

## **A bridge too near By Alfred Sommer**

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For almost a decade, medical science ignored or rejected the evidence that vitamin A could reduce child deaths by between a quarter and a third in many countries of the developing world.

Today, the scepticism of the 1980s has been swept away by an avalanche of data. And as the tables on the following pages show, most nations are now moving to make this most cost-effective of all health interventions available to their children.

If this effort succeeds, then we can expect to bring about a fall in child deaths of somewhere between 1 million and 3 million per annum.

Discovered in 1913, vitamin A has taken almost a century to come into its own. It has long been known that the lack of this particular vitamin could cause stunting, infection, and blindness in animals. But it was 1974 before the first report was published (by WHO) on vitamin A deficiency as a major cause of blindness among the children of the developing world.

### **Missing the point**

In that same year, a research project was launched in Indonesia to find out more about vitamin A deficiency, and particularly about what levels of deficiency were associated with xerophthalmia (the inflammation and drying of the eye that can result in permanent blindness). Over a period of a year and a half, 4,000 children were examined at three-month intervals.

By 1981 much useful information had been gleaned. But in looking only for what we expected to see, we had missed what the data itself had revealed. Unlooked-for and unseen amid the mass of figures was a much more dramatic message.

One December evening almost a year later, while a particular set of figures was being cross-tabulated, it became apparent that many xerophthalmic children were missing from later cross-tabulations. Running the computer analysis in the reverse direction revealed what the data had been waiting to tell us all along: children with even mild xerophthalmia were dying at a far greater rate.

Any suggestion that the higher death rate was caused by malnutrition, of which the lack of vitamin A was merely a symptom, was quickly dispelled. Malnutrition clearly increases the risk of child death, but so does vitamin A deficiency - even among adequately nourished children. In fact the Indonesian study showed that malnourished children with adequate vitamin A were less likely to die than well-nourished children who were deficient in vitamin A.

Preliminary calculations, soon to be revised upwards, showed that if xerophthalmia could be prevented, then the death rate among children aged one to six would fall by approximately 20%. Analysis also showed that the risk of death was directly related to the degree of deficiency.

To test these extraordinary conclusions, a second Indonesian study was launched. This time, vitamin A capsules were given every six months to approximately 20,000 young children in 450 randomly chosen villages. The result was a one-third reduction in death rates, compared with villages where there had been no intervention.

These findings were published in *The Lancet* and other medical journals. The response was the long silence of disbelief.

With its vision fixed on the high-tech and high-cost frontiers of modern medical care, the medical and research establishment found it difficult to accept that something as simple and cheap as a 2-cent capsule of vitamin A could represent such a break-through for human life and health. Perhaps in some quarters, also, there was an innate and ideological dislike of 'magic bullet' solutions to health problems which do not directly address the underlying problems of poverty.

Whatever the reason, a discovery that seemed to promise so much had caused barely a ripple on the surface of medical interest.

It was at this point that a wise colleague pointed out that this was the normal first reaction to any unexpected research finding. The next stage, he advised, was to "bury them in data."

Knowing that measles often leads to vitamin A loss, we had begun to wonder if Africa's high death rates from measles might also be connected with vitamin A deficiency. To test this, children hospitalized with measles in Tanzania were given vitamin A capsules. The measles death rate fell by half. It was at this point that we discovered, to our astonishment, that a similar experiment had been conducted 50 years earlier in a London hospital - with the same results: medicine too has doors it did not enter, paths it did not take.

WHO and UNICEF now acted quickly to make vitamin A supplementation a routine part of measles treatment. More broadly, the elimination of the deficiency became one of the goals adopted by the World Summit for Children held at UNICEF's instigation in the fall of 1990. The progress being made towards that goal is shown in the following tables.

By 1992, the results were in from several large, community-based investigations into vitamin A deficiency. Ghana, India, Indonesia, and Nepal all yielded results in line with the one-third reduction in mortality rates revealed by the original research in Indonesia.

At this point, the medical community accepted our conclusions as unanimously as it had dismissed them a decade earlier. A colleague who had earlier written a leader in *The New England Journal of Medicine* titled 'Too good to be true', now published a paper under the heading 'Too good not to be true'.

With the scientific community in full agreement, ministries of health across the world have now given the green light to vitamin A supplementation. Unfortunately, official recommendations usually stress vitamin A supplementation only where there is evidence of severe deficiency, whereas the evidence suggests that supplementation can significantly reduce mortality even among populations with mild vitamin A deficiency. Further studies are now needed to quantify this effect.

### **Three ways**

Increasing vitamin A intake can be achieved by three main methods - improving diets, fortifying common foods, and distributing vitamin A capsules.

The politically correct method is dietary improvement through the addition of green leafy vegetables or carrots. Of course diets should be improved. But this is a slow and uncertain process, and there are doubts about whether it can provide sufficient vitamin A even where dietary change is indeed achieved. Certainly, more work is needed on the most effective dietary ways of beating vitamin A deficiency.

Some countries, particularly in Central America, have fortified sugar with vitamin A (the problem was solved in the industrialized world by adding vitamin A to common foods such as milk, bread, and margarine). But in the developing world as a whole, food fortification is only beginning to be explored.

In the meantime, at least two children are dying every minute for the lack of the protection that vitamin A can bring.

The 2-cent capsules are therefore an essential weapon for the defence of children. And the outreach systems which have been built or strengthened by the immunization effort of the last decade have now made it possible to deliver that protection to the great majority of children at risk.

There can be no excuse for further delay.

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