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Prophylaxis programs to combat blindness due to Vitamin A deficiency in South East Asia

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Saranya K. Reddy

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Prophylaxis programs to combat blindness due to Vitamin A deficiency - a Conspectus

1. Introduction:

Several countries have embarked on programs which have had for their immediate objective reduction of Vitamin A deficiency induced blindness among pre-school children and a longer term objective of reduction of overall Vitamin A deficiency among their populations. The most commonly utilised strategy so far is that of massive dosing which entails the intermittent oral delivery at six monthly intervals of Vitamin A in single doses ranging from 100,000 to 200,000 IU. Another means of intervention which is becoming increasingly popular is that of Fortification of Foods (Nutrification) and a third strategy is that of public health intervention and horticultural activities. While other strategies are known and are possible, they have not as yet progressed from circumscribed research projects to widespread national projects and at present are being adopted only as restricted ancillary and supportive measures.

2. Periodic massive dose programs:

This has been adopted as a national program in Bangladesh, Indonesia and India, and is underway as a restricted research program in the Philippines. Project operations consisted of administering Vitamin A once in six months on a universal basis to the target population.

The technology of prevention of Vitamin A deficiency by administration of a massive dose has been known and utilised for some years and is constantly being refined to make it more effective. The application of this technology to mass programs, however, is surrounded by many obstacles and stands in need of considerable improvement, if Xerophthalmia is to be controlled in an effective and efficient manner among the most needy members of the population. The multifarious aspects of implementation are described below.

2.1 Administrative Organisation:

In Indonesia, the distribution of the megadose was planned and directed by a committee established by the Ministry of Health for the Vitamin A deficiency prevention pilot project. The Deputy Director of the project had primary responsibility for the overall administration of the project. Responsibility for project operations in each Province was delegated to a Provincial project leader assisted by a Provincial Project Committee. Administrative authority at the district level was delegated to the Kabupaten physicians. These physicians assigned responsibility to Kachametan (subdistrict) physicians who supervised the project field workers. A schematic presentation of the administrative structure is shown in Appendix I.

In India, the national Prophylaxis program is planned and directed by the Directorate of Health Services. The existing Maternal and Child Health and Family Welfare Organisation is responsible for the administration of the program. At state level, the State Nutrition Officer is responsible for all logistics and for submitting accurate reports to the Centre. The District Health and Family Planning Officer is charged with transmitting Vitamin A supplies to the field. In rural areas, the program is implemented through the Primary Health Centre and its subcentres under the supervision of Medical Officers of Primary Health Centres. The auxiliary Nurse Midwife (ANM) is responsible for administering the concentrate to children in the area covered by her. In the areas not covered by ANM's, the Lady Health Visitors (LHV) or Family Planning Health Assistants (FPHA) distribute the Vitamin A capsules.

In Bangladesh, the Director of the Malaria Eradication Program is the Director of the Bangladesh Project for Prevention of Nutritional Blindness. The project personnel at the Centre are responsible for the organisation of the program and for the collation of findings on a national scale. Project operations are supervised by the physicians in charge of Thana Health Complex. The distribution of capsules is carried out by Family Welfare Workers (FWW) and Community Health Assistants (CHA).

Program extension to cover urban areas:

As national programs were implemented through the Primary Health Centres which service rural areas, urban areas were not covered. Varying attempts have, however, been made to use alternate channels to cover urban populations. Bangladesh, for example, enlisted the aid of various voluntary agencies and service organisations, municipal organisations and educational institutions to undertake mass distribution of megadoses of Vitamin A within the city. The nature of the program was explained to interested bodies through a series of meetings and those who were willing to undertake the project were supplied with the necessary material.

The goal of the program was to administer one high potency Vitamin A capsule (HPVAC) to every child aged 6 or under, one to every lactating non-pregnant mother, and two to any person who complained of night blindness, by means of a house to house delivery system. The distribution was to be done on a six-monthly basis as was done in the larger national program.

A separate program was drawn up to accomodate those voluntary organisations and medical facilities, which, due to their structure, were unable to participate in door to door distribution. For the most part, this program included organisations which held under five clinics in permanent locations, and hospitals.

Each participating organisation selected an area of the city (with emphasis on slum and lower socio-economic neighbourhoods) in which its members would work. The were requested to keep the Blindness Prevention Program of Bangladesh (B.P.P.B.) informed of the areas

chosen, in order to avoid duplication of effort. In practice, this was ineffective, as many of the organisations were unable to indicate exact areas covered. Consequently, there was considerable duplication in some areas, and others remained uncovered. Furthermore, it was not possible to compute population estimates for poorly circumscribed areas, which rendered the calculation of coverage achieved difficult. Following selection of working areas, each organisation was issued HPVACs according to their estimates for covering target groups in their areas. Supportive material such as scissors, copies of the UNICEF blindness preventive poster, the HKI pamphlet on signs and symptoms of Xerophthalmia, the instructional pamphlet on Vitamin A deficiency, dosage schedules and recording registers were supplied. Workers were instructed to refer severe cases of eye diseases to appropriate medical facilities for treatment. Along with the initiation of the program, a series of announcements appeared in the local papers to alert the public to the distribution program. This was of considerable assistance in focussing attention on the problems and especially in allaying the apprehension and reluctance of mothers with regard to allowing strangers to medicate their young children or themselves. A month after initiation, an interim meeting was held to assess on-going distribution and assist the participating organisations with problems encountered. Throughout the distribution, training sessions for volunteers were held to assist them with understanding the nature and scope of the problem and to improve the reporting of night blindness and other ocular signs of Vitamin A deficiency.

In the Philippines, the depressed areas in Metro Manila are covered by the services of a Mobile Team from the Nutrition Centre of the Philippines, consisting of a physician, nutritionist and medical technician. The team visits each barangay for one week and among other nutrition related operations, identifies eye signs and administers Vitamin A. At first, Xerophthalmia was treated with Meldevita tablets (commercially prepared in the Philippines containing 1000 IU Vitamin A), one pearl every day for one month. This was not being well utilised as mothers often forgot to administer the pearls, and eye manifestations appeared to worsen with irregular use. So they resorted to using the megadose. If there was no improvement after one month, another capsule was administered. Volunteers from the area were trained to locate houses with pre-school children and pregnant and lactating mothers, to inform the community about the program and to assist with weighing pre-school children.

A new approach was being tried of providing health centres with the Megadose. Initial dose was given by the mobile team physician who marked the date of the next dose (after 4 months) on a sheet, and provided one copy to the health centre, and one copy to the volunteer from the child's area. This cuts down on the expense of the mobile team visiting, although follow-up in such instances is poor.

In India, in some states (Kerala), staff from the Municipal Hospitals distributes the megadose in urban areas. The paramedical staff is, however, so few in number, that coverage by the itinerant system is poor.

2.4 Form of Megadose:

The Vitamin A administered is in either of two forms: (a) soluble gelatin type capsules with a protrusion at one end; each capsule contains 200,000 IU Vitamin A with 40 IU Vitamen E (Tocopheryl Acetate), and (b) flavoured concentrate, 1 ml. of which contains Vitamin A U.S.P. (synthetic) 100,000 IU in arachis oil (equivalent to about 109,500 IU per gram). The capsules are usually supplied by UNICEF in plastic bottles which contain 500 capsules each. The concentrate in India is supplied by Indian Drugs and Pharmaceuticals Ltd. in 100 ml. bottles.

2.5 Acceptability to consumers and administering personnel:

In general, consumer acceptance of both capsules and concentrate was good. Both forms were easy to administer and store under field conditions and also had a long shelf life.

In Indonesia, the major disadvantage was that the oil tended to seep out of the cut end, soiling the workers' hands, and causing some loss of the vitamin. During administration of the capsule, the workers' hands often came into contact with the children's mouths, causing some concern about transfer of saliva from mouth to mouth. One important advantage of the capsule is that it was relatively easy to administer to fussy children as the oily contents are difficult for such children to spit out.

2.6 Dosage:

Each child 1-4 years old or 1-5 years old as the case may be in each country, is given 200,000 IU Vitamin A contained in one capsule or 2 ml. (one spoonful) of the vitamin, using the spoon supplied with each 100 ml. bottle of Vitamin A.

2.7 Dosage Technique:

The instructions for administration of the vitamin indicate that for younger children who cannot swallow the capsule intact, the protrusion should be cut and the contents squeezed into the recipient's mouth, and in the case of older children, the capsule is to be swallowed. There are some practical difficulties with this procedure. The distributors are not always supplied with a pair of scissors to snip the protrusion and it is said that they obtain a knife from the householders in order to cut the capsule. This frequently results in considerable loss of contents prior to administration. An essential item of a field worker's equipment should be a pair of scissors, which would be most helpful in carrying out this job.

The general mandate to field workers is to administer the dose, whether capsule or concentrate, personally to each recipient. However, it is clear that is is not always strictly adhered to. The concentrate has a distinct advantage in this context over the capsule, as it is not likely that the dose will be left with someone to be administered later to the recipient. The capsule, on the other hand, tends to be

Attempts were made to administer the megadose in a few urban areas in India through the Urban Family Planning Centres and the MCH clinics in the major hospitals. It was emphasised that the administration of Vitamin A through these clinics should be undertaken only where the risk of repeated administration does not exist. For this reason, the program was not implemented through the general outpatient department, but only through the special child-care clinics where due precaution to avoid repetition of these doses can be ensured. These limited efforts have not proved too successful, as attendance at these clinics was erratic, and six monthly dosings could not be achieved.

2.2 Distribution Schedules:

In the program in India, in order to achieve effective coverage and to avoid repeated administration, it was arranged that the distribution be done during a fixed time period (two months) on a crash basis, instead of spreading it over a prolonged period. Adoption of such a strategy was expected to make for effective implementation of the program, reduce the risk of overdosage with the built in minimum four month interval between successive doses, and also reduce the load on the Auxiliary Nurse Midwife (ANM) or other paramedical personnel who are multipurpose workers with multifarious responsibilities.

In Indonesia, the Provincial Coordinating Committee drew up distribution schedules and sent them well in advance of time to the Kabupaten physicians in charge, so that they, in turn, could relay the information to the Kachametans for necessary administrative arrangements to be worked out. The distribution was done over the total six month period as the program was carried out with single purpose workers who devoted their entire time to this activity.

The program is currently moving to the use of multipurpose workers in the Integrated Nutrition/Family Planning Program.

2.3 Target Population:

Most programs were directed to the 1-5 year age group as this group was the most vulnerable to nutritional blindness due to Vitamin A deficiency. In Bangladesh, the program covered the 1-6 year age group to start with, and was later extended to include lactating non-pregnant women and children with night blindness. In India, the State of Karnataka restricted the beneficiaries to 1-4 year olds, because of insufficient supplies of Vitamin A to cover the 1-5 year age group. There has been a move from the Central Government recently, requiring the coverage of mass distribution program to be extended to five year olds, but the supply of Vitamin A to the State has, for reasons not clear, not yet been increased to make this possible.

In Indonesia and the Philippines, the program included the 1-5 year old children. It must be pointed out that in Indonesia and very likely elsewhere, the precise determination of each child's age was impossible and therefore, the workers tended to extend the age boundaries by including rather than excluding children of questionable age.

left with an inmate of the house to be administered to absentee children. Judging from the experience of other public health supplementation programs, the chances of the capsules so left being actually consumed by the beneficiary is rather poor. With regard to the concentrate, the difficulty of carrying the relatively heavy bottle of concentrate, often over difficult and hard terrain, cannot be overlooked.

Mention must be made that little information is available as to the difficulties encountered in swallowing the capsule. To many in these populations, swallowing a capsule or table is a novel and uncommon event and therefore could be more strange and difficult than the more urbanised are likely to attribute to the process. Field workers are conscious of this, but have not deemed it an aspect worth mentioning unless they are specifically questioned. In many cases, the vomiting which is portrayed as a side effect, is in fact the consequence of difficulty in swallowing the capsule.

In India, the instructions to field workers on the procedure for administration of the megadose are as follows:

i. Use a 2 ml. spoon (supplied with the Vitamin A concentrate) or a medicine dropper which is calibrated to measure the 2 lakh unit dose (2 ml) presented.

ii. Instruct the mother to hold the baby in her lap with the head raised, so that the concentrate can be placed in the side of the mouth or on the tongue.

iii. Administer the drug slowly to avoid the risk of choking.

iv. If the child spits out the initial dose, repeat the procedure.

In interviews with field workers, a common reason given for mothers' reluctance to have their children partake of the Vitamin A concentrate is that they disliked the idea of using the same spoon for dispensing the concentrate to all the children. Inquiries revealed that the field workers, probably because of ease of administration, tended to have the spoon come in contact with the child's mouth, and then, without washing the spoon, proceeded to dispense the next dose to another child. Further elaboration of instructions is probably called far, such as including compulsory washing of the spoon after administration of each dose.

There are reports of children spitting out the concentrate. The instructions are to re-administer the dose to such cases. The receipt of stocks and the beneficiaries covered do not testify that this is done in fact.

In most programs, children with diarrhoea and those judged by the workers to be ill were not given the Vitamin A, in order to avoid

subsequent illness or death being attributed to the Vitamin A administered.

2.8 Selection of areas for program implementation:

In Indonesia, selection of geographical areas for the distribution of Vitamin A in the Pilot Project was made by the Project Committee in each of the three Provinces of Java. The prinicpal criteria on which selection was based were:

(a) high incidence of Xerophthalmia as indicated by clinic and hospital records, and
(b) availability of health workers to serve as project field staff.

While it was expedient to use these criteria to initiate a program, it was not always adequate in locating areas of highest risk of Xerophthalmia, as indicated by the nationwide survey of prevalence conducted later. This survey revealed that two areas of highest risk were not included using the criteria mentioned above.

In India, two major considerations were taken into account in the actual selection of the areas for the operation of the program: (a) the existing information with regard to the prevalence of Vitamin A deficiency, and (b) practical considerations such as existence of the necessary administrative infra-structure and other facilities including transport being available. Also, it was deemed desirable to cover all the blocks of a few districts rather than a few blocks scattered all over the State. The Family Planning Officer and the Nutrition Officer of each state selected the blocks to be covered on the basis of the above considerations.

Experience gained from studies in India clearly suggest that the services of properly trained paramedicals can be successfully used in the place of highly trained medical officers in the identification of the risk areas. Their services may be used not only in the collection of baseline data from primary health centre areas to determine the areas in which the program may be started on a priority basis, but also for periodic evaluation and improvement of the program.

2.9 Dosage flow from source to consumer:

2.9.1 Organisational Network:

In most countries except India, the procedure for procuring capsules is for the government to formally request a specific supply from UNICEF. UNICEF is responsible for then processing the requests, i.e. authorising, ordering and delivering the capsules to port. Reasons for the not too infrequent depletion of stocks are: not enough lead time given by management for processing the requests and bureaucratic delay on both sides, government and UNICEF, in clearing and acting on the requests.

In Indonesia, the capsules were provided the Ministry of Health

by UNICEF. No significant problem arose in the shipping of capsules from Denmark to Indonesia. However, the process of clearing them through customs in Jakarta caused some delay, and during clearance of the first shipment 4000 capsules could not be accounted for at customs.

Some difficulty was experienced however, in transferring capsule supplies within Indonesia. The first capsule shipment arrived in Indonesia before the distribution commenced, and was allocated to the participating health centres, via the Applied Nutrition Project Divison of the Ministry of Health. The Pharmacy Department, in turn, forwarded the capsules to the Pharmacy Depots of the provincial health departments. The project administrators were not informed of the change in the capsule allocation channel, and were unable to locate the capsule supplies for some months. Allocation of capsules to the Health Centres was completed six months after arrival of the shipment. During this period, a number of health centres ran out of capsule supplies and had to stop distribution. Altogether about 20,000 children did not receive capsules because of this delay.

In India, supplies of Vitamin A are procured by the Department of Family Welfare and distributed to the State Health Departments through the Regional Medical Stores and Depots. The State Family Welfare Officers transmit the supplies to the various Primary Health Centres, from whence it is provided to the ANMs and Family Planning Health Assistants.

In Bangladesh, UNICEF delivers the capsules to the port. From there, the Vitamin A Prophylaxis Project Adminstrator arranges for transport to the Headquarters Office, and from there to the various District Stores. It is then transmitted to the Thana Health Centres from which it is requisitioned by the Family Welfare Workers and Community Health Assitants. The biggest snag in timely movement of supplies from headquarters to the periphery is lack of adequate transport and possibly inefficient utilisation of vehicles, whose maintenance is not at its best.

2.9.2 Reliability of Supply:

Irregularity of supplies has been one of the main obstacles to the successful conduct of the prohylaxis program. In many of India's states, administration has been dislocated because of this, and in several states, one cycle has been missed due to depletion of stocks. Depletion of stocks as a reasons for failure to administer a dose did not always tally with actual depletion of stocks in the stores, reflecting perhaps a breakdown in the administrative set up for procuring supplies.

The supplies in many of the areas did not match actual requirements, falling short of the expected number of children. Records did not reveal whether the short supply of the Vitamin noticed in different areas was actually due to failure of the peripheral units to indicate the correct requirement or not. It was therefore difficult to assess the role of short supply as a possible factor in the failure of the

program. In some states, however, data indicated that inadequate coverage was due mainly to short supply of the concentrate. The information provided by the Medical Officers generally confirmed the data provided by the ANMs. Another common reason for erratic supply was difficulty in transporting the Vitamin concentrate from the district stores to health centres.

2.9.3 Expiry Date:

Reports from the field indicated Vitamin supplies arrived in the Health centres with a very narrow margin between date of administration and expiry date, requiring distributors to hurry through with distribution in a very short period. Stocks at district stores and at health centres did not, however, confirm this.

2.10 Leakage of High Potency Vitamin A Capsule (HPVAC) in the open market:

In one of the countries mention was made of HPVAC finding its way into the open market and being indiscriminately sold. It was not possible to confirm whether these were stray situations of negligible consequence or whether it was found in large enough numbers to be of some concern from the dual aspects of the item being deviated from its legitimate target and of the possibility of unwitting overdosage by uninformed consumers. While odd instances of the material straying is quite likely to be encountered in these populations, it is a matter that cannot be completely ignored and warrants investigation and follow-up.

2.11 Potency of various Vitamin A preparations available in the market:

In all countries, there were several Vitamin A preparations availble in the pharmacies, containing a wide range of Vitamin A. Some of the potencies were 4000, 5000, 6000, 20,000, 25,000, 50,000 and 60,000 IU. Attention was directed to the fact that Vitamin consumption, not always on physician's prescription, was becoming increasingly popular. Confusion regarding dosage of the massive dose capsules used in prophylaxis programs was evident among the distributors. This was in spite of careful training on the matter. Concern as to overdosage that might accrue from unsupervised use was expressed. This is, perhaps, a matter that needs looking into.

2.12 Side Effects of Megadose:

Field workers have frequently reported encountering complaints from parents and others in the community of the capsules causing headaches,diarrhoea, vomiting and even fever. As indicated earlier, it is not known how much of the vomiting is genuine reaction to HPVAC and how much is due to difficulty with swallowing. Even though such rumours may be expected in connection with a new medication, they nevertheless serve as a deterrent to satisfactory distribution of capsules. In Indonesia and in India, some of these complaints have been investigated and found to be unrelated to the ingestion of the vitamin. There are, undoubtedly, several reports of the illness which were not investigated, and it is therefore not possible at the present time to state categorically that no toxic reations have occurred. However, none have been verified.

2.13 Mechanism of Delivery:

Three aspects have to be contended with in developing a mode of administration: an effective coverage including those at greatest risk, insurance against repeated dosage at intervals less than 6 months, and feasibility of approach using existing personnel and infrastructure.

While the clinic approach would be more efficient by way of personnel, time and effort required, the extension approach of distribution at homes would be more efficacious: the children most in need of protection, such as children from the lowest socio-economic strata, often residing in remote and inaccessible areas, rarely making use of existing health facilities and often being at the highest risk of disease, are much more likely to be covered by this approach.

In Indonesia, the field workers would either have the children gathered in a central location with the assistance of village aides and the local authorities, or would go from house to house seeking out eligible children. Frequently, a combination of the two approaches would be used, with the children first being collected in one location, then by going from house to house to seek out missing children. The approach of gathering the children seemed more efficient but the procedure of going from house to house reduced the likelihood of missing children who were ill, malnourished, or whose parents were unable or unwilling to take them to the collection point.

2.14 Delivery system:

Maximum efficiency with a megadose Vitamin A distribution program is achieved by house to house distribution. This requires a large contingent of field workers, which makes the mechanism for delivery more expensive than the cost of the nutrient alone. Countries have attempted to keep costs of delivery systems to a mimimum by utilising either currently underutilised workers with reasonable experience in mass campaigns of one kind or another, such as malaria eradication, yaws or BCG, or by utilising existing channels and personnel. Integration into ongoing health delivery programs is advantageous in that institutionalisation would serve as insurance of future program viability.

In Bangladesh, distribution was initially undertaken by the basic workers of the malaria program. There are certain advantages to using unipurpose workers such as these. Since other activities do not compete for this worker's time, he is able to achieve a wider coverage, is able to follow up non-responders and is able to report more correctly and regularly. Later, the activities of the health and malaria eradication workers were functionally integrated, and all workers were trained to be multipurpose workers known as Family Welfare Workers (FWW). The subsectors were redelineated in order to reduce the area to be covered so that they could cope with the additional duties. The FWW covered all families in his area once a month.

In Indonesia also, the capsule distribution started with the use

of single purpose health workers who were specially trained for the distribution of capsules only. These are now being trained to be multipurpose workers, who will undertake, in addition to capsule distribution, nutrition and health education, and family planning in the integrated Nutrition/Family Planning program.

India is gradually training all its peripheral workers as multipurpose workers. Under this scheme, in addition to Auxiliary Nurse Midwives, the Family Planning Health Assistants (FPHAs) and other paramedical workers take on Vitamin A distribution. There is, however, difficulty encountered in some states (Kerala) in this move as additional duties are not compensated by corresponding salary increases, and supervision systems have been reoriented in a manner so that FPHAs are at a disadvantage. The FPHA union does not, therefore, permit them to participate in capsule distribution. These practical problems could have been foreseen and attended to prior to launching the scheme.

Experience derived from Indonesia has shown that training in a health discipline does not seem to be an essential pre-requisite for the handling of massive dose capsules. Since health personnel are in demand for programs in which their skills are required, it would seem that other types of reliable personnel could be utilised just as well as capsule distributors. Nevertheless, because capsule distribution is a preventive measure, it is appropriate that local health centres retain direction and supervision of distribution.

2.15 Registration:

The field workers administering the Vitamin were carefully trained in the registration procedures. The common procedure was as follows: each child who received a Vitamin A capsule was registered with name, age, parent's name, and address on a group registration form. In Indonesia, copies of this form were also sent to subdistrict and district centres. The date of receipt of the capsule was recorded against the name of the child both on the group registration form and on the family health card which was retained by the parent or guardian. It was hoped that the family health card would constitute a permanent record from which information regarding the recipient's age and date of receipt of the capsules could be obtained. At subsequent registrations, the family health card was then used to verify receipt of the Vitamin. In some countries, all children below the age of one year were also registered, but brought into the program only when they reached the age of one year. The loss rate of family health cards was high but expected to improve with time.

2.16 Recording and Reporting:

The various records, the information, and form of recording in the designated columns were explained clearly to all executive and operational personnel during the training sessions. Reporting procedures and the consolidation of findings at each level of the administrative set up was elucidated and the importance of maintenance of accurate records was stressed.

In recording receipt of Vitamin A, there was a remarks column intended for reasons why the child did not receive the Vitamin. The usefulness of this does not appear to have made much of an impact on most field workers, as it was rarely completed and much of the information on reasons for non-receipt was gleaned from impressions, conjectures and opinions rather than on concrete fact.

Information on how regularly children registered had successive doses was available only at the level of field worker. Reporting systems did not require that this information be relayed to the higher levels. Thus, assessment of how many children received second, third, and even fourth doses was not always easily available, except when investigated as a special research undertaking.

The reporting procedure was to report the number of doses administered in each cycle or round and the age distribution of these doses. This information was not always sent regularly by the workers.

There was considerable confusion at all levels as to reporting of doses administered. Both among peripheral workers and their supervisors, there was a lack of understanding of what a dose, and round and a beneficiary entailed. To some, a beneficiary was one who had two doses of Vitamin A per year. It appeared that the Expanded Program of Immunisation, launched at about the same time, was probably responsible for some of this confusion. Whatever was responsible, the net result was much distortion of the actual doses given.

One of the weakest aspects of the programs was the very poor maintenance of records. An evaluation in India revealed that there were no records about the receipts of the bottles nor coverage of the children in a number of sub-centres. As a result, evaluation of some of the administrative aspects was very difficult. In fact, even the Medical Officers who supervise this program at the primary health centre level do not seem to attach much significance to this aspect of the program. In a majority of instances, the figures provided by the Medical Officers reveal that there is no agreement between the amount of Vitamin A supplied to the sub-centres and the number of children covered. The health workers accord little importance and time to record maintenance, in view of the multifarious activities demanding their time and attention. The essential nature of record-keeping needs to be impressed and reimpressed on them.

Record maintenance aspects of programs need strengthening. It is desirable that record maintenance be kept to a minimum, if attention to this important aspect is to be ensured. The quantity of supplies received, the date of receipt, and the age/dose coverage of children would go a long way in monitoring the program effectively.

2.17 Collation and Consolidation of Data:

Findings from the field were transmitted to the supervisors, who

consolidated the findings of the various workers under their supervision, for onward submission to the medical officers in charge of the Primary Health Centres. Data from the various supervisors were compiled at the Primary Health Centre and transmitted to the District Medical Officer. Data up to the level of the District Medical Officer were all collated by hand. At the state level, the findings were collated and percentages were calculated using hand calculators and the consolidated information from the state was transmitted to the Statistical Cell at the centre, where national data were computerised.

Consolidated findings with analysis and comparisons worked out and interpreted did not routinely reach the states and periphery, unless a special evaluation or review was made. Interest and involvement in the program by the intermediate and peripheral workers thus remained at a relatively low level.

2.18 Registers and Records:

A factor contributing to poor record maintenance in India has been lack of adequate records and registers. One of the difficulties faced by peripheral workers seems to be that only specimen forms and no separate registers is supplied. It would help considerably if registers were supplied, so that the peripheral workers would not be faced with the problem of stationery.

2.19 Supervision:

Designated staff at each level of operation was responsible for closely monitoring program activities. The supervision was intended to determine whether the program activities were progressing in accordance with established procedures, whether there were any obstacles to reaching the desired goals, to check on how effectively the distribution was carried out and to provide consultation as might be necessary.

In India, at the field level, the public health nurse and health visitor supervised the ANM and often assisted with distribution and provided support in convincing the community of the value of Vitamin A capsules.

The health centre, district, and state Medical Officers were able to accord limited time to oversee the operation of the Vitamin A Prophylaxis Program, as it was one among many activities of which they were in charge. Their supervision was therefore often restricted to ensuring distribution data were sent to the State Directorate according to schedule.

The State Nutrition Officer was again confronted with the Vitamin A program being one of many other nutrition activities that needed attention, and so the time and attention to monitoring the program in all its numerous aspects was inadequate.

In Bangladesh, the Health Inspector and Sanitary Inspector were entrusted with the supervision of the family welfare worker and community health assistant respectively. They were to spot check family health cards, and mark in red, absence of a scheduled visit. This was not very satisfactorily done as the supervisory staff maintained they were busy with routine activities, and were hard put to find time or transport to undertake the supervision.

At the Central level, in some instances, Project Directors found themselves in an unenviable position of having to direct 3 and 4 National programs- e.g. Vitamin A Prophylaxis, National Oral Rehydration, Expanded Program of Immunisation and Primary Health Care. This inevitably meant limited time and supervision could be accorded to each of them, so that however effectively the supervision had been conceptualised during the planning process, when it came down to poorly carried out tasks.

In Indonesia, the health center heads, regency physicians, and provincial project leaders were requested to submit monthly reports of their supervisory activities related to the project, but such reports were infrequently submitted. Direct supervision of the field workers' activities appeared to have been relatively infrequent, which had rendered the verification of adherence to appropriate procedures and of the data contained in monthly reports difficult.

In India, in the course of an evaluation of the program, the figures provided by Medical officers revealed that there was no agreement between the number of bottles of Vitamin A concentrate supplied to the sub centres and the number of children covered. This suggests a lack of effective supervision over the peripheral workers.

2.20 Nutrition Education:

A massive dose program is undertaken as an emergency measure to reduce in a short period widespread deficiency of Vitamin A leading to blindness among pre-school children. This should always be viewed as an interim measure until such time as the more rational means of improving Vitamin A statue of a population by increasing their consumption of Vitamin A/Carotene rich foods from readily available sources is achieved. It stands to reason therefore that such an emergency program must always have the longer term measure of educating people to increase Vitamin A consumption as an integral component.

In most programs, however, there was little or no educational component. In Indonesia, until recently, educational aspects were generally integrated in applied nutrition program activities and were done in a conventional manner with a somewhat sterile approach. New and effective methods had not been explored or practiced. Currently, the Nutrition Intervention Pilot Project supported by the World Bank

recognising nutrition education as one of the weakest planks in the Prophylaxis program and recognising its vast potential has set about strengthening this element. A large project aimed at finding answers to various problems which now preclude the development of sound programs for prevention of Vitamin A deficiency was launched. Among factors investigated were the reasons for which Xerophthlmic children do not, at present, consume sufficient quantities of Vitamin or pro Vitamin A rich food to satisfy their requirements. Findings from this study revealed that over 88% of families of Xerophthalmia children surveyed in the study consumed green leafy vegetable (GLV) at least once a day. This indicated special horticultural activities are not widely needed since GLVs a rich source of Carotenes are apparently available to these families. Efforts would, therefore, need to be directed to changing feeding habits to ensure increased consumption of these available vegetables by pre-school children. The world over, there appears to be an apparent reluctance among young children to consume green leafy vegetable. Whether this is a mere reflection of parental attitude developed because of their own erroneous ideas of it not being suitable for young children or whether it is the time and effort taken to prepare in a form suitable to the child or inedeed whether there are other factors that contribute to an inherent dislike of the item by children need to be studied. Unless this phenomena is investigated in all its facets, it is going to be difficult to make headway in getting young children to consume green leafy vegetables.

Yet another step forward in making nutrition education a more effective feature is Indonesia's effort to use the services of a communication expert in devising pertinent and meaningful messages to the community. A prelude to the development of appropriate and pertinent messages in nutrition education is the Formative Evaluation Project where food and nutrition problems, their etiology, background, circumstances that hinder prevention are being determined through a research cum action project under the auspices of the Nutrition Intervention Pilot Project (NIPP). Information accuring from this project will be used to place nutrition education on a more viable footing.

There are two common problems to nutrition education in the developing countries. One is the difficulty of making services accessible to the rural population and the other is developing information channels which reach them. In attempting to satisfy these two requirements, the Indonesian Government has embarked on an integrated health and family planning program in which nutrition education and related activities are built into the extensive family planning network. The program aims to deliver a package of services (weighing of all pre-school children, immunisation, oralites for diarrhoea, distribution of Vitamin A capsules, Health and Nutrition Education and Family Planning) in an integrated manner to pre-school children, expectant and nursing mothers and women in the age group 15 to 44. The entire staff distributing Vitamin A in Bangladesh and Indonesia were male workers. Whether they can make a reasonable impact with educating mothers is questionable.

It appears doubtful that the men could have sufficient rapport with mothers and adequately convince them of the value of the Prophylaxis Program and much less the need to incorporate Vitamin A/Carotene rich foods in their diet.

In India, the field workers did what nutrition education they did in a perfunctory manner. They merely indicated that it was desirable for the population to consume carotene-rich foods without adequate interest or concern as to whether they acted on the advice, and if not, the reasons for not doing so, such as factors that operated in their availability, utilisation and consumption. The communities, as a result, did not attach much importance to this, and few families at all were motivated to increase their consumption of Vitamin A and Carotene sources.

Some field workers indicated they explained to the population that Vitamin A capsules contained juices extracted from Carotene rich foods. Implicit in this was that the need for consuming such foods was thereby diminished. In an era that is increasingly directed to the use of medicaments and drugs one sensed a conviction among these para-medical personnel of the superiority, no matter what the circumstance, of these capsules as as a Vitamin A source as compared to carotene rich foods. This points to the over-riding need for appropriate training and re-training of the functionaries with regard to this aspect. Many firmly believed that the chances of some of the parents procuring these foods were so poor because of relative cost and non-availability, and consequently the capsules constituted an alternative more accessible and practical source.

2.21 Research to analyse and identify low cost, easily available sources of Vitamin A and Carotene:

In efforts to educate populations to consume increasing amounts of retinal and carotene rich foods, it is incumbent that information on foods rich in the vitamin and easily accessible to the majority of the population is available. In addition, efforts to identify and analyse other foods for retinol and carotene content must continue, so that chances of enhancing consumption levels of the vitamin is improved. Many of the countries are making laudable efforts in this line. One such instance is the discovery by the Institute of Nutrition and Food Science, University of Dacca, that a small fish known as Mola (Amblypharygodon Mola Hamilton) abundantly available in ponds and rice fields has an unusually high content of Vitamin A. This and similar findings will be invaluable in the fight against Vitamin A deficiency in the Region and elsewhere.

2.22 Training:

Well trained and motivated staff contribute to the quality and

success of a program. Training of staff, both administrative and operational, has been undertaken on a multi-tier basis.

2.22.1 Training of Executives:

Usually, the training of the administrative staff and Chief Executive Personnel at national level (Coordinators, Directors of Health, Nutrition Officers) has been undertaken by the Nutrition Centre/Institute, in each country.

2.22.2 Training of Supervisors:

The trained executive and administrative staff, along with a member from the Nutrition Institute, have conducted training for all other executive and operational personnel in each District at the Regional or State Training Centres. This training has been reinforced occasionally at the District level for staff concerned. The topics included in the training were, objectives and goals of the program; program procedures and organisation; the nature of Vitamin A administration; specific job tasks and dosing techniques; registration of beneficiaries; record keeping procedures; reporting; evaluation of program coverage; worker efficiency; community information and education.

Diagnosis and treatment of Xerophthalmia have figured on occasions in the training. The State and District level training have dealt with the use of educational aids, flip charts, flash cards and manuals on their utilisation. Also considerable time has been spent on correct filling in of various record forms and periodic reporting of consolidated data. During training, stress has been laid on the need for flow of information from the field, which forms the basis of modification and reorientation of the program, so that it is really suited to the situations prevailing. Despite this emphasis, field staff seldom reported anything other than number of doses received and number of doses administered.

In India, CARE assists with financing of training of paramedical staff and School Teachers and contributes 45% of expenses of training. Health Education equipment and material such as slide projector, slides, nutrition leaflets, film strips, growth charts, weighing scales and registers are supplied.

2.22.3 Training of Functionaries/Distributors:

The Distributors, along with their supervisors, were thoroughly briefed at 1 to 3 day workshops, about the Vitamin A preparation, the strategy, specific job tasks, forms to be filled, registration, record keeping and reporting and nutrition education. The need for maximum coverage of targer population, inclusion of high risk groups and the desirability of investigating non-responders and impressing on the parents the value of the Prophylaxis was emphasised.

At present, the barest minimun information from the field is reported, or fed into the total system. It would seem that there is need for much more intensive training for the field staff, acquainting and exposing them to various types of information from the field that would be helpful to the program. One way, this might be achieved is by periodic meetings organised for field sraff from each district. At these meetings, the field staff might be asked to present case studies from their area and pertinent points from information so derived drawn out to indicate their significance and value to the program. Collection of such information could gradually be routinished to become an integral component of the field staff's job. This would serve to have the field staff more involved in the total undertaking as well as place the program on a sounder foundation.

2.22.4 Training of the Community:

Initial distribution cycle was preceded by visits by project leaders and executives to village leaders. The purpose of these visits was to explain the distribution and to obtain the cooperation of the local authorities. In Indonesia, each village leader appointed two residents of the village to serve as guides and render assistance to the field worker. These village aides were paid daily stipends for their participation. While in general, the assistance of the aides was somewhat helpful, in many cases, particularly in urban areas, the aides were found to be neither dependable nor knowledgeable about their areas.

A well informed public would make for an aware and motivated community which would, in turn, contribute to better participation. Hence, the population were informed as to the conditions resulting from Vitamin A deficiency, what the capsule/concentrate contained, what it was for, who will receive them and why, how often, where, who will distribute them and other details as required.

2.22.5 Retraining and Reorientation:

For various practical reasons, the training especially of the paramedical personnel or field workers who are actually responsible for the administration of the vitamin to the community, is restricted in duration. Often the time is inadequate for these people to register the information, understand and make it part of their action repertoire. Periodic retraining, refresher training or reorientation had served to mitigate this weakness, but for want of funds, time and difficulty of withdrawing field staff from routing activities was not always adequately attended to.

In Bangladesh, a commendable attempt towards reorientation and retraining is made, wherein each distribution cycle is preceded by a seven-day reorientation program for all program staff other than FWWs. The Health Inspectors, in turn, transmit the important elements of this refresher training to FWWs at Thana Centres.

A feature that is no substitute to retraining but would certainly be helpful in overcoming this problem to some extent would be to have lucid instructional guides prepared and distributed through the training period. This would not only serve as reference material for each worker, but also as an easy guide to such workers as may for one reason or another have not had the benefit of training on this program but with transfer or deputising, will, nevertheless, be required to undertake the dispensing of the vitamin.

2.23 Teaching/Learning materials:

Supportive materials such as flip charts, manuals on their use, flash cards, brochures, slides and film strips, are an invaluable aid in training distributors and in educating the public. These have been developed and designed locally and in most cases have been founded by UNICEF and CARE. In India, the Nutrition Institute has developed brochures on the subject which have been translated into the local languages in several States.

Much more training and practice in the maintenance and use of these materials appears to be necessary as judged from the use currently made of them. Staff state that the paramedical workers and other ancillary staff do not have an adequate understanding of how to complete growth charts or how to use them and are unable to explain their significance to mothers. This points to an important point. Development, duplication and provision of tools and aids is only one of a series of steps in the process of promoting and implementing a program. They can be completely useless if the staff, for lack of adequate knowledge as to their use, lack of functional competence or dearth of time or motivation, or for other reasons, are incapable of using them efficiently. The precise knowledge and specific skills required for functional competence has not received adequate attention so far. Much greater effort and time accorded to this aspect during training would seem greatly warranted.

During training, peripheral workers have been taught the use of these materials. However, 'Operational Expertise' cannot be imparted in a classroom situation and is best learnt within the framework of field situations. Attention to filling this lacuna in training would yield better returns from educational efforts.

2.24 Coordination of diagnosis and therapy with Prophylaxis:

It is not known what proportion of cases with ocular signs of Xerophthalmia were diagnosed. In most programs of prophylaxis with megadose, the operational personnel are trained essentially in the distribution of the megadose and in the related recording and reporting, and were seldom capable of or even interested in the diagnosis of Xerophthalmia. They, therefore, focussed their attention and efforts on distribution. Meanwhile, eye signs of Vitamin A deficiency remained largely unnoticed. In the not-so-frequent occasions when parents brought eye conditions to their attention, such cases were referred to the responsible Health Centre. Prophylaxis programs would have a better foundation and prognosis, if diagnosis and treatment of the disease

were also given concurrent and appropriate attention.

2.25 Treatment of Xerophthalmia:

Most medical personnel are unable to diagnose Xerophthalmia accurately, and treat it effectively and efficiently. The quality of treatment at the rural health units was, in general, poor. Treatment schedules based on most up-to-date knowledge and indicated in Report of Vitamin A deficiency in Xerophthalmia W.H.O. TRS 590 was seldom known. Doctors with no special interest or know-how in the diagnosis, and treatment of Xerophthalmia or its prevention, usually stumbled on some treatment schedule of their own. This quite frequently consisted of water based Vitamin A (100,00 IU) daily, parenterally until such time as there was remission of symptoms and was continued daily in some cases for as long as two weeks. Copies of current treatment schedules printed and made available to all Health Units would be of great help in upgrading treatment. A feature that hinders recommended treatment is the unavailability of Vitamin A capsules of appropriate specification. Treatment schedule recommended is:

Immediately on diagnosis	.. 100,000 IU; water miscible. preparation intra muscular.
Second day	.. 100,000 IU; Oil solution, oral.
Prior to discharge	
(Patient under 1 year of age)	100,000 IU; Oil solution, oral.
(Patient over 1 year of age)	.. 200,000 IU; Oil solution, oral.

High potency capsules, however, are available only in 200,000 IU specification rendering the administration of the oral dose of 100,000 IU for second dose and for third dose to patients under 1 year, difficult and cumbersome.

In the Philippines, daily administration of 25,000 IU capsules were used for treatment of Xerophthalmia, until there was remission of symptoms. There were reports on record of some of these capsules having been discarded because of mould.

Recent studies in Indonesia have confirmed that Xerophthalmia can be treated just as effectively with oral Vitamin A (200,000 IU) as with injectable water based Vitamin A (100,000 IU). The practical significance of this finding is widespread as treatment can now be undertaken with the relatively less expensive, easily available and easy to administer HPVAC. The extension of such information to countries with an appreciable public health problem deserves to be stressed.

There is a big time gap between availability of newer findings of research and making this known to practitioners in the field. Efforts to bridge this gap by developing a mechanism whereby newer findings of

considerable consequence can be relayed without delay to the peripheral units along with provision of the necessary material to have findings put into practice would reduce much of the unwanton wastage of precious sight.

It would appear that the International Vitamin A Consultative Group IVACG might play a vital role in achieving this. Regrettably, the work of this Group or its publications were little known among workers in this field. It would seem most useful to have the newsletter, and other publications made available to executive personnel of Prophylaxis programs.

2.26 Coordination with other Government departments and voluntary organization:

In India, special effort has been made to coordinate the Vitamin A prophylaxis program with supplementary feeding programs operated by the Social Welfare, Rural Development and other voluntary organisations. This is intended to promote the synergestic effects of efforts to improve the nutritional status and those providing preventive health measures. Since good supervision and control is fundamental to dispensing of high potency Vitamin A concentrate, the responsibility for this has been retained by the health personnel. These have not always been available in adequate numbers to cover the supplementary feeding programs, and therefore, coordination has been somewhat restricted.

2.27 Evaluation:

It would be desirable to have the element of evaluation incorporated into the program in such a manner that it is a continual process bringing to light difficulties, obstacles, pitfalls, digressions and other factors which affected effectiveness and efficiency. The feedback thus obtained would enable adjustments to be made while the program was in progress and not only permit continuous improvement of program implemation and design, but also prove useful for the planning for expansion of programs or establishing similar programs elsewhere. In practice, it must be pointed out that rarely is evaluation an intergral aspect of program design, but is carried out as an isolated activity at specific times.

Evaluation of Prophylaxis Programs should include assessment of the biological effectiveness of the program, efficiency of the project operations, efficacy and efficiency of operational personnel and community awareness and acceptance of the program.

2.27.1 Efficacy of Program in achieving coverage:

The aim of a program of prophylaxis is to obtain maximum coverage of target population ensuring those at greatest risk are included at minimal cost.

In Java where distribution was done in selected high risk villages, coverage was not adequate to reach the highest risk children, particularly

in later rounds. Coverage fell from 80% on the first cycle to 40% in the fourth. The single-most important fact contributing to the marked decline overtime in the estimated percentages of the target populations dosed was the depletion of capsule supplies. A second factor contributing to the decline in later rounds was the stricter adherence to the age limits defining the target population. A third factor thought to have been responsible for the decline was the transition of the distribution from a new program to a routine program with waning of enthusiasm and attention of the workers and interest of the villagers resulting in the workers being less industrious and the population less cooperative.

In India, record maintenance with regard to coverage was found to be poor. Out of 28 sub centres for which data were available, only in nine centres the coverage was 50% and in the rest even lower. Information on coverage for second dose was available only for 20 sub centres, and ranged from 50% to 80% in nine sub centres and in the remaining less than 30%. In fact, in eight sub centres, the coverage was only about 20%. Owing to poor records, it was not possible to discern what proportion of the children in the second round were covered in the first.

A detailed appraisal of available records indicated that in all eight primar health centres where there was no biological impact of the program, poor coverage was a major reason-- it being 20% or less.

In Bangladesh, the average coverage for first, second, third and fourth rounds were 78%, 68%, 59% and 53%.

2.27.2 Efficacy of program in achieving reduction of Xerophthalmia:

The objective of the program is to prevent blindness due to Vitamin A deficiency. It is, however, difficult to demonstrate such an impact in community studies because of various problems in identification of the severe cases, and because of large sample needed. An indirect impact of the program can be determined by assessing reduction in the prevalence of Xerophthalmia.

An evaluation carried out in two Indian States, Kerala and Karnataka, showed that there was 75% reduction in the prevalence of conjunctival signs of Vitamin A deficiency in children who had received two doses of the vitamin. Similar studies carried out in Indonesia and Bangladesh have also demonstrated the effectiveness of the massive dose program.

In India, systematic evaluation of the effectiveness of the program has not been taken up until recently except in the Kerala and Karnataka States. This is primarily because reliable baseline data are not always available regarding the incidence of Xerophthalmia. Only recently an evaluation method has been developed wherein baseline data on the incidence of deficiency signs are not essential. This is based on the observation that prevalence of Xerophthalmia exhibits a clear-out age trend progressively increasing with increasing age of children.

Using the above method, which is based on the relationship that exists between age on one hand and prevalence of Bitot spots on the other, the effectivness of the program in all the States in which it has been in operation for more than two years was examined. In 21 out of the 29 primary health centres surveyed, the age trends in the prevalence of Bitot spots were less discernible. In other words, the massive dose Vitamin A program appeared to be effective in these areas. In some of the areas, however, the initial prevalence itself was low, indicating that the problem of Vitamin A deficiency was not serious enough for the program to be initiated on a priority basis. This initial low prevalence by itself is responsible for the less discernible age trends in the prevalence of Bitot spots.

The massive dosage capsule program in the Philippines reduced night blindness and Bitot spots by about 70 per cent and eliminated all cases of corneal xerosis. Overall, the capsule program reduced the prevalence of active clinical Xerophthalmia by about 73 per cent.

2.27.3 Efficiency of program - Workload:

This was measured in terms of the number of children dosed per worker/day. Worker efficiency declined slightly overtime in West and Central Java and improved in East Java. Inconsistent reporting of working days in East Java made the apparent increase somewhat questionable. The daily coverage achieved by the field workers was lower than anticipated. Among factors reported as adversely affecting efficiency were long distance to be travelled, heavy rains which made travel difficult and parents reluctant to bring children out; the harvest during which parents frequently took their children with them; unreliability of village aids. In some areas, lack of cooperation from local authorities and parents and time-consuming record keeping procedures were given as reasons for small numbers of children covered.

In India, of the workers questioned, none indicated they covered more than five hundred children per worker, thus indicating poor coverage was due to reasons other than heavy workload. Among the common reasons mentioned by functionaries for poor coverage was short supply of the drug. In one State, heavy family planning workload was given as a reason and in two others, lack of cooperation by the community was mentioned as a contributing factor.

In Bangladesh, the Family Welfare Worker visited 30 to 40 houses per day. The coverage of target population achieved was 65%. It was not known whether poor coverage was due to (a) insufficient number of Family Welfare Workers, (b) insufficient number of capsules, (c) inadequate transportation or (d) inefficiency of Family Welfare Workers.

2.27.4 Knowledge of functionaries:

An attempt made in India to determine whether the functionaries are aware of the objectives of the program, found that 16 of 23 medical officers said it was to prevent blindness, 5 said it was to prevent Vitamin A deficiency, and 2 said it was to prevent night blindness.

None of them had given the complete objective of the program which was to prevent blindness due to Vitamin A deficiency among school children.

The majority of ANMs who answered this question said it was to prevent blindness, 11 said it was to prevent Vitamin A deficiency, and 2 said it was to prevent eye diseases. Only 2 said the correct objective.

Fourteen of the 25 medical officers responding to the evaluation indicated the distribution was spread throughout the year and the others said it was done on a crash basis. Twenty-three of the 44 ANMs said they were administering the Vitamin throughout the year, and the remaining 21 said it was done on a crash basis.

All the 25 medical officers were aware that the massive dose was to be administered every 6 months. Thirty-seven of the 40 ANMs who responded to the question said that the frequency of administration was half-yearly, one said quarterly, one monthly and one daily.

2.27.5 Knowledge of community served:

In India, data from evaluation indicated the community was not adequately aware about the program, what it was about, and what its objectives were. Their knowledge particularly about the importance of consumption of inexpensive Vitamin A and Carotene rich foods to protect against Vitamin A deficiency blindness was poor.

Awareness of the communities served in Bangladesh was very poor and consoderable confusion existed as to the nature of HPVACs, for they were often thought to be the same as contraceptive pills. One wonders if the fact that the FWW were all males was not responsible to some extent for a communication gap between the mothers and workers.

Creating awareness among the community is essential for the success of any public health program. Since the massive dose program is well accepted by the community, simulaneous and concerted efforts to educate the community about Vitamin A deficiency and the need to consume and feed Vitamin A rich foods to combat it may be expected to make the necessary impact. While the executives generally recognise that the education of the community to increase consumption is a fundamental aspect of any massive dose program, the operational personnel are not convinced of its importance or of the sptimal and practical ways of achieving this. So it is poorly put into practice.

One reason that mau contribute so this situation is that training of these workers has not emphasised functional competence. Moreover, the competence required to accomplish nutrition education has not been clearly identified, so that the precise knowledge and specific skills required to achieve this competence has not been determined.

2.27.6 Economic Analysis:

The costs of the various components of the pilot project for prevention of Vitamin A deficiency in Indonesia are shown in Appendix II.

Based on these figures, the average cost per capsule administered was Rp 80.5 or 19 ¢ U.S.

In India, the funds for Vitamin A are operated at the Centre in the Department of Family Welfare. The value of supplies sent to the States is debited to the State Accounts at the close of the financial year. This set up was probably responsible for the matter of costing receiving little attention at State level. Even information on costs of high potency Vitamin A concentrate was not always known, much less the costs of transport to the periphery or costs of distributing the concentrate.

2.27.7 Agencies participating in Evaluation:

In Indonesia, evaluation of the Vitamin A deficiency pilot project was conducted by the Government of Indonesia and the American Foundation for Overseas Blind. UNICEF also contributed with vehicles and the Vitamin A and placebo capsules used in the clinical study. Agency for International Development of the United States assisted with a grant towards partial costs of the evaluation. In India, both the interim evaluation of the program in Karnataka and Kerala and the comprehensive evaluation of the prophylaxis program were undertaken by the Ministry of Health and Family Welfare with the assistance of the National Institute of Nutrition, and the State Family Welfare Officer and Nutrition Officer.

In Bangladesh, UNICEF and the Government of Bangladesh have carried out evaluations with regard to coverage of target population independently. Helen Keller International has been requested for a consultant to assis with an impact evaluation being planned.

2.27.8 Action on recommendations from Evaluation:

In India, conclusions and recommendations from Evaluation are submitted to the Additional Secretary and Commissioner for Family Welfare, Ministry of Health and Family Welfare. The recommendations are then transmitted to the State Nutrition Officers for necessary action. The State Nutrition Officers send a copy of the evaluation report along with directives putting the recommendations into effect as far as possible - to all the District Health and Family Welfare Officers and other implementing authorities in the State for their information and guidance.

In Indonesia, the Vitamin A deficiency Steering Committee submits the recommendations to the Government. Task forces are established with the mandate of having the recommendations implemented on a national scale.

2.28 Precipitating factors in Xerophthalmia:

In a study in Indonesia to determine the exact cause of Xerophthalmia and nutritional blindness, 20% of corneal cases with active Xerophthalmia/Keratomalacia either had active measles or a history of measles preceding the onset of their eye diseases. This strongly

suggests measles can in fact precipitate Xerophthalmia. Prevention of measles through vaccination might signigicantly reduce the problem of nutritional blindness in Indonesia, and elsewhere.

2.29 Provision of HPVAC to all health units:

In most countries, HPVAC were made available only to the personnel and centres involved with mass distribution programs. This was probably warranted because of the risk of overdosage. In view of recent knowledge of the efficacy of oral dose of 200,000 IU of Vitamin A in oil, it would seem expedient that the relatively inexpensive and easy to administer capsules be made available to all health units for treatment. These would, of course, be need for education of the health community in its use as well as special safeguards to ensure there is no overdosage.

2.30 Coordination between Ophthalmologists, Paediatricians and Public Health Workers:

There was, in general, little interest among Ophthalmologists in the prophylaxis program. Apart from being vaguely aware of the existence of such a program, few have marginal knowledge as to the progress, impact, difficulties, and achievements in these programs. Ophthalmologists invariably indicated they were overwhelmed with the number of cases with other eye problems; Vitamin A deficiency seemed to be looked upon as a low priority problem, which by its nature, could be handled by public health personnel and nutritionists and did not, therefore, qualify for the specialised knowledge of Ophthalmologists. The majority of Paediatricians were like-wise over-burdened with the cases they attended to in hospitals and clinics and were not as yet geared to extending themselves into community problems and programs. Moreover, it seemed that these two groups of specialists were not adequately informed and therefore not closely involved or brought into the planning, organisation and evaluation of Prophylaxis programs.

2.31 Feedback and modification of program:

Prophylaxis was generally looked upon as a one-step process consisting of distribution of capsules rather than a continuum of distribution, recording, reporting up the various administrative channels, assessment of efficacy, efficiency and costs involved, modification of program based on above findings, and continuation with an improved program. One reason for this is that interest and motivation is low at the peripheral levels and there is a tendency to do just what is asked for and no more. Lack of interest is partially engendered by the fact that instructions come down the administrative channel, and findings or achievement go back up the administrative channel. Seldom if ever are collated results, interpretations and significance to the program and population made known to the peripheral workers. It is not surprising, therefore, that true involvement is marginal. Periodic seminars, whereby the results of prophylaxis programs are made known and obstacles to success and methods of overcoming these are ventilated among all staff concerned with execution and operation, would fo a far way in enhancing their interest and also in facilitating the continuous

process of planning, implementation, reporting, analysing and replanning that will make a program viable and successful. An example of the latter situation comes from Indonesia. A country-wide survey of prevalence of Xerophthalmia indicated that the areas of highest rish were not presently included in the limited capsule distribution program. These findings were incorporated into national plans and the program was reorganised to include these provinces.

3. Fortification of foods with Vitamin A:

Fortification of foods with appropriate amounts of Vitamin A has the advantage of reaching all those who consume the fortified food, and requires neither the active participation of the population, nor an elaborate and costly delivery system. The problem however is to select a food vehicle for fortification that meets the following requisites:

a) It should be widely consumed, especially by the group at greatest risk of Xerophthalmia.

b) Fortification through the manufacturing process must be feasible.

c) Should have a small range of variation in percapita consumption so that sufficient quantities of nutrient reach the target group without risk of overdosage to highest consumer.

d) Processing must be done at relatively few points. The addition should be stable and undiscernible by way of colour, taste and flavour in the vehicle selected.

3.1 Project Design of Research Project in the Philippines:

In the Philippines, a research project to evaluate the feasibility, relative effectiveness and cost of the fortification program was undertaken. The project covered 100 children aged 1-6, and 40 aged 7-15 years.

In order to select an appropriate vehicle the frequency of intake and the method of procuring and cooking a variety of food was collected. Frequency of consumption of these foods by pre-school children was ascertained. Of the most frequently consumed foods, the manufacturing process of salt did not lend itself to fortification. MSG, biscuits bread and other flour based food products could be fortified, but the latter were obtained from so many sources, which would render control on a national basis difficult. MSG was produced and marketed by two local firms, and 90% of it was controlled by one Company.

A further study showed that families consumed an average of two 2.4 gm packs of MSG daily. Examination of MSG and the manufacturing process showed this item fulfilled the criteria necessary for fortification. Each 2.4 gm packet was fortified with 15,000 IU of Vitamin A. Samples were tested for Vitamin A content and loss rates were determined. The results showed that average content of a packet was 11,600 IU after one year.

The fortified MSG was distributed to sample families on a two pack a day rate on a weekly basis. Empty packets were subsequently collected and replaced with new packs every week.

The fortified MSG program eliminated most of the cases of night blindness and the majority of corneal xerosis. Overall, the effect on active clinical Xerophthalmia was a reduction by about 77%.

The mean serum A value increased by about 8 mg between baseline and evaluation, and the percentage of children with low and deficient serum A levels decreased, reflecting a general improvement on the status of Vitamin A mixture.

This study suggested that the most practicaland effective approach at present to control Xerophthalmia on a large scale in the Philippines is that of MSG fortification.

3.2 Pilot Project of MSG Fortification with Vitamin A in the Philippines:

Following this somewhat restricted research project a much larger pilot project of MSG fortification for the control of Vitamin A deficiency is underway in the Philippines. The objectives of this project were the evaluation of effectiveness of MSG fortification in the control of Vitamin A deficiency, the identification of problems with regard to the fortification process, the evaluation of MSG distribution patterns, and the utilisation and acceptability of fortified MSG. Information derived from this project would provide the basis for a national Vitamin A fortification program.

Preliminary information collected indicated MSG is extensively used even in remote areas, and is a commodity that can be bought at a price as low as 15 centavos; it is technically feasible to fortify MSG. It is the cheapest possible vehicle that can maintain and protect the stability of Vitamin A and that can deliver 15,000 IU to the household for only 15 centavos. Each 15 ¢ pack is in a well protected polyethylene bag which is perfectly sealed. The fortification will not have any added cost. Part of the MSG will be removed and replaced by Vitamin A. MSG will be lessened and a valuable nutrient will be added at no extra cost to the consumer. The use of MSG is itself limiting as larger amounts than normally used cannot be used without altering the taste of the food to which it is added.

The study was conducted in three provinces, two of which served as experimental and one as control. A baseline survey on Vitamin A status was concluded, after which fortified MSG was distributed through normal marketing channels in the experimental provices. Follow-up surveys will be conducted one and two years after distribution of MSG.

Active community participation is not a critical factor in fortification as it is in massive dose capsule distribution. The critical factors are consumer acceptance of the fortified product, consumption levels of fortified product, ability to maintain constant levels of

nutrient in fortification and marketing systems that will permit easy access to the product.

3.2.1 Consumer acceptance of Fortified MSG:

At first, fine crystal MSG was used in the manufacture. The appearance of fine crystal looks distinctly different from the regular crystal.

The former looks moist, lumpy, especially when pressed, and is not as free flowing compared with the MSG regular crystal. The market surveys including consumer interviews conducted, indicated rejection of fine crystal by consumers.

The problem was remedied by changing fine crystal to regular crystal.

3.2.2 Consumption level of MSG:

IN the experimental provinces 84 and 86% of the households were consuming MSG. The consumption per household was 3.22 grams and per capita consumption was 0.5 grams.

3.2.3 Vitamin A content of fortified MSG:

Sample packets from production line randomly selected and assessed for Vitamin A indicated a greater fluctuation with use of the regular crystal. Probably because of poorer dissipation of regular crystal of Vitamin A in the MSG. Steps have been taken to remedy this problem by changing the type of Vitamin A from Retinol Palmitate to Retinol Acetate (325 L) which comes in beadlet form somewhat similar to the regular crystal MSG.

3.2.4 Reasons why some households did not use MSG:

Some believed it causes cancer, allergy and headach. Some did not like the taste and others had no money to buy it. While it is a small proportion, who for one reason or other, do not use the product, reasons given for their not using it cannot be totally ignored and need follow-up in the interest of achieving universal coverage.

3.2.5 Monitoring of supply and distribution:

This was done by gathering data on production, distribution and sales from the manufacturer.

3.3 Planning for fortification with Vitamin A in Indonesia:

In Indonesia, a study conducted jointly by the Government of Indonesia Helen Keller and International and HKI indicated three food products - wheat flour, refined sugar and MSG - as potential vehicles for prevention of blindness among pre-school children. The feasibility of fortification of these three products is being ascertained by collection of data and information from various producers, distributors and con-

sumers. The findings indicate the cost of Vitamin A fortification of wheat flour, refined sugar and MSG would be Rp 293 (US $ 0.47) Rp. 1,153 (US $ 1.83) and Rp. 36 (US $ 0.06) per child per year. The annual cost per capsule distribution is around Rp 140 (US $ 0.22) per child. The increase of price of wheat flour, refined sugar and MSG, due to Vitamin A fortification is 1.9%, 2.9%, and 1.5% respectively. Furthermore, wheat flour and refined sugar belong to the nine basic commodities, which are subsidised by the Government. Any change in price, would have extensive impact on the people, and the Government. MSG is freely marketed and its fortification would involve relatively little price change. Consideration should, however, be made on the issue that MSG has a negative effect on human health. Further information on this aspect need to be obtained. Also much more detailed information with regard to consumption of MSG is warranted to estimate amounts of Vitamin A to be incorporated in MSG and to safeguard against its potential toxicity. Technology for fortifying MSG with Vitamin A without affecting the white crystalline properties is needed to ensure good consumer acceptance. An actionable plan for fortifying MSG including means for fortification and control in the nine factories producting MSG in Indonesia needs to be worked out. MSG fortification should be tested through a tightly controlled pilot project before implementing on a national scale.

4. Public Health Intervention:

In the Philippines, a research project was mounted to test the technical feasibility for nation-wide application of alternate means of controlling Vitamin A deficiency.

Educational programs for increased consumption of Vitamin A sources, horticulture and disease prevention and control were deemed integral components of existing basic health services in the Rural Health Unit and therefore needed only emphasis and orientation towards the problem of Xerophthalmia. For this reason, these three were considered together as Public Health Intervention.

4.1 Principles:

Working principles behind this was the control of Vitamin A deficiency through the following mechanisms: (a) Control and prevention of infections and parasitic diseases, whereby demands and losses of Vitamin A were minimised, and the probability and predisposition of Xerophthalmia were lessened; early identification of clinical cases, and improvement of general health status, (b) Horticulture programs aimed at increased home production of sources of Vitamin A which could consequently increase income and consumption especially as related to nutrition education, (c) Nutrition education to create awareness of and concern for the problem of Xerophthalmia, the role of the family in the identification, treatment and prevention, appreciation of the common Vitamin A sources and the unpleasant consequences of Xerophthalmia.

4.2 Mechanics:

The operating methodologies of the intervention involved weekly one day visits to the area by a health team composed of a physician and

three paraprofessional health workers. Services included morbidity clinics, deworming, establishment of a village cooperative pharmacy, training of medical auxiliary workers, environmental sanitation with emphasis on water purification and sanitary toilets, horticulture and establishment of a community organisation to serve as a channel for implementation. Details are attached in Appendix. TTT

4.3 Effect on Xerophthalmia:

Public health intervention was found to have reduced the prevalence of active clinical Xerophthalmia by an average of about 44%.

4.4 Health Education:

In the Philippines, a most commendable effort is being made whereby the resources of the private sector is mobilised and channelled into the main stream of the nutrition program. The Barangay Nutrition and Health Scholar (BNHS) Project involves the training of capable Barangay residents to render basic health and nutrition services in their own Barangays. They conduct baseline surveys and weigh children. They provide information and education to the community, conduct home visits and mothers' classes supplemented by nutrition service, the scholars provide health referals and family planning information, assistance in food production activities and instructions on environmental sanitation.

To maximise the effectiveness of the BNHS, the use of a mobile van (Nutri-Bus) manned by a communicator and a driver-technician and equipped withVTR facilities was initiated. The UNICEF, Coca Cola and the National Nutrition Committee jointly gave financial and technical support to this innovative scheme. Each bus with its compact load of technology, manpower and supplies can service ninety Barangays in a period of two weeks. A Nutri-Bus Team brings into a Barangay a programmed series of tested nutrition education materials to reinforce the work and the influence of BNHS in the area. Each scheduled visit is also intended to monitor and evaluate the progress of all the nutrition committees at the Municipal and Barangay level.

In conclusion it must be pointed out that the various methods of Vitamin A prophylaxis are not mutually exclusive. For example, the MSG fortification in Indonesia revealed that while 70% of Xerophthalmic children in West Java consume MSG only 30-40% in high risk areas of Aceh and Lombok do. While MSG fortification would reduce the problem in West Java it would leave these two high rish areas unprotected.

It would, therefore, be desirable that whenever one method of intervention is used nation-wide, consideration be given to the other two approaches being used in addition whereever appropriate and indicated. For example, it a nation-wide program of MSG fortification is launched, the HPVAC distribution and Public Health Intervention approaches should be incorporated where appropriate into existing Government health and agriculture programs.

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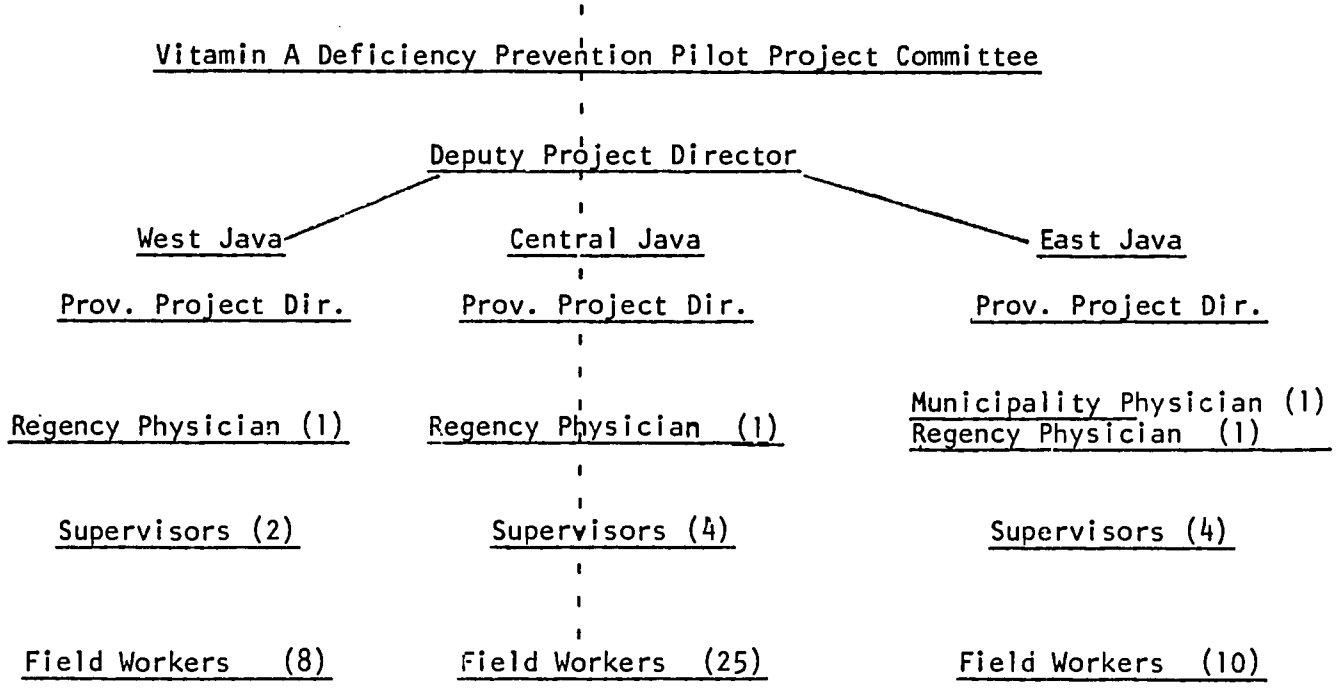
APPENDIX I


Vitamin A Deficiency Prevention Pilot Project Committee
Deputy Project Director
West Java
Central Java
East Java
Prov. Project Dir.
Prov. Project Dir.
Prov. Project Dir.
Regency Physician (1)
Regency Physician (1)
Municipality Physician (1)
Regency Physician (1)
Supervisors (2)
Supervisors (4)
Supervisors (4)
Field Workers (8)
Field Workers (25)
Field Workers (10)

APPENDIX II

PROJECT OPERATIONAL COSTS: 1972-75+

GOI Costs	Central Administration		Provincial Costs		Totals	
	Rupiah	Dollars	Rupiah	Dollars	Rupiah	Dollar
A. Incentives	1,824,000	$ 4,395	8,548,000	$ 20,598	10,372,000	$ 24,993
B. Supplies	2,800,000	6,747	770,000	1,855	3,570,000	8,602
C. Equipment	-	-	250,000	602	250,000	602
D. Handling	350,000	843	945,000	2,277	1,295,000	3,120
E. Travel	850,000	2,048	922,000	2,222	1,772,000	4,270
F. Miscellaneous	1,400,000	3,373	918,000	2,212	2,318,000	5,585
G. GOI Totals	7,224,000	$ 17,406	12,353,000	$ 29,766	19,577,000	$ 47,172
UNICEF COSTS						
A. 40 Bicycles for field workers					830,000	$ 2,000
B. Purchase and shipment of capsules					2,131,000	5,134
C. UNICEF Total					2,961,000	7,134
GRAND TOTALS					22,538,000	$ 54,306

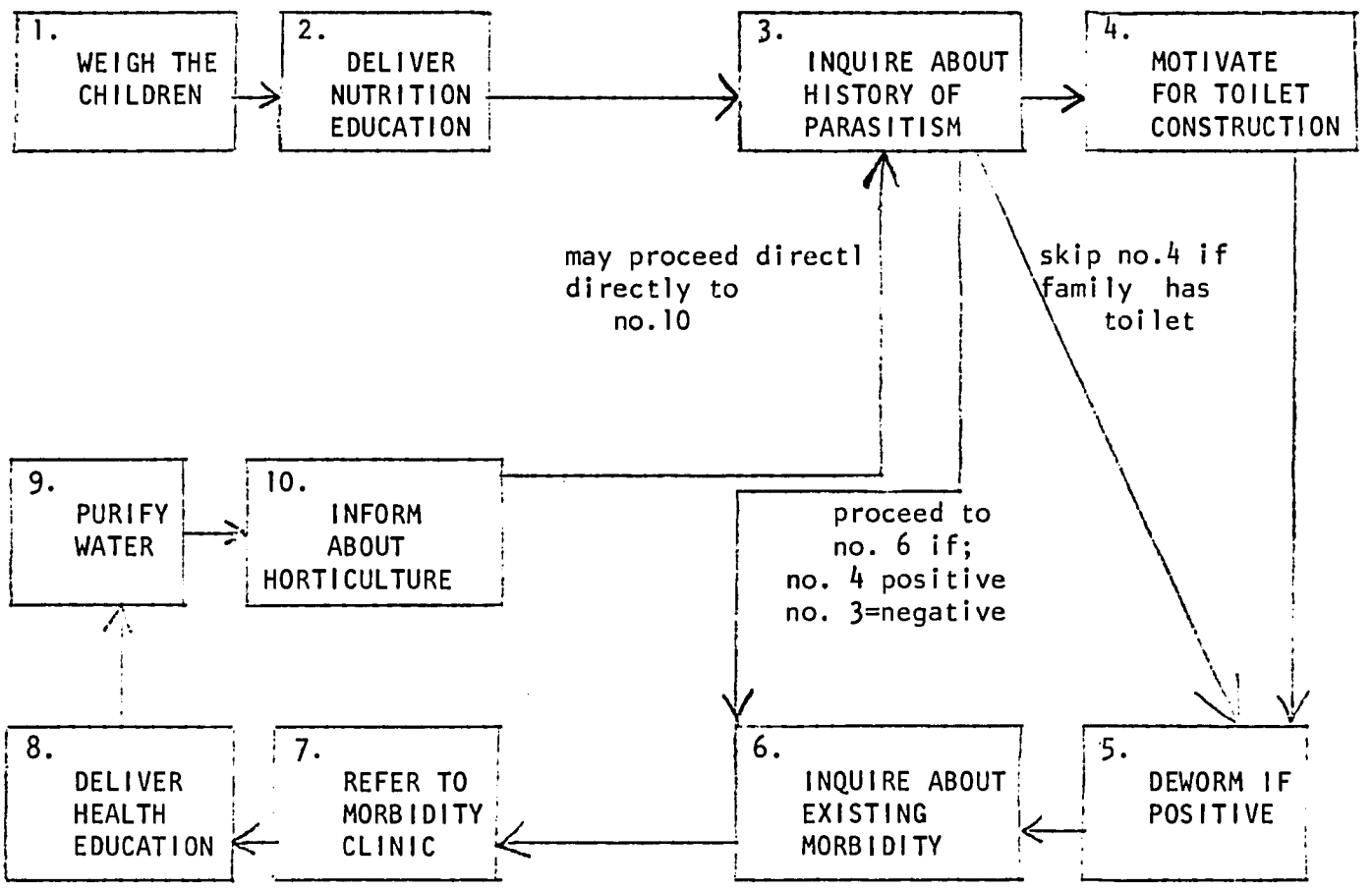
+Exchange rate used: Rp 415 = $1 U.S.

APPENDIX III

INTENSIVE FAMILY CARE

METHODOLOGY FLOW CHART

If normal weights
reinforce nutricional habits



skip no.7 if no.6 is negative