PROGRAMS TO IMPROVE THE NUTRITION OF PREGNANT AND LACTATING WOMEN

Carlos H. Daza and Aaron Lechtig

Nutritional deficiencies common in Latin American populations constitute a leading public health problem and appear to pose a serious obstacle to social and economic development in many countries. The problem of maternal malnutrition is especially acute, partly because pregnant women tend to experience particularly severe malnutrition, and partly because a mother's nutritional problem tends to affect the nutritional state of her child. This article presents some basic guidelines for programs seeking to improve the nutritional status of pregnant and lactating women in Latin America.

Introduction

Available evidence suggests that maternal malnutrition during pregnancy and lactation may create enough of a social and economic burden to make it a leading public health problem and a serious obstacle to development in many Third World countries. Conversely, investment in programs for improving women's nutritional status during pregnancy and lactation could yield enough of an economic and social return to stimulate national development.

Thus, especially since the remarkable adaptability of the human reproductive process is no reason for public health inaction, our aim should be to determine, under operational conditions, which programs directed at this problem are likely to be effective and feasible.

This article seeks to narrow the gap between academic research and practical policies by discussing some guidelines for programs and strategies aimed at improving the nutritional status of pregnant and lactating women.

Developing a Nutrition Program

A nutrition program is a whole complex of activities organized for specific purposes. Therefore, the process of developing a program implies making a detailed selection of objectives and of measures for achieving those objectives in a given length of time. This, in turn, implies making an orderly distribution of the resources, activities, and tasks needed to carry out the chosen course of action while keeping the established objectives continually in mind (1).

The steps taken to design, implement, and evaluate programs for improving the nutritional status of pregnant and lactating women are necessarily similar to those normally taken to deal with any health problems, namely:

a) analysis of the current nutrition and food situation;
b) definition of objectives and targets;
c) identification of human and material resources required;
d) program implementation; and
e) continuing evaluation and feedback to im-
prove the program.

The remainder of this article is devoted
to considering each of these steps in turn.

Analysis of the Current Situation

Such analysis, which includes a food and
nutrition assessment, should be based upon
thorough understanding of several inter-
related factors—the geographic, sociocul-
tural, demographic, and health features of
the specific population; the administrative
structure and organization involved; and
the economic and financial implications of
the nutritional problem itself (1).

A review of the main nutritional prob-
lems in the Americas (2) recently concluded
that although the countries of Latin Amer-
ica differ markedly in many respects, on
the whole their people have a diet notably
deficient in energy, protein, vitamin A,
riboflavin, iron, folates, and iodine (3-13).
Although these deficiencies are especially
pronounced among poor socioeconomic
strata, both urban and rural, wherever
they exist they are likely to have a dramatic
impact upon maternal and child health
(14-17).

Various food intake studies of pregnant
women in Latin American population
groups with low socioeconomic status have
been made over the past decade (18, 19, 5,
20). These studies indicate continuing di-
etary deficiencies, especially with regard to
energy, vitamin A, riboflavin, and iron.

Only a small proportion of the pregnant
women studied in such populations have
shown adequate excretion of riboflavin
(21). Moreover, blood samples from these
women have shown low levels of vitamin A,
carotenes, and hemoglobin as well as low
hematocrits (18).

Although no significant differences in
levels of serum protein have been detected
(22), complementary data (Fig. 1) show an
abnormally high ratio of nonessential to
essential amino acids in plasma from preg-
nant women and newborns in groups with
low socioeconomic status (23).

Serum levels of vitamin A follow a simi-
lar pattern. As Figure 2 shows, these levels
tend to be low in mothers and newborns
from groups with low socioeconomic status.
The magnitude of the differences, how-
ever, is less in umbilical cord samples from
the newborn than in samples from the
mothers. This fact suggests that, at least in
the case of vitamin A, a placental mecha-
nism exists that tends to protect the fetus
(24).

Information about proportion of women
with deficient (less than 15 per cent) trans-
ferrin saturation has defined the magni-
tude of the iron deficiency problem in Cen-
tral America and Panama. The data pre-
sent ed in Figure 3 clearly show that at
least 50 per cent of the women sampled
were deficient (5).
The fact that folate deficiency also exists becomes more evident when iron is administered to pregnant women. It has been found, for example, that sera from 58 percent of a sample of pregnant women with low socioeconomic status had low or deficient folate levels (25, 26). This point merits special attention because of increasing evidence that folate deficiency during pregnancy adversely affects fetal growth (27).

At the present time the most limiting nutrients for pregnant women in Latin America are energy, protein, vitamin A, riboflavin, iron, and folates. Iodine should be added to this list in areas where endemic goiter is highly prevalent.

It should also be noted that in many poor areas where malnutrition is prevalent, pregnant women suffer from nutrient deficits that are qualitatively similar but quantitatively greater than those observed in the general population.

Still more important, the available evidence indicates that in many ways the nu-
Nutritional status of a fetus reflects deficiencies experienced by its mother. Thus, maternal nutrition has great public health significance, because it affects not only mothers but also their unborn children. In addition, pregnancy brings with it increased need for nutrients, a fact that should be kept in mind when planning public health programs.

In planning action programs one of the difficulties in analyzing current nutritional situations is that, in general, nutrition surveys fail to provide a clear understanding of the significance and magnitude of the problem, the population segments at highest risk of malnutrition, or the most important conditioning factors involved. Moreover, they usually present their data in the form of national averages. This can lead to serious error of interpretation, since the intakes of the more needed segments of the population tend to differ greatly from average figures.

For planning and action purposes, the essential thing is to establish what is happening in the different situations and socioeconomic categories within each country. This information is what provides the policy and decision maker with the knowledge needed to understand the nature and magnitude of the nutrition problems, to identify the large disparities that exist between social groups in different geo-economic contexts, to point out the importance of certain basic foods to satisfy the requirements of the low socioeconomic groups, and to make the most appropriate decisions in each circumstance. In addition, it is essential to develop simple high risk indicators and to use them in the continuous surveillance of each country's nutrition and health status.

**Definition of Objectives**

Besides considering nutritional matters, this phase of work must define the coverage the program will provide, the implementation time required, and restrictions on extension of services. Within this context, it is also essential to define the technical and administrative standards the program is to maintain.

The program objectives should be formulated taking into account the recommended dietary allowances for the specific country and population groups involved. These estimated dietary allowances are needed to plan food supplies and consumption goals for the population; to interpret food intake records when assessing the nutritional status; to formulate nutrition policies; and to guide nutrition education programs, orient food technology, and regulate the nutritional quality of foods. Therefore, it is important to define, as clearly as possible, what the recommended dietary allowances are for pregnant and lactating women and the way to satisfy their nutritional requirements.

As an illustration, Table 1 presents the recommended dietary allowances during pregnancy and lactation for women in the United States, Central America, and the Caribbean. Comparable data for nonpregnant adult women are also included. There are some striking differences (e.g., differences in recommended iron intake arising from different assumptions about absorption rates). Some other differences can be ascribed to differences in the standard body size estimated for each population. However, there are other differences—such as the tendency to recommend lower energy and higher protein intakes in the United States—that can only be partially explained by different patterns of physical activity. For example, some differences in the recommended protein intakes (54 g vs. 76 g) are large enough to have major implications for planning food supplies or for interpreting consumption records when assessing a population group's nutritional risk.

Another important question in defining objectives for a nutrition program is the feasibility of those objectives. Very often, the recommendation has been to reach
Table 1. Recommended dietary allowances for non-pregnant, pregnant, and lactating women in the United States, Central America, and the Caribbean. These allowances are intended to provide sufficient amounts of nutrients to maintain health in nearly all population groups.

<table>
<thead>
<tr>
<th>Item</th>
<th>Not pregnant</th>
<th>Pregnant</th>
<th>Lactating</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>U.S.A.</td>
<td>Central America</td>
<td>Caribbean</td>
</tr>
<tr>
<td>Energy (kCal)</td>
<td>2,000</td>
<td>2,050</td>
<td>2,200</td>
</tr>
<tr>
<td></td>
<td>2,300</td>
<td>2,400</td>
<td>2,485</td>
</tr>
<tr>
<td></td>
<td>2,500</td>
<td>2,600</td>
<td>2,750</td>
</tr>
<tr>
<td>Protein (g)</td>
<td>46</td>
<td>45</td>
<td>41</td>
</tr>
<tr>
<td>Vitamin A (retinol equivalents, µg)</td>
<td>800</td>
<td>750</td>
<td>750</td>
</tr>
<tr>
<td>Vitamin D (µg)</td>
<td>0</td>
<td>2.5</td>
<td>2.5</td>
</tr>
<tr>
<td>Vitamin E (I.U.)</td>
<td>12</td>
<td>15</td>
<td>15</td>
</tr>
<tr>
<td>Thiamine (mg)</td>
<td>1.0</td>
<td>0.8</td>
<td>0.9</td>
</tr>
<tr>
<td>Riboflavin (mg)</td>
<td>1.2</td>
<td>1.1</td>
<td>1.2</td>
</tr>
<tr>
<td>Niacin equivalents (mg)</td>
<td>13.0</td>
<td>19.5</td>
<td>19.5</td>
</tr>
<tr>
<td>Pyridoxine (mg)</td>
<td>2.0</td>
<td>2.5</td>
<td>2.5</td>
</tr>
<tr>
<td>Ascorbic acid (mg)</td>
<td>45</td>
<td>50</td>
<td>50</td>
</tr>
<tr>
<td>Folic acid (µg)</td>
<td>400</td>
<td>400</td>
<td>400</td>
</tr>
<tr>
<td>Vitamin B12 (µg)</td>
<td>3.0</td>
<td>2.0</td>
<td>2.0</td>
</tr>
<tr>
<td>Calcium (mg)</td>
<td>800</td>
<td>450</td>
<td>500</td>
</tr>
<tr>
<td>Magnesium (mg)</td>
<td>300</td>
<td>250</td>
<td>250</td>
</tr>
<tr>
<td>Iron (mg)</td>
<td>18</td>
<td>28</td>
<td>28</td>
</tr>
<tr>
<td>Iodine (µg)</td>
<td>100</td>
<td>84</td>
<td>84</td>
</tr>
</tbody>
</table>


*Based on moderate activity for adults; adjustments should be made for greater or lesser activity.

*Adjusted to Net Protein Utilization (NPU) = 70 for average Caribbean diet (except for infants 0-1 year of age), which is reference protein.

established dietary allowances with daily intakes of milk, eggs, meats, cheeses, whole or enriched grains, legumes, fruits, vegetables, and butter or margarine. However, a diet of this pattern is beyond the reach of most poor segments of the population. Therefore, besides stressing the need to increase purchasing power and food availability, emphasis should be placed on formulating recommendations that include practical and feasible food ration models for specific target populations—models enabling the requisite nutrients to be obtained in ways best-suited to conditions prevailing in a particular country.

The data presented in Table 2 show how women in rural Guatemala could satisfy their need for additional nutrients during pregnancy by using food products available in the community. If these foods are used,
Table 2. Daily dietary “cost” of pregnancy in an indigenous rural community of the Guatemalan highlands, 1978, based on recommended increases in the intake of local products.

<table>
<thead>
<tr>
<th>Nutrient values and cost of local products</th>
<th>Nightshade*</th>
<th>Beans (4 tablespoons, cooked)</th>
<th>Tortillas (yellow, 2 units)</th>
<th>Cheese (15 g)</th>
<th>Tomatoes (1/2 unit)</th>
<th>Cabbage (1 leaf)</th>
<th>Total recommended increase during pregnancyb</th>
</tr>
</thead>
<tbody>
<tr>
<td>Energy (kCal)</td>
<td>10</td>
<td>108</td>
<td>186</td>
<td>65</td>
<td>5</td>
<td>6</td>
<td>360</td>
</tr>
<tr>
<td>Protein (g)</td>
<td>1.1</td>
<td>7</td>
<td>5</td>
<td>4</td>
<td>0.2</td>
<td>0.4</td>
<td>17.7</td>
</tr>
<tr>
<td>Calcium (mg)</td>
<td>48</td>
<td>28</td>
<td>142</td>
<td>341</td>
<td>1</td>
<td>10</td>
<td>570</td>
</tr>
<tr>
<td>Iron (mg)</td>
<td>2.7</td>
<td>2.4</td>
<td>2.2</td>
<td>0.2</td>
<td>0.1</td>
<td>0.2</td>
<td>7.8</td>
</tr>
<tr>
<td>Thiamine (mg)</td>
<td>0.04</td>
<td>0.2</td>
<td>0.1</td>
<td>0.05</td>
<td>0.01</td>
<td>0.01</td>
<td>0.04</td>
</tr>
<tr>
<td>Riboflavin (mg)</td>
<td>0.06</td>
<td>0.06</td>
<td>0.04</td>
<td>0.01</td>
<td>0.01</td>
<td>0.01</td>
<td>0.01</td>
</tr>
<tr>
<td>Niacin (mg)</td>
<td>0.1</td>
<td>0.6</td>
<td>1.0</td>
<td>0</td>
<td>0.1</td>
<td>0.1</td>
<td>1.9</td>
</tr>
<tr>
<td>Retinol (vitamin A, μg)</td>
<td>115</td>
<td>0</td>
<td>14</td>
<td>29</td>
<td>13</td>
<td>2</td>
<td>173</td>
</tr>
<tr>
<td>Cost (US cents)</td>
<td>1</td>
<td>2.2</td>
<td>2.0</td>
<td>3.0</td>
<td>0.5</td>
<td>0.3</td>
<td>9.0</td>
</tr>
</tbody>
</table>

*It may be replaced by: chard, watercress, goosefoot, crotalaria, spinach, lettuce, carrots, ripe mango or 1 g of cow liver.

**INCAP, Recomendaciones dietéticas diarias para Centro América y Panam.**

the additional investment required during pregnancy is about 9 cents per day—as compared to about one dollar per day for the foods traditionally cited in nutrition education schemes of developed countries (28).

The data in Table 2 also indicate that although vitamin A can be obtained in sufficient quantity from these locally available foods, other strategies—such as vitamin A supplementation, or fortification of a suitable food—would be needed to ensure adequate vitamin A intake for pregnant women in this population (29).

The nutrient content of a food supplement should be designed to correct or compensate for the main limiting nutrients in the home diet. Thus, a high-protein supplement may not be appropriate for populations—like many of those in the Third World—where the main limiting nutrients are sources of energy rather than protein. On the other hand, in populations where the staple food has a low content of protein (e.g., cassava), a high-protein supplement would be appropriate. It is advisable that the protein-calorie ratio of the supplement should not be lower than that of the home diet.

Two other public health considerations—dose-response and time-response relationships—also merit consideration. Data from different sources suggest that the dose-response may range from 25 to 84 grams of increased weight at birth per 10,000 supplemented calories during pregnancy. Thus, the effect a food supplement will have on the proportion of low birth-weight babies could be roughly predicted from the expected increase in average birth-weight and the distribution of infant birth-weights in the population before the intervention began (30).

Regarding time-response, the data available suggest that the more nearly the food supplementation coincides with pregnancy, the greater will be its effect on birth-weight. However, during pregnancy the effects of supplementation (per supplemented calorie) will tend to be similar, regardless of the trimester in which it is provided (16). Thus it is reasonable to expect that food supplementation provided during the third trimester of pregnancy will have a significant effect on both fetal growth and the mother’s nutritional status.

The type of food supplement to be provided should be selected so as to maximize acceptability and local self-reliance, and to minimize cultural or economic dependence on imports. To the extent possible, locally available foods should be utilized. For example, in Central America a food supple-
ment combination of corn, beans, and vegetable oil may be the most appropriate—not only nutritionally, but culturally and economically as well. Of course, the availability of key limiting vitamins and minerals is an additional matter that needs to be considered when selecting types of food supplements.

Decisions about the amount of food to be provided should depend mainly on the estimated average nutrient deficits in the home intake, the expected rates of replacement of home intake by the supplement, the expected dose-response relationship, and the cost of the supplement.

Let us assume, for example, that energy intake needs to be supplemented because the energy intake deficit is about 30 per cent (720 calories daily); that 25 per cent of the supplement will merely replace other food in the diet (i.e., the replacement rate is 25 per cent); and that the expected dose response is 33 g of birth-weight gain per 100 daily net supplemented calories during the last trimester of pregnancy. Also, the proportion of low birth-weight babies (under 2,500 g) delivered before supplementation in the hypothetical community was 20 per cent, the proportion weighing less than 2,400 g was 8 per cent, and the proportion weighing less than 2,300 g was 6 per cent.

Under these circumstances, a daily supplement of 400 calories during the last trimester of pregnancy would be expected to decrease the proportion of low birth-weight babies from 20 per cent to 8 per cent. That is, there would be an effective average supplement (after replacement) of 300 calories per day, a total expected birth-weight gain of 100 g (3 x 33 g), and a consequent elevation of all but 8 per cent of infant birth-weights to at least 2,500 g. Similarly, a daily supplement of 800 calories during the last trimester would be expected to diminish the proportion of low birth-weight babies from 20 per cent to 6 per cent.

If each supplemented calorie cost .02 cents, the cost of providing 400 calories daily would be 8 cents per day, while the cost of providing 800 calories would be 16 cents per day. Therefore, in this case a decision to provide 400 calories of supplement per day might be appropriate.

There are some advantages to distributing the food supplements at central locations within the village as compared to having them prepared at individual households. These are, principally, that this procedure minimizes replacement of items in the home diet if the supplement is provided between regular mealtimes; it avoids the need to supplement the diets of all family members; and it may facilitate nutritional education. However, if population groups are very dispersed, or if not even minimum local facilities are available, such central distribution may not be feasible.

It should be noted that although a family ration may be the most appropriate procedure to avoid dilution of the food supplement among all the family members, it is roughly five to seven times as expensive as maternal single supplementation. It also increases the probability of home diet replacement and of the family becoming economically dependent on the supplement. Such potential disadvantages may totally cancel out the advantages of the family approach.

Also, sometimes the lack of specific kitchen equipment for preparing certain supplements (such as oil-fried foods) may prevent the mother from using them, or may sharply reduce their effectiveness and acceptability.

Identification of Required Resources

This step implies a comprehensive assessment of the existing health infrastructure. Not only must this analysis take account of the human and material resources but also the organizational and administrative setting for operating the health program. Particular attention should be given to defining specific nutrition activities and tasks
to be performed by the available personnel at all levels of the health system (31).

Table 3 provides an example of the types of personnel involved and the services rendered by an integrated primary health care and nutrition program serving three rural communities in Guatemala. Table 4 breaks down program activity into tasks aimed at improving the nutritional status of pregnant and lactating women. In defining these tasks, nutrition services must be integrated with other health actions, and must never be depicted as a separate, vertical activity. It should also be recognized that Table 4 is presented merely as an example, not as any sort of rigid model to be closely followed.

The functions of program personnel should revolve about their assigned tasks—execution, teaching, supervising, making referrals, and participating in other community activities. Each of the tasks should be carefully described in the program's operations manual to ensure proper service delivery.

One key task, identification of pregnant women with high nutritional risk, can be done using very simple risk indicators. These indicators do not necessarily require that the mother be weighed, and their predictive value is independent of the gestational age of the fetus (32). The data in Figure 4, collected at four rural Guatemalan villages, help to bring out relationships between the proportion of low birth-weight babies delivered by different groups of mothers, food supplementation received, and levels of nutritional risk defined by maternal height and socioeconomic status. It is clear that both height and socioeconomic status were associated with the risk of delivering a low birth-weight infant. It is also evident that food supplementation had a dramatic effect on the proportion of low birth-weight babies delivered by the group of short mothers with low socioeconomic status—who were the mothers at greatest risk of malnutrition. In contrast, the food supplement appeared to have no measurable impact on the proportion of low birth-weight infants born to mothers at low nutritional risk (tall mothers with high socioeconomic status). These data therefore indicate that: (1) the food supplement will have its greatest impact upon women at high nutritional risk; and (2) whether or

<table>
<thead>
<tr>
<th>Level of care</th>
<th>Personnel involved</th>
<th>Tasks performed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Home</td>
<td>• Family</td>
<td>• Health, nutrition and family planning (educational and promotional activities)</td>
</tr>
<tr>
<td></td>
<td>• Midwife</td>
<td>• Simplified maternal and child health care—preventive measures and treatment of minor morbidity</td>
</tr>
<tr>
<td></td>
<td>• Health promoter</td>
<td>• Early detection of high-risk individuals</td>
</tr>
<tr>
<td></td>
<td>• Rural health technician</td>
<td>• First-aid referrals</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Health post</td>
<td>• Auxiliary nurse</td>
<td>• Health, nutrition and family planning (educational and promotional activities)</td>
</tr>
<tr>
<td></td>
<td>• Nurse</td>
<td>• Maternal and child health care</td>
</tr>
<tr>
<td></td>
<td>• Dentist</td>
<td>• Preventive measures</td>
</tr>
<tr>
<td></td>
<td>• Physician</td>
<td>• Medical care</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Dental health, nutrition, and family planning services</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Referrals</td>
</tr>
</tbody>
</table>

Table 3. Specific tasks of health personnel in an integrated primary health care and nutritional program serving three rural Guatemalan communities.
Table 4. An example of program activity (food supplementation) broken down into specific tasks, frequency, personnel, and functions.

<table>
<thead>
<tr>
<th>Activity</th>
<th>Tasks</th>
<th>Frequency</th>
<th>Personnel and functions (E = execution, P = participation, R = referral, S = supervision, T = teaching)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>2) Conduct census of pregnant women</td>
<td>Update bimonthly</td>
<td></td>
</tr>
<tr>
<td></td>
<td>3) Identify pregnant women at high nutritional risk</td>
<td>Promotional campaign every two months</td>
<td></td>
</tr>
<tr>
<td></td>
<td>4) Distribute food supplement to pregnant women at high nutritional risk</td>
<td>Every two weeks, beginning at detection of high nutritional risk pregnancy</td>
<td></td>
</tr>
<tr>
<td></td>
<td>5) Provide nutrition orientation associated with food distribution</td>
<td>Simultaneous with food distribution and bimonthly home visit</td>
<td></td>
</tr>
<tr>
<td></td>
<td>6) Follow up pregnancies at high nutritional risk</td>
<td>Once during last trimester</td>
<td></td>
</tr>
</tbody>
</table>

The goals of the program were to detect all pregnancies before the third trimester; to identify all pregnant women at high nutritional risk before the third trimester; and to reduce the incidence of low birth-weight babies from 20 to 10 per cent.

Figure 4. Proportions of low birth-weight babies in different maternal groups defined by socioeconomic status, supplementation received during pregnancy, and maternal height.

![Table 4](image)

![Figure 4](image)
not they receive the supplement, women at slight nutritional risk will deliver a relatively small percentage of low birth-weight babies.

Some maternal characteristics that could be used to design simple scales for estimating nutritional risk during pregnancy are: arm circumference, height, head circumference, house characteristics, proportion of family children alive, and usual pre-pregnant woman weight (33). Also, as Figure 5 indicates, when gestational age can be assessed reasonably accurately, weight gain during pregnancy becomes one of the best indicators of nutritional risk (34).

Program Execution

It is worthwhile emphasizing that adequate supervision and quality control have tremendous influence upon the services rendered. Supervision should be the key instrument used by the administration to control the program, give guidance, and provide on-the-job training—so that the different categories of personnel can monitor and improve their own performances as health team members.

Community participation can also help to optimize the program’s effectiveness, efficiency, and appropriateness.

Many other important activities, such as control of food commodities or other supplements, can be monitored effectively by means of simple forms. Periodic review of these forms by the person responsible should provide key information about how supplies arrive, who receives them, how they are stored, and who is assigned to distribute and control them.

Program Evaluation

Evaluation activities should be planned and defined in detail before program im-

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**Figure 5.** Risk of delivering a low birth-weight baby, as indicated by maternal weight gain during pregnancy. The numbers at the end of each line are percentiles. Shading indicates areas (I-IV) of progressively higher risk.
plementation, so as to ensure that adequate data on recipient and control groups can be collected. The main items to be evaluated are as follows:

- The program's appropriateness for existing cultural patterns, the nation's social development strategies, and the prevailing health system.
- The program's impact (effectiveness) measured in terms of its general and specific goals.
- The program operations including all the program's technical and administrative structures.
- The detected positive results or negative side-effects.
- Overall program efficiency, as measured by cost-effectiveness estimates if possible.

Evaluation—and resulting control measures as needed—constitute the essential basis for readjusting or modifying the program in the light of local circumstances. As this implies, it is necessary that program operations remain flexible enough to leave room for continual improvement of this kind.

**SUMMARY**

The purpose of this article is to present some basic guidelines for programs seeking to improve the nutritional status of pregnant and lactating women in Latin America.

A review of major nutrition problems in the Americas recently concluded that on the whole the people of Latin America have a diet notably deficient in energy, protein, vitamin A, riboflavin, and iron. These deficiencies, especially pronounced among the poor, are likely to have a negative impact on maternal and child health wherever they are found.

In seeking to analyze the problems of specific countries, the essential thing is to learn what is happening in the various social, geographic, and economic population categories involved. Many national nutrition surveys can contribute but little to this process. What is necessary is implementation of very simple high risk indicators for routine nutrition and health use surveillance of the various population groups.

Targets for any given nutrition program should be based upon recommended dietary intake levels for the specific populations involved, and also upon consideration of how feasible it will be to attain those levels.

The tasks of program personnel—teaching, supervising, making referrals, and participating in other activities—should be carefully described in the program's regular operations manual to ensure standardized execution.

In general, the type of food supplement provided should be selected so as to maximize acceptability and local self-reliance, and to minimize dependence on imports. Decisions about the amount of food to be provided should depend mainly upon the estimated average nutrient deficits in the home intake, the rate at which the supplement is expected to replace ordinary home intake instead of adding to it, the expected response of the fetus, and the cost of the supplement.

With regard to program execution, adequate supervision and quality control have tremendous influence upon the services rendered. Community participation can also help optimize the program's effectiveness, efficiency, and appropriateness.

Finally, evaluation—and resulting control measures as needed—provide the basis for modifying the program in response to local circumstances. Program operations thus need to remain flexible enough to leave room for continual improvement through modifications of this kind.

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**POLIOMYELITIS SURVEILLANCE***

In 1979, the United States experienced the first epidemic of poliomyelitis since 1972. Through 21 September there were 15 epidemic-associated cases (13 paralytic; two nonparalytic) in the United States. All paralytic cases occurred in unvaccinated Amish persons.

In addition, there were eight reported endemic cases—i.e., non-epidemic-associated cases that were indigenous to the United States. All eight were paralytic and were epidemiologically classified as vaccine associated. Five occurred in recent recipients of trivalent oral poliovirus vaccine and three in contacts of such recipients.

From 1 January 1969 through 21 September 1979, there were a total of 185 cases of paralytic poliomyelitis reported to the Center for Disease Control through the National Poliomyelitis Surveillance System. Of these, 43 were epidemic associated; 73 endemic, vaccine associated (23 in recipients; 50 in contacts); 39 endemic, nonvaccine associated; 19 imported; and 11 in immunodeficient persons. The number of paralytic cases per year from 1969 through 1978 ranged from five to 32. There were 21 paralytic cases reported from 1 January to 21 September 1979.

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