100	259	173	641
	Tonsils diseased	23	19	10	31	83
	Cervical adenitis	10	4	51	14	79
	Sinusitis	2	1	6	4	13
Nervous System	Defective mentality	0	3	3	4	10
	Defective speech	0	0	1	3	4
	Chorea	0	1	0	0	1
	Nervousness (functional)	1	3	1	2	7
	Epilepsy	0	0	0	1	1
Endocrine and Development	**Thyroid enlargement**	3	0	2	8	13
	Pituitary	0	0	1	1	2
	Obesity (not classified)	3	0	1	0	4
	Microcephalic	0	0	0	1	1
Miscellaneous	Cleft palate and hare lip	2	1	1	0	4
	Cleft palate	0	0	1	0	1

TABLE III

SAN FRANCISCO DEPARTMENT OF PUBLIC HEALTH NUTRITIONAL SURVEY PROJECT—1934

PRESCHOOL GROUP

Percentage Group	*Total*	*Percentage of Total*
Overweights		
17–20%	4	0.45
13–17%	13	1.49
9–13%	38	4.36
5– 9%	98	11.26
1– 5%	238	27.35
Normal	116	13.33
Underweights		
1– 5%	217	24.94
5– 9%	105	12.06
9–13%	33	3.79
13–17%	7	0.80
17–20%	1	0.11
Total	870	

the difference between actual and normal weight. The number and percentage of the total group and the percentage of their variation from the normal is shown in Tables III and IV. This group compared with a control group is graphically shown in charts (Figures V and VI).

DISCUSSION

The interpretation of these figures and the conclusions to be drawn from them are at present a subject for discussion.

In the school group (Figure VI) it is possible to say that 11 per cent are 10 per cent or more underweight, and in the preschool group (Figure V) less than 5 per cent are in this classification. Comparing this with the control group the figures are 13 per cent and 8 per cent respectively. Certainly it would seem logical to draw the conclusion that underweight for body build was not more, or even *as* prevalent among the relief group as among the control group.

Referring to the graphic chart of the school group (Figure VI) the widest variation occurs with the children 5 per cent underweight, a variation of 7 per cent rapidly converging to the point 5 per cent overweight. From that point on to the extreme overweight the relief group is convincingly in the majority.

With even a conservative interpretation of these findings it must be admitted that the nutritional status of children who had been on commissary relief compare very favorably with a normal or even more privileged group in the community.

The homographic aspect of the preschool group chart needs but little comment. However, it would seem to refute, for San Francisco at least, the frequently repeated charge that the preschool age was the neglected age, at least as far as nutrition was concerned. When we consider, however, that the

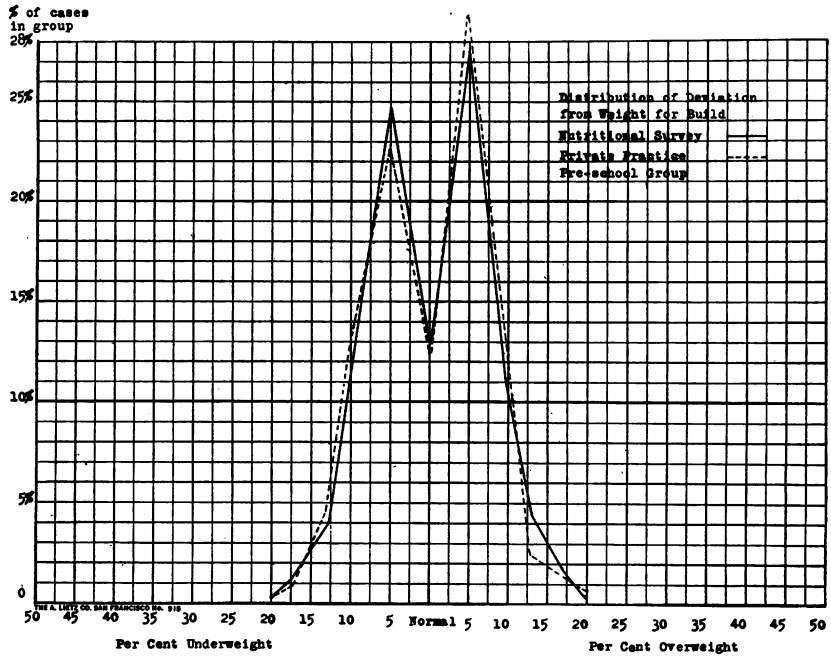
TABLE IV

SAN FRANCISCO DEPARTMENT OF PUBLIC HEALTH NUTRITIONAL SURVEY PROJECT—1934

AGE GROUP 6–16 YEARS

Percentage Group	*Total*	*Percentage of Total*
Overweights		
51–75%	13	0.35
46–50%	5	0.13
41–45%	11	0.30
36–40%	18	0.49
31–35%	46	1.26
26–30%	72	1.97
21–25%	159	4.36
16–20%	264	7.24
11–15%	416	11.41
6–10%	542	14.86
0– 5%	451	12.37
Normal	440	12.07
Underweights		
0– 5%	382	10.48
6–10%	422	11.57
11–15%	276	7.57
16–20%	93	2.55
21–25%	21	0.57
25–30%	11	0.30
30–50%	3	0.08
Total	3,645	

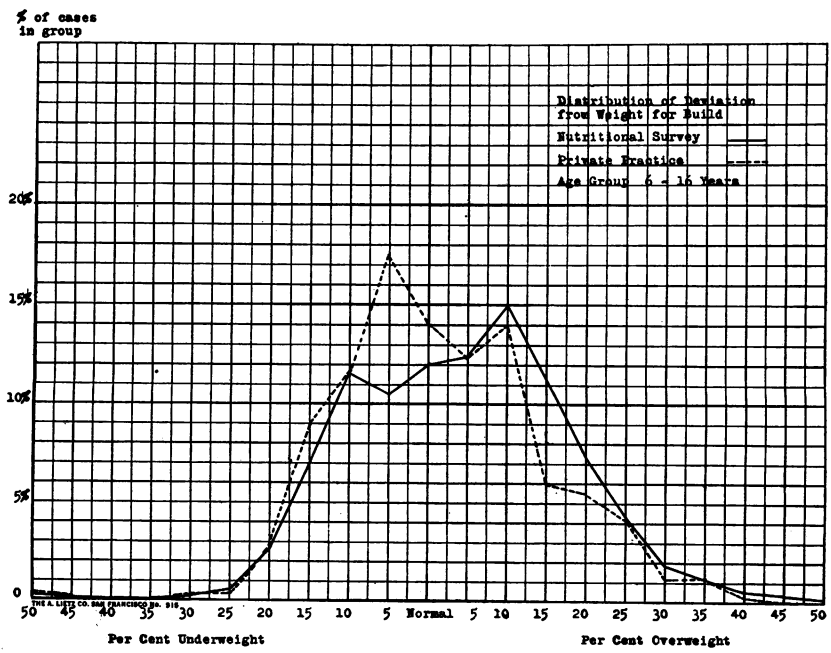
FIGURE V



vast majority of these children were registered in well baby conferences throughout the city the result is not surprising.

Six months ago the families of these children went on cash relief. It would seem highly desirable to repeat this survey, beginning if possible soon after

FIGURE VI



the first of September. The comparison of the results of the two examinations would be extremely valuable although the time is perhaps too short to judge adequately the advantages or disadvantages of the cash system. In addition a second examination would afford an opportunity for the comparison of weights in individual children which would undoubtedly be of considerable value in estimating the trend of growth and nutrition of the child.

Other considerations include the follow-up work for correction of remedial defects and the selection of special children whose wide variation from the normal height-weight ratio would single them out for special study.

If for purposes of discussion the length-width index as described is to some degree a measure of nutritional status, it would seem advisable to conduct similar surveys in various parts of the country.

The objection relative to expense raised editorially in the *J.A.M.A.*[3] a year ago is no longer a valid one. With the F.E.R.A. in operation public health officials are continuously besieged to provide work projects for the professional groups. What more profitable way to employ our needy professional brothers and sisters than by securing a cross-section of the physical condition of the children throughout the country? The use of a standard system of measuring is of course advisable for purposes of comparison. The methods used at present to arrive at a diagnosis of malnutrition are almost as numerous as the workers.

Until a more satisfactory standard is developed the simple procedure described is recommended as the one of choice. Its advantage over other methods, in addition to its simplicity, is that it can be used as a basis for weight prediction.

While it is admitted that malnutrition has never been confined to the poor, a survey of relief groups may do much to counteract some of the hysteria and even panic created by well meaning but uninformed self-styled nutritionists by their dismal picture of what was happening to our child population in the depression.

Finally it must always be borne in mind that malnutrition is a symptom and not a clinical entity. Without a well planned follow-up the mere collection of statistics may indeed be called an idle gesture.

SUMMARY

1. A change in the plan of administering relief in San Francisco made it advisable to estimate the nutritional status of the children who had been receiving aid.

2. A length-width index of nutrition was chosen as the method of selection.

3. The technic of conducting the survey is described.

4. A statistical analysis of the findings is presented.

5. Recommendations for a continuation of the study are made.

CONCLUSION

1. The relief program prior to March 1, 1934, was adequate as far as the nutritional status of the children measured by a length-width index, is concerned.

2. The aspect of health education by the physical examination for the discovery of defects was not neglected.

3. There is need for a second and third examination at intervals of 6 months.

4. Similar undertakings would be advisable throughout the country using F.E.R.A. funds.

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3. Editorial, *J.A.M.A.*, 101, 17:1318 (Oct. 21), 1933.