

NUTRITIONAL SURVEILLANCE:

A SYNOPSIS

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Committee on International Nutrition Programs

Food and Nutrition Board

National Research Council

National Academy Press

Washington, D.C. 1982

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The study summarized in this report was supported by Contract No. AID-ta-C-1428 from the Agency for International Development.

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ACKNOWLEDGMENT

The Committee on International Nutrition Programs acknowledges the work of the Task Force on Nutritional Surveillance:

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CONTENTS

	Page
1. BACKGROUND	1
Concept of Nutritional Surveillance	
Historical Basis of This Report	
Purpose and Scope of This Report	
2. CLASSIFICATION OF NUTRITIONAL SURVEILLANCE ACTIVITIES	5
Monitoring Changes in Indicators for Purposes of Planning to Improve Nutrition	
Evaluating Nutritional Effects of Programs	
Providing Early Warning and Intervention to Prevent Epidemic Inadequacies in Food Consumption	
3. MONITORING CHANGES IN INDICATORS FOR PURPOSES OF PLANNING TO IMPROVE NUTRITION	7
Data Collection and Flow	
Data Analysis	
Use of Data for Decision Making	
Priority issues for Research	
4. EVALUATING NUTRITIONAL EFFECTS OF PROGRAMS	12
Data Collection and Analysis	
Use of Data for Decision Making	
Priority Issues for Research	

5. PROVIDING EARLY WARNING AND INTERVENTION TO PREVENT EPIDEMIC INADEQUACIES IN FOOD CONSUMPTION	15
Data Collection and Flow	
Data Analysis and Use	
Priority Issues for Research	
6. RECOMMENDATIONS	19
7. OPERATIONAL APPROACHES FOR THE IMMEDIATE FUTURE	20
8. TABLE I. INTEGRATION OF NUTRITIONAL SURVEILLANCE INTO EXISTING DATA COLLECTION SYSTEMS	21
9. REFERENCES	22

NUTRITIONAL SURVEILLANCE - A SYNOPSIS

1. BACKGROUND

Concept of Nutritional Surveillance

The concept of nutritional surveillance has its roots in the more familiar area of disease surveillance. It first gained wide exposure at the World Food Conference of 1974, where it was recommended that "a global nutritional surveillance system be established to monitor the food and nutrition conditions of the disadvantaged groups of the population at risk, and to provide a method of rapid and permanent assessment of all factors which influence food consumption patterns and nutritional status" (WHO 1976). In 1975, the FAO/WHO/UNICEF Joint Expert Committee stated that "surveillance should provide ongoing information about the nutritional conditions of the population and the factors that influence them. This information will provide a basis for the decisions to be made by those responsible for policy, planning, and the management of programs relating to improvement of food consumption patterns and nutritional status" (WHO, 1976, p. 8). The Committee also noted that "surveillance means to watch over with great attention, authority, and often with suspicion".

Based on these statements, the National Academy of Sciences' (NAS) Task Force suggests that nutritional surveillance should be defined as watching over nutritional status in order to make decisions on policies and programs that are aimed at improving the nutrition of poor populations. The data must be collected regularly and be readily interpretable for policy and program planners and the agencies involved must be closely linked to the mechanisms of planning and intervention.

At the outset, it may be useful to distinguish between disease surveillance and nutritional surveillance. While both involve regular collection of information from surveys or clinical records as needed to facilitate program or policy decisions, nutritional surveillance is complicated by the pervasiveness of malnutrition and its close relationship with poverty. The range of possible actions to prevent and alleviate malnutrition is broad and often not well-defined. Since such actions frequently extend beyond the health sector, nutritional surveillance can relate to decision making in several sectors of government.

As highlighted in the 1976 publication (WHO, 1976), the first criterion of nutritional surveillance is that there be regular data collection. This distinguishes surveillance from assessment based on one-time nutrition surveys. Household surveys may be regarded as part of nutritional surveillance if they are intended to form part of the regular data collection or are designed to amplify findings from other data. On the other hand, single studies which are not coordinated with data collected periodically are not considered to be surveillance.

The second criterion is that the data be collected and analyzed in a manner that is useful for decision-making in programs with an impact on nutrition. This requires that the data collected be appropriate and interpretable for the particular purpose and that institutional links exist between the agencies responsible for surveillance and planning or policy.

Nutritional surveillance is distinguished from nutritional screening by its different objectives. Screening identifies persons at risk in order to provide intervention on an individual basis whereas surveillance involves data on population groups and action at the community, area, or national levels. Under certain conditions, however, data collected in screening programs may be used for surveillance.

It should be noted that surveillance systems providing an early indication of outbreaks of infectious disease epidemics are not included here: while these may provide useful information for long-term planning, the procedures for containing epidemics of infectious diseases are not part of nutritional surveillance.

Historical Basis of This Report

Following the FAO/WHO/UNICEF Joint Expert Committee meeting and publication of its 1976 report, several countries began nutritional surveillance activities. In 1979, a Task Force of the National Academy of Sciences (NAS) began a review of the status of nutritional surveillance. In the same year the Working Group on Nutritional Surveillance of the United Nations ACC-Subcommittee on Nutrition (ACC-SCN, 1979) met to follow up on previous consultations on this subject. Information was requested from persons and governments known to be involved in surveillance activities: the NAS Task Force asked four general questions *, and the ACC-SCN used a questionnaire. Contacts were established between the two groups to share information and preliminary conclusions. As a result of these efforts, nutritional surveillance activities were identified in several countries +.

* The following questions were asked by the NAS Task Force:

1. What are the objectives of the data gathering system?
2. What kinds of data do you gather and how do you tabulate them?
We would appreciate an example of your data as presently tabulated.
3. How does the data you collect meet your objectives?
4. Have you identified special problems relating to nutrition surveillance, which are different from those in other data collection systems?

+ The activities described in this report were derived from the following countries: Bangladesh, Botswana, Chile, Colombia, Costa Rica, El Salvador, Haiti, Honduras, Kenya, Mexico, Philippines, Sri Lanka, and St. Kitts/Nevis.

A comprehensive review of nutritional surveillance was prepared as a background document for the U.N. meeting held in Cali, Colombia in July, 1981. (Mason et al., 1981). Some of this research was incorporated into the present NAS report which is intended to be complementary in content and use.

Purpose and Scope of This Report

The purpose of this report is to provide planners, policy makers, and program managers at national and international levels with an interpretive overview of the theory and practice of nutritional surveillance. More specifically, it has the following objectives:

- o to identify and systematize the characteristics of nutritional surveillance as it is used for policy and program planning and for program evaluation
- o to provide guidance in the establishment of nutritional surveillance systems
- o to identify areas in the collection and use of surveillance information that require further research and development

Nutritional surveillance activities serve three major purposes, which are used as a frame for this report:

- o monitoring changes in indicators for purposes of planning to improve nutrition
- o evaluating nutritional effects of programs
- o providing early warning and intervention to prevent epidemic inadequacies in food consumption

Within these three purposes, the experience from existing surveillance systems is summarized according to the following:

- o data collection and flow
- o data analysis
- o use of data in decision making
- o priority issues for research

This report does not discuss methods of measurement used in nutritional surveillance since these are well established and have been thoroughly reviewed (Jelliffe, 1966; WHO, 1979a). Another issue not addressed is the application of indicators, which has been primarily in the assessment of individual patients and only in a limited way in surveillance of whole populations (WHO, 1976; Mason et al., 1981). There is practical experience, however, in the use of several indicators for reaching policy and program decisions (Habicht, 1980).

2. CLASSIFICATION OF NUTRITIONAL SURVEILLANCE ACTIVITIES

Although the activities reviewed have generally incorporated the objectives proposed in 1975 (WHO, 1979a), in practice some objectives are better met than others. The NAS working group identified the three primary purposes for nutritional surveillance that were noted on the previous page.

A surveillance system may be tailored to meet one or more of these purposes. Moreover, development of an optimal system may involve a progression from initially meeting one purpose to meeting aspects of another. Working definitions of the three purposes of surveillance are given below.

Monitoring Changes in Indicators for Purposes of Planning to Improve Nutrition

This consists of an ongoing description of nutritional conditions in the population (often with particular attention to socioeconomic or geographical subgroups) for purposes of planning policies and programs, and predicting future trends, often at a national level. Typically, the collection and collation of data is a long process, so that response to it is relatively slow. The use of the information is either in large-scale national programs specifically aimed at improving nutrition and health or to introduce nutrition concerns and objectives into development policies and programs. These are the uses referred to by "nutritional planning."

Evaluating Nutritional Effects of Programs

This involves evaluating the changes in nutritional indicators during implementation of a specific program. The main purpose is to improve the program either by more effectively targeting those in need, or by modifying it to better serve the same population. The data required for these purposes are more specific; they may be limited to anticipated outcomes and to program recipients. Response to this surveillance information is more immediate than to monitoring for national or regional planning purposes.

Providing Early Warning and Intervention to Prevent Epidemic Inadequacies in Food Consumption

This focuses on prevention or alleviation of a short-term worsening of nutritional status in vulnerable populations. This use of surveillance information does not extend to consideration of chronic inadequacies of food consumption or malnutrition. The basic need is a mechanism for response to information predicting potential problems, so that rapid, short-term interventions can be mobilized before there is a decrease in food consumption.

The major purpose of about half the projects reviewed for this paper was to monitor long-term changes in nutritional indicators for planning purposes. This is apparently because the information most readily available--routine government sources such as health services or specific surveys--is more suitable for this use. A practical approach to developing a surveillance system responsive to more than one purposes could involve expansion of a system of data collection for long-term planning to include either program evaluation or early warning. This approach minimizes the enormity of the task of establishing a total surveillance system, and encourages efficient use of established organizations. It also allows careful consideration of

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Use of Data for Decision Making

In practice, the use of data for planning purposes has been less than was envisaged in the 1976 WHO documents. One central purpose of nutritional surveillance is the use of data for planning, and the taking of appropriate action based on these data. However, nutritional surveillance data are generally not used for planning or decision making. This appears to be due to an inadequate link between data collection and planning, rather than to the quality or timeliness of the data. An effective link hinges on both government policy and the planning agency being established in the appropriate "institutional setting" (Field, 1977). These requirements may be satisfied concurrently: at the time a government commits resources outside the traditional nutrition sector to data collection and analysis, it is likely to be interested in a mechanism for response. Establishment of a nutritional surveillance system should thus generally be subsidiary to, and dependent on, planning needs.

Good communication and data presentation between surveillance staff and policy makers is required if the data gathered are to be useful in program planning. Data are frequently presented so that the policy implications are not recognized or made explicit to policy makers and program managers. In practice, decision making is rarely based on statistical information or published reports.

When nutritional monitoring data are used by policy makers, it is usually for development plans. These plans may, therefore, provide a framework for programs that are primarily health and nutrition and for integrating nutrition into the planning of other sectors. In some countries, nutritional data have served as a basis for initiating large-scale nutrition or social welfare programs. There are a few examples of other data use e.g., drawing attention

to nutrition problems among plantation workers in Costa Rica (Tristan et al., 1980; Guetra, 1981). Such links between nutritional surveillance data and planning should be more fully explored and developed.

The usual approach for presenting surveillance data to potential users in government is by periodic publication. Different strategies may be more effective when planning has progressed from the definition of policies to priorities and geographical coverage, and then to implementation at the regional and local levels. Some publications present information in narrative form addressing specific topics (e.g. changes in minimum wages and food prices); others prefer to show the data in tables describing the prevalence or incidence of the events of concern (e.g. diarrhea, preschool malnutrition). The first approach may be a more suitable way to influence high-level decision makers at early stages of the planning process, while the second may be more useful for orienting activities at regional and local levels. Both approaches require that the surveillance information be translated into policy implications. One procedure that may be used is to organize a workshop, in which information from surveillance is provided to various users and feedback is obtained on the most suitable variables reported, the level of data disaggregation, and needs that are unmet.

In several countries, the basic data are collected over time; it is therefore surprising that so few time-series nutritional data have been published.

Although the data are collected periodically, they are not being used for predictive purposes "on the basis of current trends" as proposed (WHO, 1976). With the exception of projections of food supply and demand, generally derived from survey data (particularly household budgets, food consumption, and food balance sheets), it is doubtful that these surveillance systems will achieve

this objective for some time or indeed whether this should be a priority.

This is, therefore, another area in which the use of nutritional surveillance data could be enhanced.

Priority Issues for Research

Theory: First, identifying appropriate and realistic objectives for the use of nutritional surveillance for planning purposes is a high priority. Second, primary data are required on changes in nutritional status resulting from changes in living standards as measured by different socioeconomic indicators (Sheehan and Hopkins, 1979; U.N. Department of International Economic and Social Affairs, 1978, 1979). Trends in nutritional status are followed by monitoring formal and informal sources as in communicable disease surveillance. Third, specific objectives were not defined in the 1976 WHO document and better definition of those issues which can be addressed by nutritional surveillance should receive high priority.

Practice: Clarifying the objectives of surveillance for planning purposes is the starting point for improving the organization of the system. The usefulness of surveillance outputs in decision making has been limited by the inappropriateness of the information for planning purposes and by the time frame in which the information was provided. Considerable effort is required to provide, within time and economic constraints, the most useful information for support of anticipated program and policy decisions. This information must then be presented in a way that emphasizes program and policy implications. The final requirement for an effective system is that adequate institutional links must exist between the surveillance program and the policy-making levels of government. The most suitable mechanisms for establishing these links require further consideration.

Time series data are clearly more useful than cross-sectional data in trend analysis and decision making. However, the use of cross-sectional

initial assessments is recommended for establishing a baseline to which any change can be related. This opportunity was lost in several countries which proceeded immediately to the regular collection of data. More thorough assessments based on existing data or targeted surveys are useful to planners for the following decisions: initial policy recommendations; identification of issues; definition of groups requiring attention; selection of indicators; evaluation of progress; and justification of changes in policy or program strategies.

Trends observed by monitoring data collected from routine health services, such as clinics selected by ailing individuals may not be valid for the total population. Surveys of both clinic and non-clinic populations could help to resolve this issue. Comparison of the clinic and the general populations with respect to age, sex, distance from clinic and socioeconomic status could provide a first estimate of the validity of generalizing from clinic data. Consideration should also be given to the collection of additional information that might better reflect trends in the total population.

4. EVALUATING NUTRITIONAL EFFECTS OF PROGRAMS

Most of the nutritional surveillance systems reviewed noted that program evaluation was among their major objectives, but have delayed implementing this function. In general, it is not clear which data will be collected or how they will be used for evaluating the relationship between nutritional status and program activities. Furthermore, the data currently collected for program evaluation rarely include measurement of program delivery. Links between evaluation and program planning and operations are underdeveloped or nonexistent. This is a common deficiency in the evaluation components of most health information programs (WHO, 1970-), rather than a problem unique to nutritional surveillance (Cobosack and Kinsey, 1980; and Imboden, 1980) and was addressed by David B. Messing in other health information surveillance.

Data Collection and Analysis

Surveillance systems with an active program evaluation currently use periodic anthropometric surveys of program participants. The agency responsible for the program generally specifies the indicators to be used in assessment of program delivery. As stated above, few analyses link these data to program planning and operations.

Use of Data for Decision Making

Nutritional surveillance for program evaluation has the following objectives: to improve the delivery of ongoing programs; to target resources to populations not previously served; and to compare intervention strategies.

In general, evaluation data have had limited impact on decision making. One exception is the use of weighing survey data to better target nutrition interventions at the municipal level in the Philippines.

Priority Issues for Research

Theory: The main theoretical gap is a consensus between experts and program managers on the type of evaluation that is needed and feasible. There is concern for linking nutrition surveillance data and program evaluation without an appreciation of the feasibility of this effort. The following approach outlines a theoretical framework for evaluation of programs.

Scientific evaluation of a program's impact on nutritional status would ascribe changes in nutritional outcome to particular program activities (Freeman, et al., 1979). This requires randomly selected treatment and control groups, which is generally not possible. However, an epidemiological analysis of the appropriate surveillance data can determine whether the nutrition of the targeted group meets program objectives; this is usually sufficient for conclusions on program management. This approach, "adequacy evaluation" (Habicht and Mason, 1981) requires previous identification of target groups, along with the flexibility and resources needed for ad hoc

The methodology of surveillance by the health worker needs to be well established, aiming at covering every household. Tasks and schedules should be clearly defined. The initial cost of a family register sheet as described is worthwhile. It may be maintained by the liaison and provide a key to the community. It documents births, deaths, main problems and needs, and justifies priorities. All of these activities fit with the concept of monitoring and surveillance provided that the information collected is used by the PHCW for immediate action while it is being transmitted for consolidation and analysis at higher levels in the health care system.

The time required of a PHCW can be estimated by the number of births per year, the number of antenatal visits, the time for planned events such as "health rallies" for weight measurements and immunizations on a routine basis (Berggren et al., 1981) nutrition education, and an allowance for unanticipated events. The minimum responsibilities in the area of nutrition relate mainly to food consumption and utilization and can be delivered as a component of health care services.

It seems more effective to have community health workers that provide the same broad range of services rather than a number of workers performing specific activities.* The nature and dimensions of the community's problems and the number of persons at risk will determine the activities required for treatment and/or prevention. Although there is no consistent evidence, there appears to be a synergism of programs, (Latham, 1975). The effectiveness of such programs has been demonstrated (Taylor et al., 1978; Kielman et al., 1978; Parker et al., 1978).

* Although the task Force favors the integrated approach to community health care, it recognized that there is a range of opinion regarding "integrated" versus "vertical" programs. There is strong opinion that certain programs such as family planning, vitamin A therapy, and malaria eradication might better function as vertical programs requiring, for a limited time, specific workers for the specific task at hand.

The technique of "adequacy evaluation" described above permits timely evaluation of the nutritional components of health and development programs. This can be followed by comprehensive efforts to identify the net impact of programs on nutrition and health status, data that can be used for cost-effectiveness determinations (Gwatkin et al., 1980; Drake et al., 1980, Austin and Zeitlan, 1981). At present however, nutrition surveillance programs do not have adequate resources to undertake such an ambitious effort, and this should therefore be a more long-term objective.

5. PROVIDING EARLY WARNING AND INTERVENTION TO PREVENT EPIDEMIC INADEQUACIES IN FOOD CONSUMPTION

Early warning and intervention programs (EWIP) are quite distinct from the other two primary functions of nutritional surveillance. The type of data collected is also different. Their most important feature is the close link between data collection and predetermined mechanisms for preventing serious declines in food consumption. The prediction of future declines in food consumption requires monitoring of indicators such as the following: rainfall, crop prospects, food prices, employment, and sale or consumption of reserve food supplies.

Botswana, Ethiopia and Indonesia have operational programs although information in each case programs is limited by incomplete documentation or the newness of the program. In each case, priority was assigned to early warning surveillance because the loss of purchasing power or crop failure was perceived as the most frequent or important cause of human malnutrition.

Data Collection and Flow

Rainfall, crop prospects, livestock conditions, and food prices are usually collected and reported by government agencies as a part of ongoing government services. These agencies may also gather additional information

specifically for nutritional surveillance. Surveillance data for EWIP may also be obtained from hospitals, clinics, or special survey teams. The program thus requires coordination between sectors; this has posed problems. Although nutritional status surveys are less useful for early warning than for other surveillance systems, anthropometric data from clinics have been used to direct relief supplies to areas of greater risk before advanced and widespread malnutrition could be identified by other means.

Data Analysis and Use

Data from the early warning systems are frequently hand-tabulated by geographic area to avoid overloading centralized computer facilities. Food distribution data are particularly amenable to manual processing and interpretation. Crop protection measures, agricultural inputs, and income-generating programs (e.g., public works) may require more specific identification of the affected populations and access to a computer. Preliminary analyses identifying impending problems can be produced less than a month after data collection. Results from routine reports such as annual rainfall and quarterly prices take considerably longer, but this is a function of the periodic nature of the reports rather than of the data processing itself.

When there is an impending epidemic inadequacy of food consumption, possible intervention programs (which should be mobilized in the following order), include the following:

- o provision of agricultural and other inputs
- o food distribution by market mechanisms or other outlets
- o control of food prices by subsidies and legislation
- o emergency public works programs to provide income
- o food for work
- o subsidized and free food distribution

Information on the outcome of these interventions is almost entirely lacking. In fact, the extent to which nutritional surveillance information has led to interventions is not clear. When surveillance information becomes separated from the potential action, it is probably for the following reasons: weak institutional links; lack of timeliness; political constraints causing recommendations to be ignored or overridden; and unsuitable interpretation of data.

Priority Issues for Research

The theory of these systems is currently under development. There has been little systematic consideration of information needs and strategies for both short and long-term preventive interventions. This area, in which there is a wide spectrum of opinion and interest, requires more objective studies.

In principle, there is general agreement on the following requirements for EWIP. When surveillance indicators reach predetermined "trigger levels" that indicate an imminent deterioration in food consumption, an intervention is initiated to prevent or alleviate short-term deteriorations in food consumption with minimal disturbance of the local economy. At present, there are two priorities: to develop pilot-scale activities in at least one country that can organize and test an information and intervention system; and to support the intervention systems created during a crisis, such as drought in a high-risk area. These priorities require both research and material support such as funding, equipment, training, and technical assistance.

Responses need to be timely, rapid, cost-effective, and short-term. They can be timely and rapid if there is an organized flow of information to the decision making body when any indicator reaches the trigger level. When this is confirmed by a second or third indicator, the responsible agency, which has been preparing for a possible intervention since the initial warning, acts before the food shortage occurs. A timely flow of data thus has an increasing

impact as different measurements confirm the impending shortage. This is a more rapid, organized, and effective action than a sudden reaction to an unexpected food shortage or starvation crisis. An early warning system therefore needs to be both sensitive and specific. Local decision making, based on automatic trigger levels, has been faster and more specific than centralized decision making. The sensitivity of the system can be evaluated retrospectively by corroborative data obtained from that component of the nutritional surveillance system responsible for monitoring changes in indicators for planning purposes.

When additional assistance becomes necessary, interventions are implemented sequentially, beginning with those that are the least disruptive to the local economy. The appropriate timing of interventions requires a phasing of trigger information and checks built into the system, to ensure that interventions are not overreactions that could upset the local economy. Initially, appropriate interventions would be at the level of the local market and might include addition to the food supply, or subsidization of the prices of staple foods. For example, in Indonesia, since cassava is eaten only when rice is not available or too expensive, a subsidy on cassava automatically targets the assistance to those in greatest need. Similarly, when the impending decrease in food consumption is due to a loss of employment or income, the provision of public works employment at a wage slightly below the usual rate, would achieve similar targeting. The additional cost and inefficiency of food distribution is reserved for situations such as famine where less expensive interventions have failed. Expensive interventions should be replaced as soon as possible by less expensive self-limiting interventions.

6. RECOMMENDATIONS

Specific priority issues, many of which would benefit from international cooperation, are identified in the previous sections. More general recommendations for supporting nutritional surveillance are summarized below.

1. Support should be given to nutritional surveillance systems that have or are developing effective links between data collection and program or policy decisions. The criteria proposed at the beginning of this report should be applied: data collection should be regular, and the data presented in a form appropriate for decision making.
2. Pilot schemes should be fostered to develop methods and gain experience in nutritional surveillance. These should be required to have an effective link with decision making. In practice, they may operate at an area level where there is decentralization of decision making or at the level of specific projects where decision making is centralized. Since most progress has come from integrating into existing data collection systems, priority should be given to similar proposals.
3. Support should be given to theoretical and operational research on such issues as those defined above for the different types of surveillance, and in support of established or pilot surveillance systems. Some issues have general applicability and are suited to research by institutions specializing in this field; others are specific to individual systems, require some internal investigative capacity and operational flexibility.
4. The exchange of information on developments in nutritional surveillance systems should be fostered. Exchanges between individual nutritional surveillance systems can partially address

this need; however, with the growing number of surveillance activities, one or more focal points would facilitate information flow, especially given the current dearth of systematic theory and relevant practical experience.

5. As understanding of the needs of nutritional surveillance improves, it is necessary to provide training and other inputs to building the institutional capacity needed to operate the systems. This again will require international collaboration.

7. OPERATIONAL APPROACHES FOR THE IMMEDIATE FUTURE

Based on experience since 1975, the most promising approaches in nutritional surveillance involve the use of existing resources for data collection (see Table I). The approaches available to a country for developing a nutritional surveillance operation depend on its institutional capacity for data collection and analysis. Those countries with the lowest incomes and minimal development of statistical services will generally have to use data available from routine services; those with more developed institutional data collection and analysis capacities can include surveys; in countries even more developed, institutional data is more reliable and covers more variables and can be supported by more surveys.

TABLE I

INTEGRATION OF NUTRITIONAL SURVEILLANCE
INTO EXISTING DATA COLLECTION SYSTEMS

<u>Purpose of Nutrition Surveillance System</u>	<u>Existing Data Collection System</u>
Monitoring changes in indicators for purposes of planning to improve nutrition	Data collection using government services - health system, education system, administrative records, agricultural reports, census data.
Evaluating nutritional effects of programs	Ongoing household survey systems, where these are being developed. Project monitoring and evaluation systems. Repeated small scale indicator surveys. Adequacy evaluation from routine data.
Providing early warning and intervention to prevent epidemic inadequacies in food consumption	Systems with routine collection of data for predicting deterioration in food consumption-- agricultural reports, health services. Program monitoring, as above, to assist in decisions on the phased response to emergencies.

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