

From hearing reports by the Select Committee on Hunger:

EDITOR'S NOTE: When Michael Latham permitted *HUNGER NOTES* to reprint his 1984 article, agreeing with us about its continuing relevance, he noted two topics with increasing prominence in the nutrition field which he would want to add to the earlier discussion. One is the effect of the economic recession and structural adjustment policies of the 1980's on hunger, nutritional status, health and social services in poor developing countries. The second topic is the relationship between vitamin A deficiencies, morbidity and mortality. While Latham disputes the claim of Alfred Sommer and others that dosing young children with vitamin A has reduced mortality by as much as 40%, he agrees to the importance of research on this question. On the following pages, both of these topics are illuminated by testimony excerpted from three hearings on international nutrition held by the U.S. House of Representatives Select Committee on Hunger, May 16, 1985, April 30, 1986, and May 14, 1987. Alfred Sommer, M.D., is director of the Dana Center for Preventive Ophthalmology and the Wilmer Eye Institute, and professor at the Johns Hopkins University School of Public Health. Richard Jolly is deputy executive director of the United Nations Children's Fund (Unicef). Further references on these and other topics in Latham's article are found on pages 22-23.

DOES VITAMIN A SAVE LIVES AS WELL AS EYES?

Excerpts from testimony by Alfred Sommer

The work that we have carried out over the years, very much under A.I.D. funding, was to help demonstrate...the geographic distribution of vitamin A deficiency, the severity of the problem, and to begin to develop ways to work with governments in preventing Vitamin A deficiency and treating the presence of the disease. It was originally from the point of view of the ocular manifestations. Those are the most dramatic, and those are the ones that people have been looking at over the last 50 years. One of the things we are able to demonstrate is that...5 to 10 million a year develop ocular manifestations of vitamin A deficiency, and one quarter of these children go blind every year from severe xerophthalmia, or vitamin A deficiency.

The ocular manifestations begin in a very mild sort of way with the onset of night blindness. ...When he has a normal amount of vitamin A... [a child] walking around the village at night can see his food, find his toys...simply by candle light or moonlight. At the onset of early vitamin A deficiency...the child often will sit huddled in a corner of a room simply because he can't see his food that is sitting in front of him or see his toys around the hut.

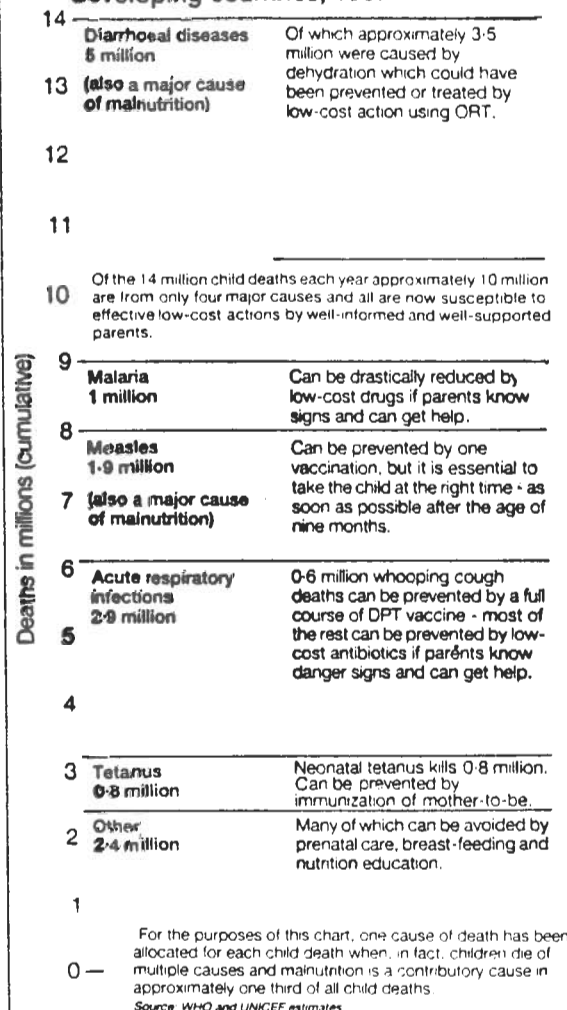
With more severe deficiency...the outside of the eye starts to turn into a skinlike structure ...and the ...front cornea which is clear and we see through, begins to become very granular and skinlike as well.

With more severe deficiency, you begin to get ulceration of the cornea, [then] melting of the cornea;...[and] with really severe deficiency, the entire cornea melts away. That is what happens to 250,000 children every year and they are irrevocably blind.

[Now] what was surprising is that when we looked at some of our studies that had been set up to study ocular effects..., we found, quite unexpectedly that children with mild xerophthalmia, otherwise normally nourished, without other illnesses beforehand, were having a marked increase in their death rate compared to children living next door...depending upon the age group, from 4 to 16 times the rate of the children...next door.

The reasons appears to be that the children with mild vitamin A deficiency have a three to four-fold increased risk of respiratory disease and diarrhea, which of course are the major causes of childhood deaths around the world.

Fig. 1 Annual under-five deaths, developing countries, 1987*



We then planned a major research initiative [to] answer the question of whether or not vitamin A supplementation would significantly reduce the mortality and morbidity in children. The study [lasting 3 years with A.I.D. funding] was carried out in Aceh Province in northern Sumatra in Indonesia. There were 30,000 Indonesian children enrolled in this study living in 450 villages. The Indonesian government was committed to expanding vitamin A distribution to this area because of [blindness], but they could not expand it to all the villages over a short period of time. So working with Indonesian colleagues, we were given the opportunity to randomize the villages which would be getting the program first versus those that would be getting [it] phased in subsequently.

Half of the villages were randomized to receive a vitamin A capsule distribution program, which meant that in theory every child...got one large dose, 200,000 units, every 6 months. The children were all examined before the start of the program and were examined one year later.... The bottom line of that study, which was completed [in late 1984],...is that the mortality rate in the control villages was essentially 50% higher than in the villages that had the dosing program....Vitamin A distribution reduced childhood mortality in the 1-5 year age group...by a third.

The mechanism probably has to do with that abnormal surface...on the outside of the eye where it starts to turn like skin, because bacteria love to grow on that and through that abnormal skin they can get through into the systemic circulation. Now, this shouldn't really be all that surprising if we look back at the...very early studies that were done on vitamin A deficiency. Those done in the 1920's and 1930's, first on animals and then on autopsied children in Boston...demonstrated that the earliest changes of vitamin A deficiency...where the skinlike changes in the respiratory tract, in the urinary tract and in the intestinal tract, and that these changes occurred...before they actually occurred to the eye. But you didn't see them clinically because they were hidden, there you could see what was happening to the eye...

Eighty percent of the blindness in African children is due to measles. Now, the question is why does measles cause blindness in Africa? It doesn't cause blindness in the United States; at least, not anymore. Some research we have carried out suggests that a very large portion of this blindness is because the children suffer acute vitamin A deficiency. They [may] have a borderline vitamin A status to start with. They get measles, which severely interferes with vitamin A metabolism. The vitamin A status goes through the floor, and they go blind.

Acting upon that theory, a mission hospital working with us in Tanzania began to administer high doses of vitamin A to alternate children who were coming in with measles, although all children were treated in the manner in which they were usually treated. The preliminary results from that study are that the mortality rate among measles children given vitamin A was only half

the mortality rate amongst the measles children not given vitamin A...

[NOTE: The foregoing is from oral testimony given in 1985. Testifying again in 1987, Dr. Sommer added the following new information.]

Not all children in the program villages [in northern Sumatra] actually were available to receive their vitamin A. When adjusted for those who did not get it, the potential biologic impact was an astounding 75% reduction in mortality. A greater than 35% reduction in mortality was observed in a recently completed vitamin A fortification program in Western Java...In both [North Sumatra and Western Java], vitamin A supplemented children grew better than non-supplemented children. The fortification study also confirmed that vitamin A deficiency contributes to anemia. After 1 year of fortification, hemoglobin values of children in the program rose by almost 10 percent. The mechanism by which vitamin A exerts these beneficial effects is as yet uncertain. But in our studies in Indonesia and ones that have followed in India, mildly vitamin A deficient children were at an increased risk of developing respiratory disease...[and] In Indonesia vitamin A deficiency was also associated with an increased risk of...diarrhea.

The World Health Organization...has formulated a 10-year program [to give greater attention to the problem of vitamin A deficiency]. UNICEF and the World Health Organization have just prepared a joint position paper recommending high dose vitamin A supplementation of all children with measles in communities in which vitamin A deficiency is recognized as a problem and even where it is not, wherever the case fatality rates from measles are 1% or higher, [common in Africa].

Spurred by...[the] implications for a relatively inexpensive, cost-effective approach to improving children's health, survival and vision, dozens of countries worldwide are actively considering a wide variety of vitamin A initiatives.

EDITOR'S NOTE: Vitamin A is one of the few vitamins known to have toxic effects on health when present in excessive amounts in the body. It is also one of the few vitamins which can be stored in the liver over time, so that the accumulation of excessive quantities is possible. For this and other reasons, further research is underway or being planned to test the results of Sommer's studies and to determine safe levels of vitamin A dosage for children of different ages, sizes, and other conditions. Much of this research is being funded by the U.S. Agency for International Development. For further information, contact: Frances Davidson, manager of vitamin A projects in the A.I.D. Office of Nutrition (202-235-9092); or Pamela Johnson, Office of Health, Bureau of Science and Technology, (202-235-8926); both in the U.S. Agency for International Development, Washington, D.C. 20523.

By early 1988, one large mortality research project was being conducted in the Sudan by Harvard University. Two similar projects planned for the Philippines and Bangladesh were "on hold" because of political unrest and civil disorder. Several smaller scale morbidity projects in various countries were still in the planning state.