A in children with diarrhoea, Dr. Sommer publishes a table which was omitted at the Lancet's suggestion from the paper reviewed above. This shows that children with corneal xerophthalmia and accompanying diarrhoea responded as well to 2 successive daily oral doses of 200,000 IU oil soluble vitamin A as to one intramuscular dose of 100,000 IU water miscible vitamin A followed by an oral dose. Diarrhoea was defined as 4 or more loose stools per day on the day of admission, when the initial oral or intramuscular dose was given. Most of the children were judged to be clinically dehydrated.

Since children with diarrhoea are at increased risk of xerophthalmia any method of increasing their vitamin A intake should be investigated. Just because absorption of orally administered vitamin A is reduced does not necessarily mean it is "unwise" to add vitamin A to oral rehydration fluid. If enough can be provided, sufficient amounts may be absorbed to prevent severe xerophthalmia. There is nothing new in the concept that reduced absorption may be overcome by larger doses, as commonly observed in other malabsorptive states. A. Pirie.

History of Nightblindness: a simple tool for xerophthalmia screening.
Alfred Sommer, Gusti Hussaini, Muhilal, Ignatius Tarwotjo, Djoko Susanto, and J. Sulianti Saroso, Am. J. Clin. Nutr. 33: 887-891, 1980. Nutritional Blindness Prevention Project, Bandung, Indonesia.

"These results suggest a properly elicited history of nightblindness can be almost as specific and far more sensitive an index of vitamin A deficiency and early xerophthalmia than the presence of Bitot's spots (X1B), and that vitamin A deficiency is a clustered, neighbourhood phenomenon rather than an isolated, sporadic occurrence."

This is the final sentence of the authors Summary and it is clear that both statements are of immense *practical* importence. For a simple field test for vitamin A deficiency is urgently needed and, if interventions can be targeted to those areas where active cases are found, that will concentrate resources and so make control of xerophthalmia more likely.

In a two year longitudinal prospective study of pre-school children in 6 villages, divided into neighbourhoods of 5-25 families, 5925/6598 such children were examined. Of these 325 (5.5%) had one or more clinical signs of xerophthalmia. A history of nightblindness, with or without conjunctival signs was found in 273 (84%) of these abnormals whereas Bitot spot was found in only 132 (41%). It is an area, where despite a fertile soil and abundance of cheap carotene-rich green leafy vegetables xerophthalmia remains a serious problem. Presence or absence of a history of nightblindness was determined for every child by asking the accompanying guardian or relative whether the child had "buta ayam" or "kotokeun" (chicken blindness in Indonesian and Sundanese respectively), local terms for nightblindness. If the guardian was unsure of its meaning (a rare occurrence) he or she was asked whether the child had particular difficulty locating food or toys after dusk or in a poorly lighted room. A history of nightblindness was only accepted where the response was definite and positive; the respondent had already noticed a difference between the child's behaviour and that of his normal peers; and where this represented a recognised change. Of 228 children with a history of nightblindness, 209 were objectively tested in dim lights. Only 7 were test negative.

During the first clinical round of examinations, blood samples were obtained from every child with evidence of active xerophthalmia, from normal age, sex, neighbourhood matched controls and from a 5% random sub-sample of all the children. The vitamin A in serum was as low (13.9 μg/dl serum) in children with nightblindness alone as in those with Bitot spot with our without nightblindness. All children showing signs of xerophthalmia had statistically significantly less vitamin A in their serum than clinically normal children living in their own neighbourhood, matched for age and sex. Furthermore, these "neighbourhood normals" had significantly less vitamin A in their serum than did clinically normal children living in neighbourhoods free of xerophthalmia, indicating that otherwise "normal" children living in the immediate vicinity of clinically apparent cases are more apt to be vitamin A deficient, hence at higher risk of xerophthalmia, than those living further away.

Considering the study population as a whole, the prevalence (rate per 100) of nightblindness was 4.6% and of Bitot spots 2.2%. The prevalence of "deficient" vitamin A levels (less than 10 μg/dl serum) was 1.6 times greater than that of clinical xerophthalmia and an "inadequate" level (less than 20 μg/dl serum) was 8.4 times as prevalent. Thus serum levels seem to be an even more sensitive indicator of poor vitamin A nutrition than any clinical sign but they are more likely to vary from day to day according to other factors than are clinical signs. Estimation of serum vitamin A is not a practical screening procedure.

The present study suggests that a properly elicited history of nightblindness can be as valid evidence of vitamin A deficienty as the presence of Bitot spot. The ease with which nightblindness can be investigated, requiring little training and no clinical experience, and the large proportion of xerophthalmia cases it identifies facilitates its use in survey work and screening programmes. Clustering of vitamin A deficient children in neighbourhoods might be put to good use by treating all children in the neighbourhood of a clinical case instead of limiting therapeutic and preventive measures to the child with demonstrable disease.

The authors end on a note of caution. What is valid in Java, may not be valid in other countries and other cultures especially where local terms for nightblindness do not exist or are not in common usage. A. Pirie.

BOOKS

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RETINOL SERUM LEVELS IN RELATION TO BODY WEIGHT AND MORBIDITY IN GUATEMALAN PRE-SCHOOL RURAL CHILDREN

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During the field study carried out from 1975 through 1977, to evaluate the impact of fortification

of sugar with vitamin A in Guatemala, a cumulative number of 3169 serum retinol measurements were made among the samples of preschool age children. The body weight and height of these low socioeconomic rural children was measured simultaneously. One purpose of collecting these data was to obtain an indication of the general status of malnutrition of the groups of children, that is, what is generally referred to as protein-energy malnutrition (PEM), but which in effect, may be the consequence of multiple deficiencies including those of some vitamins and minerals. The main objective, however, of having these anthropometric indicators was to determine the relationship between the serum retinol levels of the children and their deficit in body weight. The analytical approach used for this purpose was as follows: Children with serum retinol levels in the "deficient" category (<10 μg/100ml) were selected at random and randomly matched for age and sex with children from each of the following 10 μg-groupings: 10-19; 20-29; 30-39 and 40-49 μg/100 ml. Twenty-five age-sex matched pairs were obtained by the computer for each of the serum retinol level categories and the distribution of the subjects within each sub-group by weight/age and weight/height was found. Part A of Table 1 shows the results in

Table 1 Distribution of Weight Deficit as a Function of Serum Retinol Levels in Preschool Children Matched for Age and Sex

Guatemala, 1975—1977

PART A

Serum retinol (μg/dl)	No.	Adequacy of weight/age (% of standard) <60 No.	<60 %	60—74 No.	60—74 %	75—89 No.	75—89 %	≥90 No.	≥90 %
<10	25	7	28	12	48	4	16	2	8
10—19	25	3	12	7	28	10	40	5	20
20—29	25	4	16	4	16	11	44	6	24
30—39	25	2	8	9	36	12	48	2	8
40—49	25	0	0	6	24	16	64	3	12

PART B

Serum retinol (μg/dl)	No.	Adequacy of weight/height (% of standard) <80 n	<80 %	80—89 n	80—89 %	90—99 n	90—99 %	≥100 n	≥100 %
<10	25	6	24	7	28	10	40	2	8
10—19	25	0	0	7	28	12	48	6	24
20—29	25	1	4		16	11	44	9	36
30—39	25	0	0	8	32	13	52	4	16
40—49	25	0	0	6	24	17	68	2	8

relation to weight/age. The Chi^2 test showed that as the serum retinol levels increase, the distribution of the children among the weight/age categories improves significantly ($Chi^2 = 23.34$; $p<0.025$). It was evident that the per cent of children with very large weight/age deficit (<60 per cent of standard), decreases notoriously as the serum retinol levels become higher, the group with less than 10 μg/100 ml showing a distinguishing, higher proportion of cases with this magnitude of weight/age deficit. The analysis of the data in part B of Table 1 showed that when the critical indicator of present malnutrition (weight/height) is applied there is also a significant relation between serum retinol and the distribution of the children among the weight/height categories

[1]Evaluation of sugar fortification with vitamin A at the national level. Pan American Health Organization Scientific Publication No. 384, Washington, D.c., 1979.

($Chi^2 = 28.30$; $p<0.005$). It is again evident in this case that the children with less than 10 μg retinol per 100 ml are remarkably worse off than the rest. These data point to the epidemiologic significance of serum retinol levels less than 10 μg/100 ml as indicators of health and nutrition risk.

The association between general morbidity, especially infections, and decreased serum retinol levels was also investigated. This association has been widely recognized, and the cause-effect relationship was recently documented further by Arroyave and Calcano[2]. In order to investigate this relationship in the present study the approach used was the same as for the anthropometric analysis already described. Children with serum retinol levels in the "deficient" category (<μg/100 ml) were selected at random and were matched for age and sex with children also selected at random from each of the following 10 ug-groupings: 10-19; 20-29; 30-39, and 40-49 μg/100 ml. Twenty-five age-sex matched pairs were obtained by the computer for each of the serum level categories.

The morbidity found in these children upon clinical examination is shown in Table 2. It is evident that the

TABLE 2 MORBIDITY LOADS IN GROUPS OF CHILDREN MATCHED BY AGE AND SEX AND GROUPED IN CATEGORIES OF SERUM RETINOL
Guatemala, 1975—1977

Retinol (μg/100 ml)	No.	Fever	Respiratory disease	Gastroenteritis	Conjunctivitis	Conjunctival xerosis	Changes associated with PEM: Hair	Lips	Oedema	Morbidity load[1]	Children with two or more morbidity signs or disease entities
<10	25	4	12	8	3	1	2	2	2	34/25	11/25
10—19	25	1	5	5	4	—	3	—	—	18/25	4/25
20—29	25	—	5	5	5	—	2	1		18/25	4/25
30—39	25	2	9	2	3	—	—	1	—	17/25	
40—49	25	1	5	4	2	—		1		13/25	4/25

[1] Ratio between the total number of signs-symptoms and the total number of children.

children with less than 10 μg of retinol per 100 ml have a significantly higher morbidity load, clearly distinguishing them from the others. Fever, respiratory disease, gastroenteritis, and edema are mostly responsible for the difference. The last colum of Table 2 gives the proportion of chilren who showed two or more morbidity signs or disease entities. This indicator also separates the "deficient" serum retinol category as the most affected as evidenced by the significant difference found ($Chi^2 = 9.35$; $p<0.025$). The data have additional intriguing epidemiologic appeal, since they indicate an important potential of *serum retinol levels below 10 μg/100 ml* as a public health indicator, at least in preschool children.

CORRESPONDENCE

Dr. M. P. Upadhyay, Assoc. Professor of Opthalmology, Institute of Medicine, Chhetrapati, Kathmandu, Nepal, and Project Director of the Nepal Xerophthalmia Survey Project, writes that this project has now started. Two field teams, trained for 3 months, have left for survey. In all, about 6000 children in 12 districts will be examined in a house to house survey. Reports from 2 districts in the mid-hills and in the terrai show prevalence rate of 2—4% Bitot spot. Dietary history is taken as well as a clinical

[2]Arroyave, G., and M. Calcano. Descenso de los niveles sericos de retinol y RBP durante las infecciones. Arch. Latinoamer. Nutr. 29: 233-2-60, 1979.