International Nutrition

Nutrition Surveillance and Program Monitoring

Philip Harvey  MPH, PhD

Copyright 2005, Philip Harvey. All rights reserved. Use of these materials permitted only in accordance with license rights granted. Materials provided “AS IS”; no representations or warranties provided. User assumes all responsibility for use, and all liability related thereto, and must independently review all materials for accuracy and efficacy. May contain materials owned by others. User is responsible for obtaining permissions for use from third parties as needed.
Countries in which MOST works or has worked
Definitions

- **Surveillance**: from French “surveiller”, to watch over with great attention...
  - term from infectious disease epidemiology
  - adopted for nutrition at 1974 World Food Conference

- **Survey**: collection of info at one point in time

- **Assessment**: appraisal of available info

- **Evaluation**: process of reaching a judgment

- **Monitoring**: continuous observation, here describes activity more specific than surveillance
Nutrition Surveillance

- Based upon regular collection of data about nutritional conditions & factors influencing them.
- Provide basis for decisions re: immediate action, policy, planning, management of programs.
- Surveillance & service cannot be separated, data MUST be collected and analyzed in a way that is useful for decision making.
- Concerned with data on populations, not individuals.


Information and Indicators

- **Levels of information** (classification from WHO 1976)
  
  A: Ecology -- meteorology, land, water, vegetation
  
  Demography
  
  Infrastructure - transport, communications, services
  
  B: Resources & production -- ag. product’n, livestock, food
  
  imports/exports/stocks, fuel
  
  C: Income & consumption -- market data, income, food
  
  consumption
  
  D: Health status -- nutritional status, disease patterns

- Intervening effectively to improve nutrition requires understanding the causes of malnutrition (UNICEF Framework)
UNICEF’s Conceptual Framework of Malnutrition

Adapted from UNICEF
Cut-off points and trigger levels

- Cut-off point -- a value that marks the boundary of acceptability (e.g. $< -2SD\ W/A$)

- Trigger level -- percent of observations below a cut-off point required to initiate action (e.g. $\%\ children\ < 5\ y\ with\ W/A\ < -2SD\ greater\ than\ 10\%$)

- Need to use the most sensitive indicators (in terms of triggering action) that are feasible
Applications & system types

- Surveillance used for
  1. Early warning & intervention
  2. Planning & advocacy
  3. Program monitoring
  4. Evaluation

- Surveillance activities include
  - Nutrition surveillance systems
  - Special surveys (DHS, NNS)
  - Routinely reported data (HMIS, program M&E)
  - Sentinel Sites
Application 1: Early warning & intervention

- FEWS Net -- Famine Early Warning System Network, information system to identify problems in the food systems in 17 sub-Saharan countries <http://www.fews.net>

- Data sources: USGS/EROS Data Center satellite data monitor agricultural conditions
  - Normalized Difference Vegetation Index (NDVI)
  - Water Requirements Satisfaction Index (WRSI)

- Monthly bulletin distributed to decision makers
NDVI (Normalized Difference Vegetation Index)

WRSI for maize
(Water Requirements Satisfaction Index)

Application 2: Planning & advocacy

- Demographic and Health Surveys (DHS)
- Multiple Indicator Cluster Survey (MICS)
- National Nutrition Surveys (Philippines, Central American countries)
- WHO/FAO Projections
DHS History (Source: Mukuria A, ORC/Macro)

1972 - 1984  World Fertility Survey (WFS)

1976 - 1984  Contraceptive Prevalence Surveys (CPS)

1984 - 1998  Demographic and Health Surveys (DHS)

1998 - Present  Demographic and Health Surveys (MEASURE DHS+).
Measure/DHS+ Nutrition Data

Household
- Iodized salt testing

Individual Mothers (given birth in past 6 y)
- Heights/Weights
- Anemia Testing
- Iron supplementation
- Night blindness
- Vitamin A supplementation

Individual Child (less than 6 y)
- Heights/Weights
- 24 hr. dietary recall (expanded)
- 7 day food frequency
- Frequency of solids or semi-solids in past 24 hrs.
- Vitamin A supplementation
- Hemoglobin (anemia) testing
Presentation of DHS data

- The Seminar
- The reports and the data
- The Chartbooks -- telling a story with pictures
  - Immediate Influences
    - Diarrhea and Cough with rapid breathing
  - Biological and Behavioral Influences
    - Undernutrition of children (6-23 months) by measles vaccination status
  - Underlying social and economic influences:
    - Mother’s education
    - Source of drinking water
    - Type of toilet
  - Basic influences:
    - By region
    - Urban-rural residence
Prevalence of underweight in children under 5 years, Sub-Saharan Africa

(Source: DHS/Measure+, ORC/Macro)
Breastfeeding Practices by Age, Peru 1996

Breastfeeding Practices by Age, Peru 2000

(Source: DHS/Measure+, ORC/Macro)
DHS contd:
24-h recall vs 7-d food frequency

- **7-day Food Frequency**
  - How many days during the last 7 days including yesterday did (name) drink (eat) each of the following:

- **24-Hour Recall**
  - In total, how many times during the last day or at night did (name) eat (drink) each of the following foods either separately or combined with other food?
Ethiopia 2000: Comparing yesterday (Y/N) to 3 or more days in the last seven days

(Source: DHS/Measure+, ORC/Macro)
Peru 1996:
Comparing yesterday (Y/N) to 3 or more days in the last seven days

(Source: DHS/Measure+, ORC/Macro)
UNICEF’s Indicator Cluster Surveys

- UNICEF’s major tool for monitoring progress to goals (2 surveys to date MICS1, MICS2)
- MICS2 used for end-of-decade assessment of World Summit for Children Goals, provided data on 63 of 75 indicators. web site has indicators, questionnaires, manuals etc.
- UNICEF and ORC/Macro collaborate in standardizing across surveys where possible
- MICS3 will assess progress towards Millennium Development Goals
Figure 1. Trends and projections of underweight rates in children <5 years compared to the MDG goal in 2015.

Figure 19: Trends in diet composition and total per capita calorie consumption developing countries between 1964 and 1999, and projections for 2030.

Source: WHO/FAO 2003
Reprinted with permission from WHO.
Application 3: Program monitoring

- HKI Nutrition Surveillance Systems, Indonesia & Bangladesh (www.hkiasiapacific.org), Nicaragua (SIVIN)

- Monitoring for management
  - USAID frameworks
  - Cluster surveys for supplementation

- Sentinel Site Surveillance

- Cost analyses
Nutrition Surveillance Process

Source: HKI Indonesia Crisis Bulletin, January 2000
Sampling framework for HKI/GOI NSS

Rural

7 rural provinces

3-6 Ecological Zones

PPS

30 villages

SS

40 households

33,600 households

Jakarta Surabaya

All kelurahan with slums

SRS

40 kelurahan with slums

Purposive

2-3 RWs

SS

30 households

10,800 households

Urban Poor Areas

Semarang Makassar

All RWs with slums

SRS

80 RWs with slums

SS

30 households

Source: HKI Indonesia
Crisis Bulletin, January 2000

PPS – Probability Proportional to Size
SRS – Simple Random Sampling
SS – Systematic Sampling
Map of the HKI/GOI NSS Project Sites

Source: HKI Indonesia Crisis Bulletin, January 2000
Uses of Indonesia HKI/GOI NSS

- Monitoring
  - Impact of economic crisis (Crisis Bulletins)
  - Implementation of vitamin A supp program
  - Nutritional status and program information in specific provinces
- Targeting food aid (donors)
- Providing survey vehicle for collaborations on specific issues, e.g. malaria
- Further issues forthcoming (e.g. anemia)
- USAID funding for NSS recently ceased
USAID’s Results Framework:
ESSENTIAL NUTRITION ACTIONS AND CHILD SURVIVAL

**SO:** Vulnerable families achieve sustainable improvement in the nutrition and health status of seven million women and children by 2006

**IR1 Service providers improve quality & coverage of maternal and child health & nutrition services & key systems**
- IR1.1 Coordinate/converge services provided by the Dept. of social services (ICDS) and MOH, e.g. through Nutrition and Health Days, and Block planning
- IR1.2 Build capacity of service providers, supervisors and managers in the dept. of social services (ICDS) and MOH

**IR2 Communities sustain activities for improved maternal and child survival and nutrition**
- IR2.1 Increase awareness of households & other key audiences about desirable nutrition and health behaviors through multiple channels, e.g. ‘change agents’
- IR2.2 Increase ownership and participation of community leaders and groups in monitoring health and nutrition services and behaviors
- IR2.3 Stronger links between health systems and communities

Source: Adapted from CARE/India INHP II, DAP II 2001-2006
## Logical Framework

### Nutrition Program Example

<table>
<thead>
<tr>
<th>PURPOSE</th>
<th>PERFORMANCE INDICATORS</th>
<th>MEANS OF VERIFICATION</th>
<th>ASSUMPTIONS</th>
</tr>
</thead>
</table>
| Sustainable improvement in the nutrition and health status of women and children through improved services provision and community participation | 1. Proportion of children 6-36 months in any grade of malnutrition  
2. Coverage of essential nutrition actions: exclusive BF, appropriate CF, vitamin A, iron supplements /fortified foods, iodized salt use, coverage of sick and malnourished in special programs  
3. Proportion of households at risk of HH food insecurity or vulnerable | 1. Annual reports from MCH services, special surveys  
2. Annual reports, special surveys  
3. National / local tracking reports (surveillance) of high risk areas/populations | - Stable political situation, sustained political commitment and financing  
- Sufficient numbers of competent health care personnel and supplies in the government sector  
- No natural disaster or disease epidemic |

**NOTE:** A logic model would allow a program to select indicators that monitor all stages (inputs, process, outputs) of their activities e.g. funds and staff available (inputs), training sessions completed (process), number of skilled workers or villages with trained volunteers (outputs).
Supplement coverage in Nepal
1997-2001*

*Based on a weighted average of multiple representative district surveys applied nationally. Data from non-NIDs vitamin A supplementation efforts in Nepal. Source Houston R, 2002.
Ghana  VA supplementation 2000-2002

Coverage from tally reports compared with the 'mini-survey' results, July 2000, May 2001 and May 2002

Amouful E.  IVACG XXI, 2003
Reasons for not receiving Vit A supplement, Ghana (July 2000, May 2001 and May 2002)

Did not know about distribution
Was out of community
Other reasons
Out of capsule
Child was sick
Distribution site too far

Amouful E. IVACG XXI, 2003
What care givers reported being told (among those dosed) Ghana, (May 2000 N=2169, July 2001 N=3436 and May 2002 N=3451)

Amouful E. IVACG XXI, 2003
Sentinel Site Surveillance

- Refers to the application of epidemiological surveillance to limited populations or sites to detect trends in health events, or events that mandate a specific response (e.g. polio outbreaks)
- Limited in scope, less costly, less complex, but not representative
  - CBS as capacity building process, part of development process: generates motivation and commitment
  - Response to limitations of data routinely collected through health service
  - 4 components: List objectives, questionnaires, contingency tables, data entry format
Program Costs: Increasingly important
(Austin JE 1978)

Three types

- **Biological cost-effectiveness**: e.g. $/ change in infant mortality, $/ change in malnutrition
- **Delivery system cost-effectiveness**: $/ recipient, $/ target group recipient, $/ nutrient delivered, $/ nutrient deficit reduction
- **Operating-effectiveness measures**: do not incorporate costs but measure other program dimensions -- coverage, nutrients, permanency, personnel, leakages
Application 4: Evaluation

  Applied framework of Habicht et al. 1999 to Iron Deficiency Anemia programs

- Three questions --
  - Who is the evaluation for?
  - What questions will the evaluation answer?
  - How will the evaluation be conducted to generate useful answers?

- Three designs --
  - Monitoring: Severe VAD in Denmark, Pellagra in Mississippi
  - Plausibility: Effective anemia programs in Thailand
  - Probability: Progresa in Mexico
Designs for program evaluation
From Stoltzfus & Pillai 2002

**Monitoring (Adequacy):**
Measuring target indicators over time

**Plausibility Evaluation:**
Building a reasonable argument for causality, without a randomized trial

**Probability Evaluation:**
Establishing cause and effect by randomly allocating program and non-program areas

Ascending Confidence
Increasing Cost
Severe vitamin A deficiency in Denmark disappeared after margarine was fortified.
Morbidity and Mortality Rates of Pellagra in Mississippi

- Morbidity
- Mortality

Source: AMJ Public Health 2000; 90:727

Decrease in anemia prevalence resulted from IFA program - Plausible?

- Nutrition/anemia incorporated into national development policy & primary health care in 1970s
- Community volunteers established (cadre now 500,000)
- 98% Thai women attend ANC, 84% attend 4 times, encouraged to attend early
- Universal supplementation
- Supplies adequate, needs estimated by provinces
- Clear messages about dose, frequency, duration & coping with side effects
- Surveillance data used in feedback

Source: Winichagoon 2002
References

- WHO Methodology of nutritional surveillance WHO Tech Rep Series No. 593 WHO Geneva 1976
- Austin JE; The perilous journey of nutrition evaluation Am J Clin Nutr 1978 31:2324-2338
- UNICEF, Multiple Indicator Cluster Surveys, access from http://www.childinfo.org/MICS2/Gj99306k.htm

For more information Contact pharvey@istiinc.com or visit www.mostproject.org.