USAID's Experience With Vitamin A Programs

Lane Vanderslice

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United States Agency for International Development
Center for Development Information & Evaluation
1331 Pennsylvania Avenue, NW, Suite 1425
Washington, DC 20004

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I. INTRODUCTION

This paper will examine USAID's experience with programs to prevent vitamin A deficiency from 1985 to the present. USAID and its development partners have had considerable experience with vitamin A programs.

The first goal of this paper is to draw on the substantial experience of USAID and its partners by identifying existing program evaluations, and summarizing the wealth of understanding they provide. The paper draws on 64 USAID evaluations of multicountry programs as well as programs in 19 developing countries. Countries with USAID vitamin A programs used in this study include Benin, Burkina Faso, Malawi, Mali, Mauritania, Niger, Sudan, Uganda, Bangladesh, Indonesia, Nepal, the Philippines, Bolivia, Dominican Republic, Ecuador, El Salvador, Guatemala, Haiti, and Honduras.

The second goal is to provide a synthesis of USAID's experience based on these evaluations. The methodology is straightforward. Vitamin A programs are classified by type of intervention and other key topics; program successes and challenges identified in the evaluations are highlighted.

The third goal is to suggest some next steps to undertake in vitamin A programming. These suggestions are based on the evaluations themselves and on the experiences of other vitamin A and child survival programs.

II. THE IMPORTANCE OF MICRONUTRIENTS

Human life depends on vitamins and minerals. Only small amounts are necessary of these micronutrients, but if the proper amounts are not available, poor health or even death result.

Over the centuries, we have come to recognize the important role these micronutrients play. Sailors suffered from the scourge of scurvy for many years until it was discovered that scurvy could be prevented by eating certain fruits or vegetables. Later, vitamin C was identified as the preventative substance in these fruits and vegetables.

Conditions associated with poor vision have been recorded since ancient times. Research in the twentieth century identified vitamin A as the source of these conditions, including blindness, night blindness, and eye ulceration. It has become increasingly clear that a lack of vitamin A affects other organs and increases mortality. Studies beginning with that of A. Sommer (1983) emphasized the important mortality effects of vitamin A deficiency in children, including its role in increasing mortality due to measles and diarrhea.

Micronutrient deficiencies are an important public health problem in nearly all developing countries. According to a World Bank study (1994), more than two billion people worldwide are at risk for these deficiencies, and the health of more than one billion people is adversely affected. Table 1 shows the worldwide scope of the three micronutrient deficiencies with the most serious public health consequences.

Table 1: Population at Risk of and Affected by Micronutrient Malnutrition (Millions)

Region	Iodine Deficiency Disorders		Vitamin A Deficiency		Iron Deficient or Anemic
	At Risk	Affected (Goiter)	At Risk	Affected (Xeroph-thalmia)[1]	
Africa	150	39	18	1.3	206
Americas	55	30	2	0.1	94
South and Southeast Asia	280	100	138	10.0	616
Europe	82	14	NA	NA	27
Eastern Mediterranean	33	12	13	1.0	149
Western Pacific and China	405	30	19	1.4	1,058
Total	1005	225	190	13.8	2,150

NA = Not available

USAID micronutrient funding has been the subject of a congressional earmark or reserve, which in recent years has ranged between $20 and 25 million (Putnam 1997). For FY 1996, $20 million was reserved for micronutrient programs, of which about $6.3 million was allocated to the Global Bureau, $1.8 million given to bilateral programs, and $12 million allocated through a competitive process in which an Agencywide nutrition group made funding decisions. In FY 1996 this $12 million was allocated in the following way: Vitamin A programming received 62 percent of the funding, iron programming 37 percent, and iodine-related activities 2 percent. Comprehensive programs, those that had a budget of more than $1 million, took place in only four countries: Bangladesh, Indonesia, Nepal, and the Philippines. Nine countries experienced moderated level activities—those that spent more than $400,000 over three years—and 18 countries experienced smaller interventions. The principal recent funding mechanisms have come from such projects as Opportunities for Micronutrient Interventions (OMNI), Vitamin A for Health, and Food and Nutrition Monitoring and Support (SUSTAIN).

[1] Xerophthalmia (drying of the eye) is a general term for all eye signs of severe vitamin A deficiency (World Bank 1994, 7).

III. USAID'S VITAMIN A PROGRAMS

USAID has undertaken four principal vitamin A interventions since the mid-1980s when vitamin A programming increased substantially. These include:

- Supplementing the diet with high dose capsules
- Fortifying commonly consumed foods
- Increasing knowledge of vitamin A and promoting changes in dietary practices
- Improving production of and access to vitamin A-rich foods

The first section below discusses these interventions. The following section considers two other important topics: integrating vitamin A interventions with other interventions such as immunization and appointing a lead agency to promote vitamin A efforts among other agencies and the government.

This review of USAID programs covers field implementation, not issues involved in the administration of central programs such as OMNI and Vitamin A for Health or program components such as research. Putnam et al. (1997) recently completed a useful review of USAID's micronutrient portfolio, which gives particular emphasis to centrally funded projects and their administration. Though there is overlap, this paper draws on many documents that were not explicitly considered in the Putnam review.

Interventions

This discussion follows the above categorization of vitamin A interventions. Many programs engage in more than one type of intervention.

Supplementing the Diet with High-Dose Capsules

Many USAID programs used high-dose capsules to supplement the diet of children and, to a lesser extent, pregnant and postpartum mothers. These programs, undertaken by governments, international private voluntary organizations, and local nongovernmental organizations, were initiated in many countries including Malawi, Bangladesh, the Philippines, Guatemala, and Honduras. Significant results were achieved, even though achieving widespread distribution is by no means an easy task. In general, programs were able to achieve double-digit percentage increases in coverage, which is distribution expressed as a percentage of the population under consideration, as table 2 shows. For example, coverage of children in a CARE project based in Nepal increased from 0 to 28.4 percent. Vitamin A programs for postpartum women were not as common but were also successful.

Increased coverage was achieved in a number of ways. The most common way of distributing capsules, and achieving wide coverage, was by using already existing child survival services. As

part of this approach, the use of usually unpaid village health workers was common. Sometimes distribution during special immunization days, where governmental health services and volunteers are mobilized, helped to ensure wide distribution. Nutrition education regarding the value of vitamin A was a typical feature of many programs. One innovative strategy for reaching greater numbers of vitamin A-deficient people was to permit capsule distribution through sources other than health workers, such as designated members of nongovernmental organizations. This alternative increased capsule distribution in various countries, including Indonesia (Ferris-Morris 1992). Often, permission must be obtained from health and other governmental authorities to pursue such a strategy, and care must be taken to avoid the possibility of vitamin A overdose by clients receiving capsules from multiple sources.

The limitations of national health systems and the cost of vitamin A capsules were the two key challenges to capsule distribution faced by the programs surveyed. Wide distribution of vitamin A depends on the effective operation of health systems in a given nation. The imperfect operation of health systems is often a major barrier to the capsule effort, and one that is difficult to surmount. For example, although Indonesia is considered to have a good public health system, vitamin A initiatives met distinct system limitations. "In the city, polysandus [the local clinics] have the reputation of offering only one service, and serving only poor clients as well. As a result, attendance is limited, even by those who could most benefit from the services provided" (Ferris-Morris 1992, 13). Health system limitations are usually most profound in poor areas, which are often areas of pronounced vitamin A deficiency. Deficiencies in the distribution chain is a severe health system problem. Horner and Ferris-Morris noted that the chronic nationwide shortage of capsules in the Philippines limited the impact of supplementation programs (1992, 13). In Central Java, access to capsules was cited as a serious constraint (McDivitt et al. 1991, 18).

A second challenge is capsule cost. Although by U.S. standards capsule cost is extraordinarily low, it can pose a problem in developing countries. The problem arises for several reasons. Few resources are allocated in national budgets to the poorest people, and poor people have few resources themselves. Moreover, many countries are forced to or should import vitamin A capsules rather than produce their own, because of much lower production costs abroad. This forces local vitamin A programs to compete with other claims on scarce foreign exchange resources. For these reasons, an apparently modest cost may prove to be effectively beyond the means of governments and people in developing countries.

There are relatively few cost-benefit studies of vitamin A deficiency prevention. A Guatemalan study (Phillips et al. 1996) indicated that the **yearly** cost per high-risk person of achieving adequate vitamin A status was least for fortification and highest for food production (98 cents for fortification, $1.68 for supplementation, $3.10 for food production).

The above considerations have led some to view capsule distribution as an unsustainable intervention (e.g., Willard et al. 1992a, 11). According to Putnam et al. (1997), availability of vitamin A supplements and the costs associated with mass distribution of capsules caused many countries to begin to reassess this approach and consider fortification or diet modification. In spite of these challenges, capsule distribution has proven effective in reducing vitamin A deficiency in targeted populations and should continue to be part of vitamin A prevention programs.

Table 2: Selected Program Experience with Vitamin A Capsule Distribution

Country **(NGO)**	**Year**	**Result**
Bangladesh (CARE)	1994	Increased from 15.8% in 1991 to 51% in 1994 the proportion of children aged 0-23 months who received vitamin A supplements in the past 6 months.
Guatemala (International Eye Foundation)	1997	Increased to 86% the percentage of children aged 6-23 months who received vitamin A supplements every 6 months.
		Increased to 45% the percentage of post-delivery mothers receiving vitamin A within 30 days after delivery.
Haiti (World Vision)	1992	80% of children from 6-83 months received at least one dose of vitamin A during the last 6 months; dropout rate (from one dose to the next) was high, however.
		72% of mothers received vitamin A within 30 days after delivery.
Honduras (International Eye Foundation)	1997	Increased from 60% in 1993 to 85% in 1997 the percentage of children that received 1 dose of vitamin A every 6 months.
		72% of postpartum women received vitamin A within 30 days after giving birth. (No baseline statistic.)
Malawi (International Eye Foundation)	1994	Increased from 17% in 1992 to 54% in 1994 the percentage of children 12-23 months receiving vitamin A in last 6 months.
		Increased from 27% in 1992 to 44% in 1994 the percentage of women receiving vitamin A.
Nepal (Save the Children)	1994	Increased the percentage of children that received at least 1 dose of vitamin A from 0% at baseline to 28.4%.

Fortifying Commonly Consumed Foods

USAID has also played a role in fortification efforts in a number of countries. Guatemala, Honduras, and El Salvador have on-going food fortification programs, all which had previous USAID support. USAID also supported a trial in Guatemala of a vitamin A-fortified children's food to be used after diarrheal episodes (Herrera 1991). USAID and its development partners have also taken part in fortification initiatives in Indonesia, Bolivia, and the Philippines.

Formal evaluation of USAID's larger scale food fortification initiatives is limited but includes some Indonesian programs (USAID 1990). Putnam et al. (1997) evaluates some other efforts. This latter study includes reports on food fortification and other vitamin A efforts in Bolivia, El Salvador, and the Philippines. Table 3 provides illustrative results of fortification efforts, including a sugar fortification effort in El Salvador that was projected to reach almost 90 percent of the population.

There are a number of advantages to fortification. A variety of foods can be fortified including sugar, margarine, vegetable oils, MSG, and tea. (Sugar has been the most popular food used.) Fortification is also potentially inexpensive; enables a large number of consumers to be reached; and requires little modification of dietary preferences, assuming that a product already in wide use is the one fortified.

While fortification can be very advantageous, there are clearly challenges that must be overcome. Technical expertise is a necessity. For example, the process of fortifying MSG with vitamin A in Indonesia, which had worked well elsewhere, needed to be adapted to a more humid climate to avoid discoloration and clumping of the product. Technical expertise is also needed to evaluate the effectiveness of fortification efforts. Continuous evaluation, which is usually undertaken by the national government, is also essential. In addition, the creation of consumer awareness and, thus, market demand is necessary. This is even more important when a voluntary approach to food supplementation is undertaken. There may well be consumer resistance to an unfamiliar concept, especially when cost recovery for supplementation means an increase in price. As an example, a Bolivian sugar producer that had its marketing costs supported by OMNI and other international agencies introduced a vitamin A-fortified sugar in four Bolivian cities. Its introduction was successful in one city, less successful in the other three. In the least successful city, reasons for nonacceptance included higher price, difficulties in persuading store owners to carry the sugar, concerns that the vitamin A was not actually in the sugar, and questions about its taste (Putnam 1997, 21-A).

Although fortification is valuable, it is by no means easy to achieve on a permanent, effective basis. Sustained commitment, both financial and technical, by governments and a donor such as USAID, appears necessary to overcome significant hurdles. Given this need for sustained commitment and technical expertise, it seems most logical that an effective fortification initiative be launched after the government and other key actors in a country have become well aware of the problem of vitamin A deficiency, have attempted to reduce the worst vitamin A deficiency through capsule distribution, and are ready to take the further step of supplementation.

Table 3: Selected Program Experience with Vitamin A Fortification

Country **(NGO)**	**Year**	**Illustrative Result**
Philippines (OMNI)	1997	The Department of Health developed a seal of approval indicating adequate fortification with vitamin A, iron, and iodine to stimulate private industry to fortify its products. At the time of the evaluation three products were able to use this seal.
Bolivia (OMNI)	1997	Preliminary evaluations show very good results in one city, but lesser results in three others.
El Salvador (OMNI)	1996	A sugar fortification program begun in 1993 was projected to impact close to 90 percent of the country's sugar production by 1997.
Indonesia (Helen Keller International)	1989	At the time of the evaluation, large scale commercial trials of supplementation of MSG were temporarily suspended to improve coating of vitamin A.
Guatemala (International Eye Foundation)	1991	There was some success (82 percent of targeted households) in distributing a food supplement containing vitamin A (to be used after diarrheal episodes) and educating parents on its use.

Increasing Knowledge of Vitamin A and Promoting Changes in Dietary Practices

Health education to increase knowledge and influence attitudes was a feature of all projects surveyed. Some projects specifically used social marketing techniques such as segmentation of audiences into various key groups, audience research into consumer beliefs, and the development of a limited number of messages based on the research to induce the consumer to change. More traditional nutrition education approaches use someone knowledgeable to disseminate information. The target audience is expected to make decisions based on their own circumstances and their assessment of the information and the information provider. Many of the projects evaluated combined the traditional approach with at least some social marketing techniques.

Both social marketing and more conventional health education approaches were successful, as tables 4 and 5 show. For example, International Eye Foundation efforts in Guatemala, which included demonstrations of food preparation of vitamin A-rich foods at village meetings, increased the percentage of children older than five months receiving vitamin A-rich foods two to three times a week from 81 percent to 92 percent. In the Niger social marketing campaign, 93 percent of women in the study consumed liver in the week prior to being surveyed, up from 43 percent before the campaign. Ninety-four percent of children surveyed ate greens during the week prior to being asked, up from 57 percent before the intervention.

Table 4: Selected Program Experience with Health Education

Country (NGO)	Year	Intervention	Illustrative Result
Ecuador (Project Hope)	1995	Vitamin A-rich foods from home gardens prepared during village meetings.	Exceeded a numerical goal of 1,750 mothers attending vitamin A education session by 100%.
Guatemala (International Eye Foundation)	1997	Village meetings on vitamin A, including cooking demonstrations.	Increased from 81% to 92% the percentage of children older than five months receiving vitamin A-rich foods 2-3 times a week.
Nepal (Save the Children)	1994	Nonformal education classes established by the project.	As a result of education efforts in Nepal, 91.5 % of mothers knew that vitamin A prevents night blindness, 22.5% reported that green leafy vegetables were sources of vitamin A, and 16% reported yellow fruits as sources of vitamin A.
Honduras (International Eye Foundation)	1997	Health staff, including volunteers, provided information to mothers.	The percentage of children that received vitamin A-rich foods two times per week increased from 60.4% in 1993 to 71.7% in 1995.

Table 5: Selected Program Experience with Social Marketing

Country (NGO)	Year	Intervention	Illustrative Result
Niger (Nutrition Communi-cation Project)	1992	Used village drama and radio to promote increased production and consumption.	Cultivation of vitamin A-rich foods remained low. Women's consumption of liver increased from 43% to 73%, and children served greens increased from 43% to 94%.
Indonesia (ROVITA, Academy for Educational Develop-ment)	1986	Radio spots and village volunteers promoted vitamin A capsules.	Capsule coverage increased from 24% to 50% over three years in districts with a health clinic.
Philippines (HEALTH-COM)	1994	Radio, TV, and mobilization of government agencies promoted increased consumption and production of vegetables.	Vegetable gardening increased (overall figure not given). The percentage of children who ate green leafy vegetables in the 24 hours preceding the interview increased from 35 to 42.

Evaluations of past projects indicate that health education and social marketing have been, and must continue to be, an integral part of vitamin A interventions. People must be convinced to adopt new practices on the basis of the effective presentation of relevant information. Moreover, education is best carried out in a context where specific desired behavior changes are facilitated (e.g., green leafy vegetables are good for you and here is how you can start a garden).

Health education and social marketing face a number of challenges:

- People's beliefs may hinder the adoption of vitamin A. For example, pregnant women in Indonesia noted that loss of appetite and fear of delivery problems due to increased size of the baby were deterrents to eating more green leafy vegetables (Pyle 1987). The focus on understanding and addressing people's beliefs has been a valuable emphasis of social marketing. "Build it, and they will come" may be a recipe for success for an Iowa ball field, but it does not apply in vitamin A promotion.

- It is not easy to reach target audiences, who are typically very poor, even with well-funded communications efforts. The Healthcom campaign in Central Java employed health volunteers, village banners, and radio, yet many did not get the message. For example, only 21 percent of mothers in the intervention area said they had ever heard radio messages about vitamin A. Further research indicated that less than half of the mothers had a radio in their households (McDivitt 1991).

- Education can be so successful that it creates a demand which cannot be met because of program limitations of one kind or another. For example, McDivitt (1991) noted that, for the Healthcom project in Central Java, limited access to capsules, not a lack of interest in taking them, was the most serious constraint to promotion efforts.

- Development of educational materials can take a relatively long time and substantial effort, leaving little time for promotion and use before the end of the project. For example, the evaluation (Barrows 1997, 17) for the International Eye Foundation project in Guatemala praised the high quality materials but observed that greater effort in dissemination would have helped institutionalize vitamin A training.

Which approach is most effective, social marketing or health education, is difficult to determine. The evaluations did not provide a definitive answer but did make points in support of both approaches. Nutrition education was the principal instrument used in the vitamin A programs surveyed for inducing people to adapt new behaviors, possibly because social marketing techniques are more costly or because integrating new behaviors into the health systems of developing countries is too difficult. Arguments in favor of nutrition education are that people do change behavior based on information provided by others and that this approach is both low cost and equipped to handle the provision of information on a variety of topics. As mentioned earlier, health education has adopted social marketing techniques.

Social marketing appears to be a valuable approach to behavior change, especially in large campaigns. As noted, social marketing focuses on a key question: What needs to be understood about the consumer in order to promote behavioral change? Its emphasis on the importance of communication and the difficulty of achieving an effective communication strategy has also been

valuable. The question is one of relative effectiveness of the two techniques. More explicit consideration of the educational/behavioral change component of programs would be worthwhile in future projects or operations research studies.

Improving Production of and Access to Vitamin A-Rich Foods

Home gardens are another way to decrease vitamin A deficiency; they can be successful in increasing production of vitamin A-rich foods, as table 6 indicates. A Healthcom project in the Philippines increased the production and consumption of five vitamin A-rich vegetables; Project Hope in Ecuador helped establish more than 2,700 new gardens in the communities where it worked. Home gardens have important advantages, including reliance on local land and labor and benefits that flow directly to the home gardener, and should be viewed as a key element in sustainable improvement of vitamin A status.

Table 6: Selected Program Experience with Home Gardens

Country **(NGO)**	**Year**	**Illustrative Result**
Bangladesh (Helen Keller International)	1992	Increased targeted families having a garden from 50% in 1991 to 100% in 1992. Garden size and number of vegetable varieties planted also increased.
Philippines (HEALTHCOM)	1995	Used radio spots and a wide range of community activities to increase production of five vitamin A-rich vegetables.
Dominican Republic (FUDECO)	1994	Seven women's clubs had some success in drying vegetables and fruits (this was a midterm evaluation).
Ecuador (Project Hope)	1995	Exceeded by 100% the goal of establishing 1,350 gardens in two provinces.
Guatemala (International Eye Foundation)	1997	The percentage of mothers with home gardens with more than 2 foods rich in vitamin A increased from 12% in 1994 to 41% in 1997.
Haiti (World Vision)	1991	46% of area families had vegetable gardens. (Unclear how much was due to project.) Lack of water was a problem for 31% of sampled population.
Burkina Faso (Helen Keller International)	1992	The gardening workshop was less well received than other workshops. The message of creating a sustainable local source for vitamin A-rich foods was clearly understood, but implementation faltered due to a lack of staff support and followup.
Honduras (International Eye Foundation)	1997	Program had staffing difficulties but ended up with 1,200 families planting a fruit tree.

Perhaps the best documented home garden promotion, with accompanying nutrition education, was that of Helen Keller International in Bangladesh (Asian Vegetable Research and Development Center 1993), and it is worth examining to appreciate the great potential of home gardening. The Helen Keller International project was a well-designed effort to both target poor households and measure the effects of the intervention. Target households had a small amount of land, at least one child under six years, and the mother's willingness to engage in gardening activities. Control households were in other villages. Interaction households were in the same villages as the target households to measure possible emulation effects of seeing the target households plant gardens.

At the time of the baseline survey, 50 percent of the target households reported having a home garden of an average size of 61 square meters with an average of six varieties of vegetables. Two years later, the midterm survey showed 100 percent of the participating households had gardens, as expected, with the mean size 130 percent larger at 138 square meters. The average number of varieties grown throughout the year increased fivefold to 33. Only 25 percent of the control households reported having a garden, while 87 percent of interaction households had gardens, indicating that there was a strong demonstration effect. Helen Keller International has since increased its home gardening efforts, reaching 20 percent of Bangladesh's districts and 1.6 percent of the population in 1997 (Putnam et al. 1997, 3A).

Nonetheless a few cautions are in order. Though gardens emphasizing vitamin A-rich foods can be introduced in poor communities, they will not automatically be sustained, due to challenges such as lack of water, land, and time, and the expense involved in protecting gardens from animals. Another potential difficulty is the continued provision of seeds after the project ends. Part of the problem is that hybrid varieties are often used, which will not reproduce truly from seeds. In Bangladesh, Helen Keller International helped coordinate the provision of seeds and other inputs and helped establish 2,000 self-sustaining village nurseries to provide seedlings for home gardeners (Putnam et al. 1997, 22). Often people do not value vitamin A-rich foods sufficiently, and promotion of vitamin A-rich foods must be undertaken simultaneously to encourage increased vegetable production. Changing dietary preferences can be challenging. As Seidel (1996) noted, selection of the right foods includes questions of seasonal availability, vitamin A content, cost, consumer acceptance, and the ease of preparation and time required. In particular, parents hold strong beliefs about what young children can digest, or what foods are appropriate for children being weaned. For this reason, green leafy vegetables are often not fed to children being weaned. These concerns should not discourage the promotion of home gardens as a sustainable, low cost means of nutritional improvement, but rather are concerns that should be addressed in project design.

Program Coordination

USAID widely used two key approaches to program coordination of vitamin A-promotion projects: inclusion of vitamin A with other interventions, principally child survival interventions, and use of a key organization to work with other private voluntary organizations (PVOs) and governmental units. Evaluations of these approaches indicate that they are valuable and will be fundamental in continued work in vitamin A.

Integration with Other Interventions

Integration of vitamin A initiatives with other interventions, usually child survival activities, enables development agencies to take advantage of existing health services, provide the necessary range of services to clients, and ultimately lower the cost of services. Provision of such services to poor people, who often live in remote districts, and have a distinctly limited ability to pay, is by no means an easy undertaking, and integration brings these services within the realm of possibility. If services are not jointly provided, the cost of each would be prohibitive. As the section on vitamin A capsule distribution illustrates, integration has been successful in past projects. In this particular case, capsule distribution was integrated with a variety of other child survival interventions.

As with any multidimensional project, some interventions receive more emphasis and are more successful than others. There is a danger of including too many interventions or otherwise trying to accomplish too much. As the evaluation report (Barrows et al. 1997, 32) for the Guatemala International Eye Foundation project stated, "[an] across the board push for child survival programs is not advised ... limit interventions and focus on quality." There did not seem to be any magic number of interventions or areas covered, but a number of factors need to be taken into account, such as the implementing agency's familiarity with the interventions and with the communities involved.

The utility of combining vitamin A interventions with other interventions, including other micronutrient initiatives, is so great that this approach should continue to be a prominent feature of programs.

Working with Other Private Voluntary Organizations and the Government

USAID has often employed a lead vitamin A agency as a key strategy in its vitamin A efforts. This lead agency promotes vitamin A through its interaction with PVOs and governmental organizations. Its coordinating efforts include orienting other organizations to the issues involved in vitamin A, training staff, providing materials, and assisting in developing specific programs. At the beginning of the period covered by the evaluations, few PVOs or governments had begun vitamin A programs, so there was much to be done. This approach has been successful in increasing vitamin A efforts of PVOs and governments. The involvement of each will be discussed separately.

A number of projects sought the help of PVOs including the Vitamin A Technical Assistance Project (VITAP) managed by Helen Keller International and the International Eye Foundation's project in Guatemala. VITAP's final evaluation (Horner et al. 1994) judged the lead agency approach to be very successful. The project, according to the evaluation, caused at least 10 PVOs to increase significantly their vitamin A efforts. Table 7 indicates other program results.

There are a number of distinct advantages to the lead agency approach, such as:

- Coverage of vitamin A-deficient populations can be substantially increased as other PVOs are enlisted in vitamin A activities. By spreading costs over a wider number of beneficiaries, this approach also has the potential to reduce costs. Helen Keller International found that the cost of its home garden pilot project was $25 per garden over a three-year period, while the estimated cost for a substantially expanded program fell to $8.30 (Putnam et al. 1997, 22).

- Technical assistance can be provided at low cost. Training, for example, is provided to groups of PVOs; the provision of assistance for each PVO individually would cost much more.

- A knowledgeable lead agency can be very useful in overcoming initial hurdles in program implementation, such as determining the vitamin A-deficiency status of the population. As the VITAP evaluation noted for Burkina Faso, "the PVOs have been able to proceed fairly independently in incorporating vitamin A strategies into their programs once that initial investment [of VITAP assistance] was made" (Willard et al. 1992, 12).

While the lead agency approach has clearly been a successful strategy, limitations of time and resources reduced outreach effectiveness somewhat. For example, in Indonesia lack of time was cited at the midterm evaluation (Ferris-Morris 1992) as the reason why the lead agency strategy made no discernable impact on vitamin A capsule distribution. VITAP was a five-year program with funding reduced for the second part of the project, and the evaluation noted that time and budgetary limitations prevented VITAP staff from following through adequately on midterm recommendations (Horner et al. 1994, 35).

A number of other concerns were raised in the evaluations. One concern mentioned in at least two evaluations (Indonesia, Ferris-Morris 1992 and Guatemala, Barrows 1995) was the lack of a country-specific plan, drawn up at the beginning, which would include measurement of vitamin A deficiency and its causes. Such a document could have been used both as a plan for action and also to convince others of the importance of vitamin A programming. Another concern was that the lead agency only provided technical assistance, when cooperating agencies also wanted funding for their own interventions. Finally, the lead agency was often required to work with U.S. PVOs exclusively, although local PVOs could have been very valuable counterparts. VITAP, however, was allowed to work with local PVOs later in the project in countries where it had programs.

Table 7: Selected Program Experience with Lead Agency Strategy

Country **(NGO)**	**Year**	**Illustrative Results**
Indonesia (Helen Keller International)	1992	The program interested at least eight PVOs in vitamin A activities and helped change government policy to permit greater NGO involvement. There was no evident impact on capsule distribution at time of evaluation.
Guatemala (International Eye Foundation)	1995	The program developed and disseminated vitamin A materials for PVOs. There was limited success in establishing a vitamin A working group.
Burkina Faso (Helen Keller International)	1992	Four PVOs made solid commitments to vitamin A activities, with at least 87 communities reached.
Honduras (International Eye Foundation)	1997	Goals for transfer of activities to the government (such as training of government personnel) were met. However, government institutions were concerned that they would be overwhelmed by the constraints that they would face once the project was gone.
Philippines (Helen Keller International)	1992	The program's service delivery was not measured. The evaluators praised the program's collaborative approach to working with the government and others (such as local physicians).
Bangladesh (CARE)	1994	The program collaborated with government primary health care workers in improving service delivery. The percentage of children 0-23 months who received vitamin A supplements in the last 6 months increased from 34.8% to 66.9%.

Collaboration of a lead agency with government was also a successful strategy. As table 7 shows, CARE, working with Bangladeshi government health workers, was able to facilitate an increase in the percentage of children zero-23 months receiving vitamin A supplements in the six months prior to being surveyed from 34.8 percent to 66.9 percent. In Bangladesh, as in most developing countries, the government's health care system is the major avenue for reaching very poor—and most likely vitamin A-deficient—people. Moreover, government approval can be necessary for advancing key aspects of a vitamin A strategy, including granting permission for the use of high-dose capsules, or involving nonmedical personnel in capsule distribution. In the Philippines, for example, Helen Keller International played a central role in obtaining government permission to use high-dose vitamin A capsules in program implementation.

The degree of involvement with local governments has varied considerably. An example of a high degree of involvement was Helen Keller International's efforts in Indonesia in its Child Survival I project, where the NGO devoted much of its energies to catalyzing and supporting government efforts. Working with the government "often calls for adopting different methods, compromising on certain issues and working at a slower pace, patiently waiting for the bureaucratic machinery to learn, adopt and put into practice" (Pyle 1987, 6). Other projects have acted on behalf of the government in certain geographical areas, with the assumption that government involvement can be phased in at the end of the project—an assumption that may be erroneous. The evaluations of such projects, done as the programs were ending, were not able to address this concern.

Working with governments may present some challenges, including relative slowness in implementing a given project. Sustainability should be an advantage to working with the government, whose health systems will remain in place. In contrast, NGO projects may be dependent on outside funding, and therefore have an uncertain future. Nonetheless, governmental program sustainability is not guaranteed. A frequently cited barrier to sustainability is government personnel turnover. "The national health system in Niger is a definite confounding factor in determining any impact that VITAP has had, as the Ministry transfers its personnel frequently.... Projects must keep training Ministry staff.... As a result, many projects get trapped in a never-ending cycle of seminars and workshops, rather than on supervising outreach activities" (Willard 1992c, iii). Lack of resources and time for effective implementation have also been concerns. As Pyle noted for the Helen Keller International effort in Indonesia, "[the] capacity building approach is ... very difficult to accomplish within the limited three-year time frame provided under Child Survival grants" (1987, 8).

There has been a large increase in the number and knowledge of vitamin A programs among PVOs and governments over the past 12 years, attributable in part to the lead agency approach. Evidence suggests that this approach should still play a significant role. A lead agency approach that incorporates funding for other agencies can promote widespread vitamin A programming. Countries with less-well-developed vitamin A programs and those wishing to expand into new areas such as food supplementation also can benefit. While progress has been made, serious vitamin A deficiency continues to exist in many countries, and a well-designed lead agency approach can continue to provide benefits.

IV. THOUGHTS FOR THE FUTURE

USAID now has an extensive history of vitamin A promotion, as the evaluations listed in the bibliography attest. These evaluations and the issues they raise offer lessons for the future. Recommendations on specific aspects of vitamin A programs based on the preceding analysis of evaluations follow.

Programs Are Most Cost-Effective Where Vitamin A Deficiency Is Greatest

The same amount of money spent on program implementation yields bigger benefits where vitamin A deficiency is greatest. Moreover, the importance of the problem galvanizes people and governments to action. Programs in Bangladesh and Indonesia are illustrious of this point. This statement implies that a high priority be given to programs in the many African nations where vitamin A deficiency is a serious problem. This advice may not be easy for USAID to act upon, as it vies with other important Agency priorities in these countries, such as increasing agricultural production and reducing high birthrates. A relatively small USAID budget and staff in many African countries are complicating factors as well. Notwithstanding these difficulties, there should be a role for vitamin A programming in a significant number of African countries.

Integration with Other Child Survival Activities Should Continue

USAID tended to integrate its vitamin A activities, which often included capsule distribution, with other activities, such as child survival activities. This integration reduced the cost of services and provided the health service consumer with a broader range of valuable services. Integration will continue to be a valuable approach in the future, even though the specifics may change, with more emphasis perhaps on home gardens and less on vitamin A capsule distribution. Implementation of these multidimensional programs will require continued coordination within USAID among those responsible for various aspects of child survival and related programs.

Vitamin A Capsules Are Not Expensive

Vitamin A capsules are viewed as expensive for developing countries, and there is consideration of phasing them out in national or regional campaigns. Nonetheless, the assumption that vitamin A capsules are too costly is not necessarily true, and some thought needs to be given to the alternatives.

In situations of high vitamin A deficiency, and when programs are beginning in a certain region, provision of vitamin A capsules appears to be the lowest-cost alternative, especially when a substantial immediate reduction in vitamin A deficiency is desired. One alternative, food supplementation, can be lower on a per-person cost than capsule distribution. However, food supplementation is less targeted to the people who need it most, resulting in an increase in cost. Capsules are distributed to children, the neediest group, while food supplementation is provided to all consumers of the supplemented product. Another alternative, improving production of and access to vitamin A-rich foods, is also a valuable approach, but it is less economical than

supplementation, and, due to the necessary changes in consumption and production, which take time to accomplish, its short-term impact is less. It seems that most vitamin A programs should employ a mixture of approaches, especially as the programs progress, but that supplementation will remain a valuable approach.

One reason why vitamin A capsules are thought to be too expensive is that they are frequently imported, and the poorest developing countries (where USAID works) often face severe foreign exchange problems. However, some support by donor agencies for the foreign exchange cost could minimize this concern.

Projects May Need To Last Longer

There is certainly much to accomplish even in a four-year project, and some project lengths have been two years, and many three. Even when the implementing agency is familiar with the geographic area, there is much to be done, such as surveying for vitamin A deficiency, and possibly conducting other surveys as well. In addition, often extensive and time-consuming steps are necessary to establish a program, including overcoming unforeseen difficulties. USAID may not allow enough time for these initial activities. Moreover, many elements of vitamin A interventions do not take hold overnight, such as changing food consumption patterns, including weaning practices, and establishing new agricultural practices like home gardens. When the project design calls for a lead vitamin A partner to collaborate with other partners such as international and local NGOs, the need for a longer time frame also seems appropriate.

A reasonable time frame for many projects would be five years or even longer. It can take two years to establish a well-functioning, large-scale (district level plus) program. Once this is done, the program ought to have three years or even more to be effective, including a reasonable phase-out period if activities are to be sustained by others. For national level programs an even longer time period should be considered.

Establish the Benefits and Costs of Interventions

It is clear that vitamin A interventions benefit people. But not enough is known about the costs and benefits of the specific vitamin A interventions. We typically know that a project costs a certain amount and has led to results that can be used to evaluate impact. Typical evaluations provide somewhat limited information. For example, as discussed above, the evaluations for the nutrition education activities did not effectively measure impact. It would be valuable to design and fund a proportion of future vitamin A activities with a more elaborate evaluation component. Such a design would, for example, provide more information on the impact of nutrition education or the costs of various alternatives to reducing vitamin A deficiency for those at high risk. This is an operations research approach applied in the context of actual field projects, to obtain a better quantitative understanding of these projects. While this project design requires control districts where no assistance is given—which runs counter to the desire to help people—it is necessary in order to better assess the impact of project interventions. Operations research tied to actual project activity has been tried to some extent in the past (e.g., in the Bangladesh home gardening effort discussed earlier), and it seems worthy of greater emphasis in the future.

National-Level Programs Need Greater Emphasis

If USAID expects to contribute to the reduction of vitamin A deficiency on a global level, national programs are fundamental for a number of reasons. Vitamin A deficiency is a problem dispersed throughout a given country. Even if a significant fraction of the worst vitamin A deficiency is located in a particular region of a country, it is usually an area much more extensive than one PVO can cover, and thus a number of actors, including the government, must be involved. Many programs require key goals to be accomplished at the national level, such as establishing and monitoring vitamin A supplementation standards, importing vitamin A capsules, and funding public health programs that involve vitamin A.

Finally, effective reduction of vitamin A deficiency requires that all the key solutions be employed. For example, vitamin A capsules may be necessary to make an immediate impact in severely vitamin A-deficient areas, home gardens may provide a longer-term solution to vitamin A deficiency in many areas, and food supplementation may reach a large number of people at low cost, especially in urban areas.

Putnam (1997, 8) indicates that OMNI, the lead micronutrient project, supported at least four comprehensive national programs in 1996. This number appears to be quite low, even if projects other than OMNI are undertaking efforts that can be considered national programs. Clearly, it would be valuable to expand the number of national programs.

One successful basis for a national program is the development of a successful regional or district-level program. A successful intervention in an area with high vitamin A deficiency strongly establishes the basis for future action. USAID has successfully employed the in-country lead agency approach in the past and could continue to use it in the future as well. Also known as the umbrella organization approach, it is in fact increasingly being used by USAID in other areas, such as AIDS prevention and family planning.

The Interrelation With Malnutrition Must Be Considered

Much of the worst vitamin A deficiency appears to be in areas with high protein-calorie malnutrition. For example, the International Eye Foundation project in the Chikwawa district of Malawi (Brown et al. 1994) recorded a high prevalence of chronic malnutrition, with one survey indicating that 49 percent of the children were less than 90 percent of the proper height for their age. The existence of malnutrition would not argue against vitamin A supplementation, but it might well reduce the effectiveness of the interventions. Malnutrition needs to be addressed in its own right. If the key cause of malnutrition is low income or limited food production, nutrition education, for example, might not be able to produce much of an improvement in vitamin A status. Instead, a program that incorporates increased food production activities would be more suitable. PVOs have considerable experience increasing agriculture production and in other income generating activities for low income people, so this approach can play into USAID strengths.

V. CONCLUSION

This paper has examined USAID's experience with programs to combat vitamin A deficiency in developing countries from 1985 to the present. Vitamin A deficiency has long been identified as a cause of vision problems, among other negative consequences, such as increased measles mortality. USAID and its development partners' efforts play a key role in addressing vitamin A deficiency in developing countries. Cost-effective strategies are used to reach vitamin A-deficient children and adults in many countries, and evaluations are one tool that USAID and its partners use to assess their performance and progress.

Employing four interventions, USAID programs have been successful in reducing vitamin A deficiency in targeted populations. Programs using nutrition education to explain the advantages of supplementing the diet with vitamin A capsules successfully increased capsule coverage. USAID has played a role in vitamin A fortification initiatives in a number of countries, with significant increases in coverage in such countries as Guatemala, El Salvador, and Honduras. Fortification programs face challenges including the need for ongoing technical expertise and promoting consumer demand. Health education or social marketing was part of every program surveyed because changing behavior contributes to the success of all programs. It may be worthwhile to pay more explicit attention to measuring the impact of health education in future programs. USAID-sponsored home garden programs exhibited some success. Home garden programs have advantages such as use of local land and labor and sustainability; however, successful project design needs to address concerns such as garden costs and continued provision of seeds. USAID's projects have employed two principal types of program coordination: inclusion of vitamin A interventions with other efforts, such as child survival programs, and use of a lead agency to work with other organizations and the government to promote widespread vitamin A use. Both have been valuable strategies to reduce the cost and broaden the outreach of vitamin A interventions.

Future vitamin A programming should continue to focus on areas where vitamin A deficiency is greatest; continue integration with other interventions; continue use of vitamin A capsules and lower their real cost to developing countries; develop and work with national programs; and, in areas with high malnutrition, address this problem in tandem with vitamin A deficiency.

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