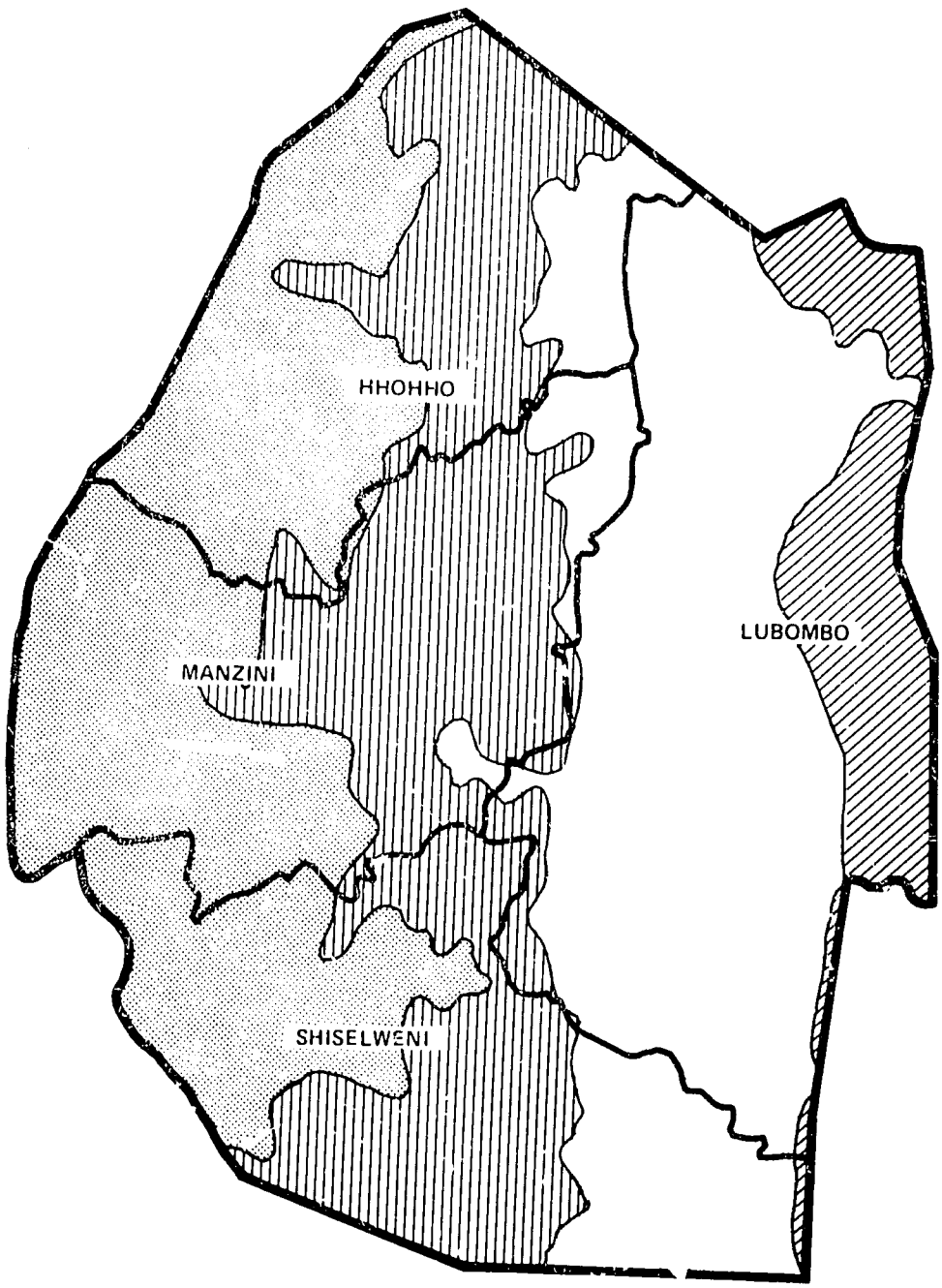
Swaziland

National Nutrition Status Survey
Full Report
1983



Conducted by the Government of Swaziland with the assistance of

U.S. Department of Health and Human Services
Public Health Service
Centers for Disease Control

in cooperation with
The United States Agency for International Development
Office of Nutrition

SWAZILAND NATIONAL NUTRITION STATUS SURVEY, 1983

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PREFACE

A national nutrition status survey was conducted in the rural and peri-urban areas of Swaziland from September 1983 to January 1984. This period followed a 2-year drought and overlapped with the traditional hunger season. The primary aim of this survey was to provide information on preschool children (0-59 months) with emphasis on the measurement of anthropometric status and feeding practices. Additional information was collected on the sociodemographic, geographic, and health characteristics of the homestead and household. This report consists of survey results that will be useful for program planning and evaluation.

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OVERVIEW AND RECOMMENDATIONS

INTRODUCTION

The Swaziland National Nutrition Status Survey was conducted in the rural and peri-urban areas of Swaziland from September 1983 to January 1984. This period followed a 2-year drought and overlapped the traditional hunger season. Following the survey, a 5-day Swaziland Food and Nutrition Workshop (June 17-21, 1985) was conducted to disseminate survey results and identify the most effective interventions and strategies for improving nutritional status within Swaziland.

The survey was planned and carried out by the the Central Statistics Office, Ministries of Agriculture and Health, the National Nutrition Council (Government of Swaziland), and the Centers for Disease Control (United States). Funding for the survey was provided jointly by the Government of Swaziland and USAID.

The purpose of this survey was to (1) provide estimates of the nutritional status of children in Swaziland by using anthropometric indicators, (2) determine factors associated with undernutrition and thus identify children at high risk of undernutrition, and (3) determine where further studies, if needed, would be most productive. It was recognized from the outset that a cross-sectional survey of this nature would be unlikely to establish any cause-and-effect relationships. Nor was the survey designed to assess the prevalence of specific nutritional deficiencies such as pellagra.

Such deficiencies are usually too infrequent to be reliably documented in a sample of the size used.

The survey covered the entire country, excluding the urban areas of Mbabane and Manzini. A rural and peri-urban universe were constructed for the survey. In the rural universe, a two-stage population-proportionate sampling method was used to select 125 enumeration areas, and a random process was used to identify the starting homestead within each sample enumeration area. In contrast to the rural universe, which was systematically chosen to be representative of rural Swaziland, the peri-urban universe consisted of four enumeration areas arbitrarily chosen from socioeconomically disadvantaged areas by the National Nutrition Council.

Because of the number of areas covered by this survey, the amount of information collected in any one area was necessarily limited. The major areas examined in this report were those considered to be most directly associated with preschool nutritional status: infant- and child-feeding practices, immunizations, diarrhea and treatment thereof, and mortality among children less than 5 years of age. In addition, some limited information was collected on socioeconomic and demographic characteristics of the homestead.

Following are summary findings of the major areas examined. Following each summary is a list of recommendations developed at the Food and Nutrition Workshop.

NUTRITIONAL STATUS

Chronic undernutrition, without concomitant acute undernutrition, was identified as the most common nutritional condition in the Swazi preschool population. Chronic undernutrition as measured by retarded linear growth or "stunting" (height-for-age below -2.00 standard deviations of the NCHS/CDC reference median) was identified in 20.3% of rural children and 23.0% of peri-urban children 3-59 months old. The prevalence of stunting was 12.8% at 3-5 months, which potentially reflects both prenatal and postnatal influences. The prevalence of chronic undernutrition reached its highest levels among children 18-23 months of age and remained high at later ages. (The peak at 18-23 months is probably artifactual because of a change in the reference population). On the other hand, acute undernutrition (wasting), as measured by low weight-for-height (weight-for-height below -2.00 standard deviations of the NCHS/CDC reference median), was identified in only 0.9% of rural and 0.6% of peri-urban children, a prevalence slightly lower than that found in the reference population.

Despite the high prevalence of chronic undernutrition as evidenced by stunting, the level of acute undernutrition was remarkably low. Overall, Swazi children appear to be equal to or somewhat better off nutritionally, as reflected in weight-for-height, than children in other African countries that have been surveyed in the past by using a similar methodology. Thus, the problem appears to require sustained efforts to overcome chronic malnutrition, particularly in the identified high-risk groups.

As has been found in surveys of other developing countries, peri-urban residence was generally associated with a lower prevalence of chronic undernutrition than rural residence. The generally higher socioeconomic level

in the peri-urban area (as measured by education) and availability of resources may account for this. Surprisingly, factors associated with higher levels of stunting were not consistent between rural and peri-urban areas.

No striking regional pattern was observed for district of residence or agro-ecological zone. However, differences were observed by land tenure. The lowest prevalences of stunting were in company towns, followed by Government towns, Individual Tenure Farms, and Swazi Nation Land. After controlling for maternal education, the differences disappeared for children of mothers with no education or adult education only. Within the Swazi Nation Land tenure category, the Rural Development Areas and the non-rural development area had similar prevalences of stunting.

The percentage of stunting was lower among children from homesteads where children use a latrine or toilet. In the rural sample, the percentage was lower for homesteads that usually obtain drinking water from a private tap as compared with a public tap or other sources.

Family characteristics were modestly associated with chronic undernutrition in the rural sample, including previous sibling deaths, larger household size, and maternal non-membership. Older maternal age was associated with higher rates of stunting in infants only. Children whose fathers were uneducated and had several wives were at higher risk of chronic undernutrition than if fathers had only one wife. Marital status had little association with chronic undernutrition. Children of unmarried mothers had about the same rates of stunting as children of married mothers.

Longer travel time to the nearest clinic and nonattendance at maternal child health clinics were modestly associated with chronic undernutrition in the rural sample.

Because of the potential importance of agricultural factors to the availability of food for children, questions on cattle ownership, land cultivation and use, and presence of a vegetable garden were asked. Homesteads where land was cultivated for homestead use had a higher prevalence of stunting. For homesteads cultivating land, the prevalence of stunting was higher where crops were used only for the homestead as opposed to being sold for cash. Children in homesteads where there was a vegetable garden had a lower prevalence of stunting in the rural, but not the peri-urban sample. Cattle ownership was not associated with stunting. Without more indepth information on food and income distribution within the homestead, general information on land cultivation and use is of limited usefulness in identifying children at high risk. Homestead ownership of cattle apparently may not insure access to milk and meat by the children within the homestead. Cultivation of land for crops may reflect the need for income, and the sale of crops may reflect a crop surplus.

Nutritional Status Discussion Issues: Programmatic

This survey identified linear growth retardation without concomitant wasting. Groups at high risk were identified. Chronic undernutrition may result from a combination of dietary and nondietary factors associated with poverty, including inadequate diet, increased infections (particularly gastroenteritis), and poor health and nutritional status of the mother. To be most effective, programs must address both the likelihood of infection (e.g., through diarrhea control, immunizations) and the quantity and quality of the diet.

The multiplicity of factors associated with growth and their complex interaction necessitate consideration of a variety of interventions. Programs

and institutions in Swaziland having resources that could be used to improve nutritional status will need to be identified. These programs and institutions include government health, agricultural, educational, and economic programs as well as private and voluntary organizations. Once these programs and their resources are identified, it will be important to define the specific information needs of those who make decisions and the mechanisms that would allow these programs to operate most efficiently. Subsequent information gathering or monitoring should be designed to meet the practical needs of these programs.

1. Nutrition should receive consideration in the process of planning programs with resources that could be used to improve nutritional status. Potential activities that could be conducted within sectors and/or the nutrition council include:
   - -- analysis of the nutritional implications of major Government programs and policies;
   - -- monitoring of the nutritional status of the country and development of guidelines for investigation of factors related to malnutrition;
   - -- service as a clearinghouse for all related information in Swaziland;
   - -- increasing the level of awareness of nutrition activities within different ministries or private organizations.

   If these activities are deemed useful to the planning process, the technical capacity of the responsible organization(s) may need to be augmented.
2. Emphasis should be given to prevention and treatment of diseases that contribute to malnutrition, specifically, diarrhea and immunizable diseases (see chapters: "Diarrhea" and "Immunizations").

3. Attention should be given to monitoring the growth of the preschool child by routine weighing and by use of growth cards.
4. An important long-term goal is to increase the adequacy of the Swazi diet for children (see chapter on "Infant and Child Feeding Practices"). Agricultural policies and programs should be examined in relation to their possible nutritional implications and, where possible, specific issues might be examined through more detailed analysis of survey results and other available data. Some of the specific issues that might be considered include the relationship of cashcropping to nutritional status; the activities of home economists; the relationship of home gardens and household economics to the nutritional status of women and children; and specific issues related to marketing of food crops, such as the possible benefits of decentralized milling. However, the survey does not provide sufficient data to support specific recommendations in these areas.
5. Nutrition-related conditions must similarly be approached in a comprehensive manner. These include low birth weight, iron deficiency, and others. Maternal education, pre-natal care, and availability of family planning are important for prevention of these conditions. However, the survey does not provide data to support specific recommendations in these areas.

Nutritional Status Discussion Issues: Data

6. Expansion of the current nutrition data base may be a long-term goal. The current nutrition surveillance system is based on weight-for-age data collected at Maternal Child Health (MCH) clinics. Other possible data sources include tabulation of clinically diagnosed cases of protein energy malnutrition, nutrition-related pediatric hospitalizations, and nutrition-

related deaths. Expansion from the health sector to include a regular flow of information from other sectors (e.g., agriculture and economics, and meteorological information) could be useful in identifying important trends. A review of this surveillance approach in other parts of Africa would help in making a decision about this issue. If a more expanded system would be deemed useful and if the resources (particularly personnel) were available, consideration could be given to expanding the current system.

7. Further analysis using a multivariable approach would help to determine which factors are independently associated with the outcome of interest. The purpose of this analysis would be to clarify risk factors and to identify variables that may not be etiologic, but which are otherwise associated and which can thus be used for targeting programs. The two most important areas are chronic undernutrition and infant-feeding practices (initiation and duration of breastfeeding and age at supplementation). Methods should be developed that take into account the large design effects arising from the cluster sampling methodology.

8. Although multivariable analysis would help to clarify the relative importance of various factors, it would still identify only association not causal mechanisms. Thus, if establishment of causal mechanisms is deemed important, further indepth studies of homesteads identified at high risk of undernutrition would need to be conducted.

INFANT-FEEDING PRACTICES

Initiation of breastfeeding is very common in Swaziland. Nearly 95% of children in the rural sample and 92% in the peri-urban sample had been breastfed. Duration of breastfeeding was examined by using prevalence of breastfeeding by age of child and mean duration of breastfeeding. Prevalence of breastfeeding dropped gradually over the first 18 months and more rapidly after 18 months of age, with less than 5% of children being breastfed after 2 years. Mean duration of breastfeeding was 15.9 months for rural children and 16.1 months for peri-urban children. In the rural sample, as has been described in other developing countries, mean durations of breastfeeding were lower for children with low birth order, for those whose mothers were working away from the home, and for children from high socioeconomic levels whose mothers had received more education than most other mothers.

In addition, markedly lower durations of breastfeeding were evident among mothers who were not members of the homestead. However, the independent effects of these and other important factors, such as birth interval and pregnancy status, were not examined with multivariate analyses. Peri-urban residence was not associated with a lower mean duration of breastfeeding as in other developing countries. In the peri-urban sample, males were breastfed 1.2 months longer than females, and birth order was positively associated with duration of breastfeeding. Surprisingly, in both samples, the oldest mothers (more than 35 years old) had the lowest durations of breastfeeding. Although the percentage of women initiating breastfeeding in Swaziland is comparable to this percentage in other African countries for which data are available, mean durations of breastfeeding are 1.1 to 8.8 months lower.

Early introduction of non-human milks is common in Swaziland and exclusive breastfeeding is not prolonged. Among infants less than 6 months of age, only 27.9% of rural children and 22.3% of urban children were exclusively breastfeeding. In addition, 14.0% of rural children aged less than 3 months and 16.2% of peri-urban children of the same age were already receiving semi-solid or solid food supplementation. More importantly, 3.9% of rural children aged 6-11 months were not yet receiving solid foods. Health education programs need to focus on these high-risk groups.

Infant-Feeding Discussion Issues: Programmatic

1. Swaziland already has very high rates of breastfeeding initiation. If breastfeeding-promotion programs are undertaken, they need to encourage both initiation and longer duration of breastfeeding. Possible programs to encourage breastfeeding include maternity leave, child care facilities, and health education programs.
2. Artificial feeding of infants may increase the rates of infection and likelihood of mortality. Artificial feeding should be strongly discouraged, particularly in infants at the highest risk of infection. Non-formula milks do not contain complete nutrition for infants and should never be used as the sole source of infant nutrition.
3. Appropriate timing of supplementary foods should be encouraged. The development of locally available, nutritious weaning foods and their use is crucial to the growth of infants.

Infant-Feeding Discussion Issues: Data

4. Data from the Swaziland survey can be used as a baseline to compare prevalences of breastfeeding in future surveys and thus document national trends in breastfeeding in Swaziland. Following trends in breastfeeding

in populations at high risk for poor child health should be a high priority.

5. More detailed analysis of the data collected in this survey would provide very useful information. The relative contributions of factors that appear to be associated with initiation of breastfeeding or the length of time a child is exclusively or partially breastfed could be studied using multivariate techniques.
6. To examine whether any factors that may influence feeding decisions are amenable to change, indepth studies would be needed to study groups who choose not to initiate breastfeeding or who breastfeed for short durations. Examples of factors that may be amenable to change are work status of the mother, whether the mother is a member of the homestead, and availability of family planning (if another pregnancy is not yet desired). Infant-feeding education programs and family planning programs therefore need to be coordinated.

IMMUNIZATIONS

The survey found that 56.4% of rural and 54.1% of peri-urban children from birth-23 months of age had immunization cards. The percentage of children with cards plateaued after 3-5 months of age, implying that children are reached early by the immunization program or not at all. The immunization coverage rates reported in this survey are probably underestimates, since some children without cards or whose cards could not be located were reported to have received one or more immunizations. In fact, about half of rural and 70% of peri-urban children aged birth-23 months who had no cards were reported to have had one or more immunizations.

An area of concern is the relatively large proportion of Swazi children between 12-23 months of age who have not completed the immunization series even though they have immunization cards. About one-fourth of Swazi children with cards fall into this category and represent a failure of the system to follow through on these children once they start on the series.

Among children aged 12-23 months, 30.5% of the rural and 33.7% of the peri-urban sample had cards and were classified as fully immunized. The percentage of fully immunized children by district varied from a high of 35.4% in Manzini to a low of 25.4% in Hhohho. By agro-ecological zone, the percentage fully immunized varied from a high of 33.0% in the Highveld to a low of 27.6% in the Middleveld.

The various land tenure areas varied substantially in immunization coverage status. Land tenure areas with relatively high rates of immunization card possession were generally the same ones having relatively high rates of specific antigen coverage. The maximum Rural Development Areas (RDA) had the highest percentage of children with cards (63.8%) and the second highest percentage with complete coverage (35.0%). The individual tenure farm areas had both the lowest percentage of children with cards (49.3%) and the lowest percentage with a full immunization series (20.6%).

Children whose mothers were homestead members and present at least 50 percent of the time had relatively high rates of full immunization. Peri-urban children from small households (less than five persons) were more likely to be fully immunized than children from larger households. There was no similar association in regard to household size in the rural sample. However, rural children from homesteads containing relatively few preschool

children (less than four) were more likely to be fully immunized than children from homesteads containing more children (four or more).

Rural children who were more than two standard deviations below the reference median in height-for-age (stunted) were slightly less likely to be fully immunized; only 25.7% of stunted children were fully immunized, compared with 32.9% of children who were not stunted.

Rates of full immunization were low for children who had not visited an MCH clinic in the previous year (15.9%) or who had made a visit but whose caretaker could not produce a growth chart (9.6%), compared with those children who had made a visit and had a growth chart (47.0%). Travel time to a clinic, which may reflect proximity to a clinic or ability to obtain transportation, was an important factor in immunization. Children living relatively close to clinics had higher rates of full immunization than those who did not. There was no clear association between parental education levels and children's immunization status.

The distributions of immunization coverage for specific vaccines were not necessarily similar to the distributions of full coverage in the districts and zones. Although Manzini district had the highest percentage of children who were fully immunized, it was the third highest in BCG and second highest in measles coverage. The Highveld had the highest percentage of children who were fully immunized, but had the third highest percentage for both BCG and measles coverage and lowest percentage for BCG coverage.

Immunization Discussion Issues: Programmatic

1. Steps should be taken to improve the immunization coverage of children who attend MCH clinics. According to the survey findings, 15.9% of children who have one or more documented clinic visits have no recorded

immunizations. An additional 37.2% are only partially immunized at the age of 12-23 months. One possible factor could be that many children visiting clinics are not immunized because they are ill at the time of the visit. The World Health Organization has recently re-emphasized that neither malnutrition nor illness is a contraindication to vaccination.

2. Additional steps should be taken to increase the rates of immunization among children who are least likely to be fully immunized. The specific geographic and administrative target groups include children living in Hhohho district, the Middleveld, and the Individual Tenure Farm (ITF) and non-RDA land tenure areas. Other groups that will be more difficult to target include those whose mothers are not members of their homestead or whose mothers are away most of the time, peri-urban children from large households, rural children from homesteads containing many preschool children, and children who are chronically malnourished. To the extent possible, programs should target these children at high risk for not being immunized.

3. The finding that immunization rates plateau after 3-5 months of age suggests the need to improve immunization coverage of older infants and children who have not been immunized early in infancy.

4. Children from homesteads with long travel times to clinics were less likely to be immunized, indicating the need to find ways of reaching more remote areas with immunization.

5. If the cost of a card is a factor in the high proportion of children who did not have immunization cards, serious consideration should be given to providing cards at a reduced charge. This might be accomplished at low cost to the Swazi Government through use of the UNICEF Road to Health

Cards, which have the advantages of encouraging growth monitoring and of providing space for recording both immunization and growth information. It might also be useful to promote the concept among parents that the purchase of an immunization card entitles the child to a full series of immunizations.

Immunization Discussion Issues: Data

6. Future Expanded Program of Immunizations (EPI) investigations might include an indepth review of reasons for vaccine delivery failure. Among the data to be included in future EPI investigations should be information to:

(a) Identify reasons for children not getting into the immunization system at all. These reasons might be related to logistics (i.e., clinic distances, availability of mobile immunization teams, etc.), or to parental reluctance to have children immunized (e.g., mother's lack of awareness of the EPI, lack of knowledge of vaccines, fear of vaccine side effects).

(b) Identify reasons why children who visit MCH clinics have not been immunized. Reasons may include clinic policies that exclude from immunization children who are ill or obviously malnourished, vaccine shortages, parents' inability to pay for vaccine cards, or clinic policies on age at immunization.

(c) Estimate the number of immunized children whose cards could not be located, but whose caretakers claimed vaccination. This would involve efforts to identify the percentage of children without cards who have other evidence of immunization (such as the presence of a BCG scar) and efforts to identify the frequency with which cards are lost.

DIARRHEA

During the two weeks preceding the survey, 16.4% of rural and 14.5% of peri-urban children had diarrhea. The point prevalence of diarrhea (on the day of the interview) was 5.2% in the rural sample and 5.4% in the peri-urban sample. Diarrhea in the rural sample was reported most often in the Lubombo district (22.4%), the Lowveld (22.6%), and the minimum RDA areas (20.7%). In both the rural and peri-urban areas children between the ages of 3 and 35 months had the highest rates of illness. Children older than 11 months of age who were stunted had a higher prevalence of reported diarrhea than those who were not stunted. There was a modest association between lower maternal education levels and higher diarrhea prevalences in the rural areas; this association was not found in the peri-urban areas. Infants 2 months of age or less who were partially breastfed or completely weaned from the breast had a substantially higher rate of diarrhea than those who were exclusively breastfed.

Oral rehydration salts (ORS) were reportedly used to treat diarrhea in 27.4% of the rural and 12.5% of the peri-urban cases. Generally ORS were used most often in the districts, zones, and land tenure areas reporting the highest prevalences of illness. Areas where use of ORS was lowest were Individual Tenure Farms and the peri-urban areas.

Diarrhea Discussion Issues: Progammatic

1. Future programs for diarrhea prevention should especially target the Lubombo district, the Lowveld, and the minimum RDA and company-town land tenure areas where children appear to have modestly or substantially higher rates of illness. Within these areas, children in the 3- to 35-month age groups have the highest rates of diarrhea. Attention

should also be focused on promoting the increased availability and use of oral rehydration salts. The continued promotion of exclusive breastfeeding in the first months of life is an important means of reducing diarrheal illness.

Diarrhea Discussion Issues: Data

2. Future investigations should include information on the prevalence of diarrhea and the use of ORS as a primary treatment for diarrhea. Although this report has been confined to diarrhea morbidity, another important future focus should be prevention of deaths from diarrhea-related illness.

MORTALITY

Generally, the indirect estimates were higher than the direct estimates. In the rural sample the probability of dying between birth and 1 year of age was estimated at .0577 (57.7/1000) by using direct methods and was .113 (113/1000) using indirect methods; the probability of dying from 1 through 4 years of age was estimated at .0280 (28.0/1000) and .0733 (73.3/1000) respectively. In the peri-urban sample, infant mortality was estimated at .0699 by direct methods and .094 by indirect methods; 1-4 year mortality was estimated at .0188 and .0541 respectively. Comparison of these rates for Swaziland with rates calculated by similar methods for other African countries suggests that Swazi rates are relatively low. However, because of the large discrepancy between direct and indirect estimates of mortality and intrinsic limitations in these methods, these mortality estimates must be interpreted with caution.

SWAZILAND FOOD AND NUTRITION WORKSHOP

SYNOPSIS OF RECOMMENDED PROJECTS

A 5-day Swaziland Food and Nutrition Workshop (June 17-21, 1985) was conducted to disseminate survey results and identify the most effective interventions and strategies for improving nutritional status within Swaziland. A synopsis of recommended projects is presented below.

Agriculture

Since the GOS is already doing a great deal in this area, the challenge was to find the gaps in present programming and do something about them that would not overly tax an already sizeable financial committment in this area. For this reason the project proposed in this area attempts to (1) promote improved accessibility to credit and technical assistance to women (who do most of the farming), (2) encourage crop alternatives to maize, (3) foster legume production, (4) teach trench gardening techniques, (5) promote storage facilities built at the homestead level, (6) demonstrate water-harvesting for domestic use and vegetable gardening, (7) create an awareness of the problem's magnitude (chronically malnourished children), (8) motivate families to produce enough food to meet their needs, and (9) promote food preservation in the homestead for "hungry season" use. Other interventions not specifically addressed by projects, but which the workshop considered important enough for further discussion and development included (10) emphasizing use of technology already available at the homestead level (e.g., compost-making), (11) subsidizing the cost of seed to offset the high seasonal start-up costs that constrain production, (12) encouraging community leaders to remove grazing livestock from land used for crops in time for early planting, (13) examining the potential benefits of a national pricing structure for farm

produce, and (14) conducting a review by the GOS of production constraints inherent in current land tenure policies.

Education

In order to promote better nutritional status, the workshop recommended that education could be carried out in several ways: (1) Foster inter-ministerial consensus on the needed messages, their wordings, and their priority. (2) Promote the development of health and nutrition curriculum material for the formal sector and educational/ motivational messages and material reflecting this curriculum for the general public. (3) Develop appropriate dissemination techniques and networks, and get the message across. (4) Provide nutritious midday meals to all preschool and primary schoolchildren.

Health

The primary intervention suggested was (1) to improve general maternal-child health status, infant-feeding practices, child spacing, immunization, and diarrheal disease management through integrated training of health workers at all levels. Though not a listed component of all health projects, (2) concomitant education of the general public was thought to have the next highest potential for positive impact on the national nutritional status. (3) Involving nongovernmental organizations and private voluntary organizations in this effort was a common ingredient to all proposals, as was the (4) monitoring and (5) evaluation of health worker performance after training. (6) It was also agreed that measures stronger than simply encouraging exclusive breastfeeding through the first 3-6 months were needed. These included (7) banning the advertising and promotion of breastmilk substitutes, (8) banning feeding bottles and teats (except by

prescription), (9) ensuring quality control over commercially produced weaning foods, and (10) legislating 3-months' paid maternity leave. Strengthening existing (11) water supply and (12) sanitation programs was viewed as highly important in the light of survey findings. Other issues not addressed by the submitted projects, but deemed important to pursue were: (13) the possible elimination of immunization charge, (14) requiring completed immunizations for entry to preschool and primary school, (15) encouraging private sector involvement in immunization services, and (16) encouraging the integration of curative and preventative services.

Food Assistance

The participants felt that the primary need in this area was to develop a program that would use most effectively the known resources to be contributed by the World Food Programme over the next 3 years in order to promote better national nutrition status. This would mean (1) ensuring that supplemental food reached those who need it most. Consequently, (2) using defined "at risk" criteria for entry into the feeding programme became important, as did (3) improving the programme's ability to identify those at risk as early as possible. (4) Establishing guidelines regarding the quantity, composition, frequency, and duration of food allocated to families, and (5) developing means to minimize the negative effect of food aid were the final interventions necessary to use this finite resource best.

NEED FOR COMMON SUPPORT

After ensuring consensus, the focus then shifted to interventions previously listed under a fifth general category, that of common support for all projects. Participants who had finished their project descriptions

earlier in the day were asked to focus on the needs reported to the plenary body and make recommendations in two major areas of common support: continued research and surveillance systems. Project recommendations were discussed and the entire workshop finally agreed on specific, limited interventions in each area.

Continued Research

(1) Define the catchment areas of clinics. (2) Assess current infant- and child-feeding practices. (3) Undertake multivariate analysis of survey data in response to identified needs for improved decision-making.

Surveillance System

The single intervention recommended by the workshop was to strengthen the practice of growth monitoring of children under age five, primarily to see the health progress of monitored children and to identify the malnourished child.

NEED FOR COORDINATION AND CENTRAL SUPPORT

The need for coordination and central support for all projects which impact on Swazi nutritional status was discussed. The first assignment to the entire body was to list legitimate needs for coordination not already provided by the proposed projects. The analogy used was that of a wise executive who felt the need to hire someone new. He would first define the need (be sure about the job tasks to be performed), and satisfy himself that no one in his organization was doing these tasks. He would then proceed to describe the characteristics required to fulfill those tasks well. Only then would he begin to look for the individual possessing them. Consequently, no theories about who or what a coordinating body might best be were accepted until there was agreement on the needed (not now performed) job tasks that such a body might perform.

The workshop finally did identify legitimate needs for coordination: (1) advocacy for and influence in securing approval and support of projects benefitting nutritional status; (2) encouragement of institutions implementing nutritionally beneficial projects to implement them as envisioned; (3) avoiding duplication; (4) stimulating, through the cross-fertilization of ideas from different sectors and organizations, nutritionally beneficial actions that might not otherwise occur; (5) collection and dissemination of data relevant to decision-making that affects nutritional status; (6) formulation of a national food and nutritional policy; (7) advising others on the nutritional effects of various projects, products, and policies; (8) initiating and promoting legislation benefiting nutritional status; (9) disseminating nutritionally important information to the public. Every one of these job tasks was deemed to be important and necessary in any serious campaign for a better nutritional status in Swaziland. Moreover, participants were convinced that few of these tasks would be performed without an effective coordinating body.

In order to perform the functions listed above, participants of the workshop decided the needed coordinating body must have the following characteristics: (1) Its work should be guided by high-level technical, professional, and managerial representation from as many ministries and NGOs as possible that influence or impact directly upon nutritional status. (2) It must have full-time, paid staff. (3) It should be centrally located within the government (Prime Minister's Office or Department of Economic Planning perhaps), so that it can adequately support the work in all ministries. (4) It must be a statutory body.

In summary, the participants felt a coordinating body necessary to effective implementation of a national nutrition strategy, but agreed that much could be done before it became a reality as described.

CHAPTER 1: INTRODUCTION AND BACKGROUND

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CHAPTER 1: INTRODUCTION AND BACKGROUND

INTRODUCTION

In response to a request by the Government of Swaziland (GOS) to the United States Agency for International Development (USAID) Mission in Mbabane and to the USAID Development Support Bureau/Nutrition in Washington, D.C., the Division of Nutrition, Center for Health Promotion and Education, Centers for Disease Control (CDC), Department of Health and Human Services, provided technical assistance to the National Nutrition Council to plan and conduct a national nutrition survey.

The Government of Swaziland provided survey personnel, training sites, and administrative and logistical support. The USAID/Mbabane Mission and the USAID Development Support Bureau/Nutrition in Washington, D.C., under the terms of an interagency resources/support-services agreement, provided the funds for the CDC technical personnel, survey equipment, salaries for field workers, other survey expenses, data analysis, and the final report. The diligent efforts of the survey team members under varying and often difficult circumstances facilitated the survey's smooth implementation. A complete list of organizations responsible for making this survey possible appears in Appendix 1.1. The survey schedule appears in Appendix 1.2. A glossary of terms appears in Appendix 1.3.

The purpose of the Swaziland nutrition status survey was to meet the needs expressed by the GOS for a statistically valid baseline assessment of the health and nutritional status of the preschool population. This assessment was accomplished by measuring certain key indicators among infants and

children from 0 through 59 months of age who were selected by population proportion sampling methodology.

The specific goals were to:

- Provide information on the nutritional status of the Swazi population living in the different agroecological zones of Swaziland.
- Identify differences in nutritional status within selected rural and peri-urban areas of the country.
- Obtain information on current dietary practices among infants and toddlers.
- Plan future nutrition programs and suggest areas for further research.
- Develop the capacity within the Government of Swaziland to design and conduct surveys that can be used to further evaluate applied health and nutrition activities.
- Provide for planning purposes current information on certain demographic characteristics of Swazi homesteads and on other selected indicators.

BACKGROUND

Physical Description

The Kingdom of Swaziland is landlocked and is bordered on the north, west, and south by South Africa and on the east by Mozambique, Swaziland's outlet to the sea. Mbabane, the capital, is 390 km east of Johannesburg, 225 km from the nearest port, Maputo, and 500 km north of Durban. Richard's Bay, another port accessible by tarmac and railroad, lies between Swaziland and Durban.

Swaziland is the smallest country in southern Africa, and among the very smallest on the African continent; yet its 17,364 square kilometers contain a variety of topographic and climatic conditions. Four geographically

distinct regions extend from the northern border to the south in relatively narrow, parallel bands (Figure 1.1). From west to east, the Highveld in the west averages 1,300 meters altitude, the Middleveld averages 700 meters, and the Lowveld, 200 meters. The Lubombo plateau rises abruptly in the east (600 meters). Although considered distinct regions, the Lubombo and Middleveld are similar in climate and altitude.

Variation in physical conditions supports a diverse agriculture. Extensive pine and gum forests thrive on the often steep, rainy slopes of the Highveld. There are citrus and pineapple crops in the Middleveld, and sugar and cotton under irrigation in the Lowveld. Most of this intensive cultivation is done on individual tenure or freehold farms (farms held under title deeds), owned mainly by individuals of European origin or by commercial enterprises.

The predominant use of land, however, is for subsistence farming. More than half the land area is held in trust for the Swazi Nation by the king (Ingwenyama). This land is allocated by chiefs to individual Swazi families for their use, but it cannot be individually or privately owned. Because 85% of it is used for grazing of livestock, rural settlements are widely dispersed. Urban land accounts for only about 110 square km; more than two-thirds of such areas are in the Highveld and another one-fifth is in the Middleveld. The Middleveld region has the greatest rural population densities of the four agroecological regions.

During the time of the survey, Swaziland was divided into four administrative units, each under the supervision of a district commissioner (Figure 1.2). These districts cut across agroecological zones. From the north to the middle

of the country, and ranging from the middle to the west, are the Hhohho and Manzini districts respectively. The Shiselweni district spans the entire southern part of the country, while the Lubombo district covers the upper eastern section of the country. The Hhohho district is mainly covered by the Highveld and Middleveld regions while Manzini and Shiselweni districts each contain Highveld, Middleveld and Lowveld regions. The Lubombo district, however, is covered by part of the Lubombo plateau and the Lowveld region.

Population

Swaziland's population is relatively homogeneous and has a high rate of growth, a sizeable youth component, more women than men, and a dispersed pattern of settlement. Ninety-seven percent of the inhabitants share a common language (Siswati) and cultural heritage.

Swaziland's resident population at the time of the 1976 census was 494,534. An additional population of 25,425 were counted as temporary absentees, most of them migrant workers in South Africa. The increase of 119,963 people between the 1966 and 1976 censuses suggests an annual growth rate of 2.8%. Population projections for 4 stand at 625,901 residents and 40,358 temporarily absent workers.

In 1976, a little over 47% of the population was <15 years of age; fewer than 2% were over 65. About 89% of the 266,490 working-age (15-64) Swazis actually lived in Swaziland. Among the resident population, women outnumber men by 100 to 88. When absentees are included, the ratio is 100 to 95.

Settlement Patterns

Rural Areas. Over three-quarters of Swaziland's population is housed in more or less traditional style. Settlements are widely dispersed. Village

clusters have been atypical, although they are emerging as a feature in the rural development areas. Extremely low population density poses problems for improving rural shelter and services that are quite in contrast with the problems of high-population-density urban areas; each commands attention on its own terms.

The typical rural homestead is composed of a number of huts clustered around a heavily fenced cattle kraal. These huts house the members of the homestead unit (umuti) (typically eight or nine individuals, sometimes more), who generally are an extended family. The homestead head (umnumzane) customarily runs the homestead. The headman's mother may be in charge of a "great hut" (kagogo), which serves as a shrine dedicated to relatives. In polygamous homesteads or homesteads with married sons, each wife shares her cooking and huts with her own children. When each wife uses separate facilities, her unit forms a household .

Peri-Urban Areas. Swaziland has two major towns: Mbabane, the capital, and Manzini, the center of commerce. There are six other village-towns scattered throughout the country. Situated from south to north, these village-towns are Lavumisa, Nhlangano, Hlathikhulu, Mankayane, Siteki, and Pigg's Peak. Siteki and Nhlangano serve as headquarters for district commissioners (DC's). Pigg's Peak, Mankayane, and Hlathikhulu are subsidiaries of DC offices, while Lavumisa functions as a harbor and rail junction in the southern part of the country.

In addition to the urban area and village-towns, there are company towns. Company towns generally are large privately owned or operated commercial

ventures associated with eucalyptus or pine forests, sugar cane or citrus plantations, or the Swaziland railroad.

These commercial ventures employ large numbers of Swazis who live there, often in company-owned housing on or near the worksite. Big Bend, Simunye, Mhlume, and Tshaneni are all in the sugar-growing region; Bulembu is the administrative center for the asbestos mine; Bhunya and Mhlambanyatsi are the centers for the pulp industry; Mpaka is a coal-mining village; and Sidvokodvo is the railway headquarters.

For purposes of the nutrition survey, all other towns and villages were treated as rural areas because of their population sizes, and only Mbabane and Manzini were considered urban. Simunye is currently classified as urban, a change from the 1976 population census data. (See sampling criteria in Chapter 3.)

The two major towns are unique in character: (1) Mbabane accommodates most government activities; (2) Manzini, and nearby Matsapha, embrace most commercial activities of the country. Migration to these centers has always resulted in a population size that exceeded available accommodations. As a result, informal housing units have mushroomed around the peripheries of urban areas.

Around Manzini, these informal housing units are built on both title deed land and Swazi Nation land. Occupants acquire dwelling plots through <u>kukhonta</u> from the local chief or simply by influencing whoever is entrusted with the land. Some landholders who are close to the cities have realized the potential of their location and have built rental housing units in their yards. In Mbabane, the informal housing units form what may be known as slum areas

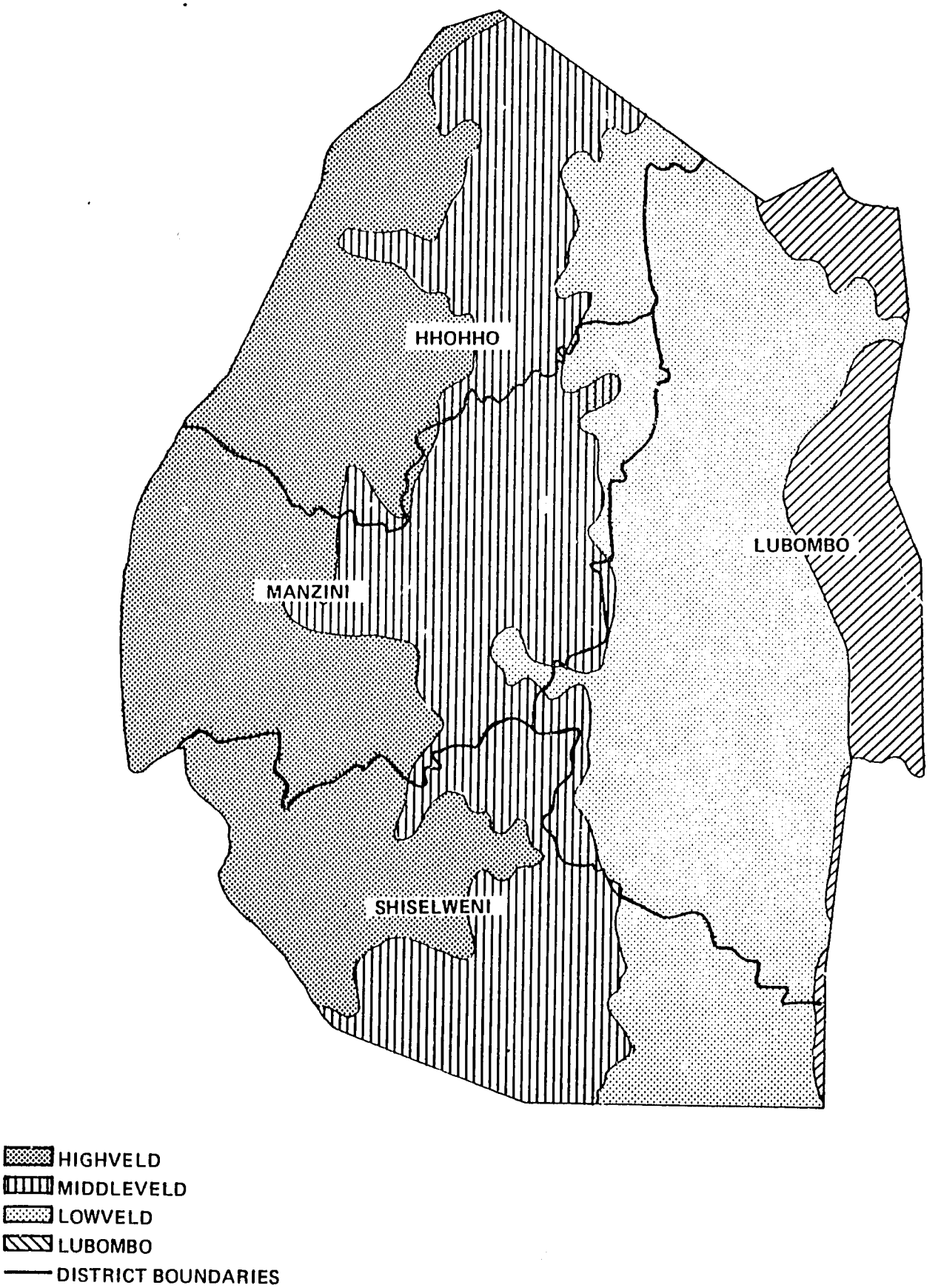
due to congestion and lack of proper municipal facilities, whereas in Manzini crowding is not as serious a problem.

For the purpose of studies conducted by the Central Statistics Office, the densely populated areas surrounding Manzini proper are defined as "peri-urban areas," whereas those around Mbabane have been considered slums in past housing studies. The nutrition survey considered peri-urban and slum areas as "stressed" areas and simply classified them both as peri-urban.

The distinction between peri-urban areas and slums is that residents of the former enjoy some access to gardens or to land areas for cultivation, whereas the land in slum areas is occupied mainly by dwelling units. The distinction between the two areas is not always clear; both peri-urban areas and slums have some characteristics in common: lack of clean tap water; low economic status of the inhabitants; difficult access by car; and other characteristics common to, but differing from, the areas having proper municipality facilities.

FIGURE 1.1

SWAZILAND AGROECOLOGICAL ZONES & ADMINISTRATIVE DISTRICTS



APPENDIX 1.1

CONTRIBUTIONS BY ORGANIZATIONS

GOVERNMENT OF SWAZILAND

Interministerial Involvement

Through the National Nutrition Council, the Ministries of Health, Agriculture and Cooperatives, and Education and some nongovernmental organizations asked the Government of Swaziland to have a national nutrition status survey conducted.

Ministry of Health

The Ministry of Health paid $21,000 (U.S. currency) for petrol, three vehicles, and a full-time driver.

Ministry of Agriculture and Cooperatives

The Ministry of Agriculture and Cooperatives released a full-time survey nutritionist who was appointed interministerial coordinator of the survey and later technical advisor after the departure of the consultant technical advisor from CDC. The Ministry also provided three vehicles to be used full-time for the survey, two full-time drivers, and petrol for the vehicles.

The Ministry also donated bags of maize for the consumption of survey enumerators. In addition, whenever possible, survey enumerators and the mobile field headquarters staff had access to ministerial accommodations and facilities.

The home economics section of the Ministry of Agriculture released $13,000 (U.S. currency) for petrol.

Ministry of Education

The Ministry of Education facilitated the survey with field accommodation for enumerators and headquarters staff. The home economics section of the Ministry of Education also donated six 3-kg cans of meat and beans for survey enumerators.

Central Statistical Office (CSO)

The CSO provided a statistician who served as survey director and stayed full time in the field. The CSO office also provided three field supervisors, a logistics person, a clerical officer, and a storeman. Two survey vehicles and camping equipment were also provided by CSO.

USAID

USAID cosponsored the survey with the Government of Swaziland. The Agency contributed $50,000, which was used for enumerator salaries, office equipment, training, workshops, printing, and petrol. In addition, USAID sponsored the CDC technical assistance.

Save The Children Fund

Save the Children Fund donated a 25-kg can of peanut butter to the survey enumerators.

The National Nutrition Council (NNC)

The NNC was in close contact with survey personnel from the initial stages to the end. NNC made a major contribution in the design of the questionnaire. A subcommittee from the NNC selected some variables from the survey questionnaire that would be of interest to the council for analysis. These variables were in addition to those selected by CDC.

APPENDIX 1.2

SURVEY SCHEDULE

1977 (August)	The Swaziland Health Status Feasibility Study conducted by the Canadian Government recommends that a survey be conducted.
1980 (July)	USAID consultants explore the possibility of a national nutrition status survey.
1982 (June)	GOS requests that CDC collaborate with GOS officials in planning a national nutrition survey. CDC team visits Mbabane.
1983 (June-July)	CDC survey team arrives to assist with the survey. Final preparations for the survey: final governmental and interministerial agreements completed, questionnaires refined and arrangements for printing completed, enumerator recruitment started through radio advertising, and arrangements for training concluded.
1983 (August)	Survey workers are recruited and training begins.
1983 (September)	Data collection begins.
1984 (January)	Data collection is completed.

APPENDIX 1.3

GLOSSARY

Household (indlu): A unit within the homestead that consists of residents eating from the same cooking pot.

Homestead (umuti): The basic survey sampling unit in traditional rural areas defined as a group of people living in adjacent housing units that share a common kraal (Sibaya) or a common yard (libala).

Homestead members: Persons belonging to the homestead who considered the homestead their primary home. Persons who lived temporarily away from the homestead for work purposes were considered members if they planned to reside in the homestead after completing their work.

Land tenure (land holding): Property in Swaziland is divided into four categories of land tenure:

Individual Tenure Farms: Farms held under title deeds or concessions by their owners.

Swazi Nation Land (traditional land): Land held by the king in trust for the nation. Rural development areas (RDAs) are organized development areas set aside for inducing farmers to produce more.

Company towns: Residential areas for workers on a particular company's land.

Administrative towns: Residential areas for workers on a government-operated area or an administrative center.

CHAPTER 2: SURVEY METHODOLOGY

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CHAPTER 2: SURVEY METHODOLOGY

COVERAGE AND CONTENTS

Geographic Coverage

The survey covered the entire country of Swaziland except for the urban areas of Mbabane and Manzini. Three universes were constructed for the survey: rural, peri-urban, and special group.

Eligible Survey Population

The target population eligible for this survey was infants and children 0-59 months old residing in survey homesteads; their mothers were also included. Demographic and socioeconomic information was collected from all homesteads.

The Questionnaire

A pre-enumeration form, an interview control form, and five questionnaires were used in the Swaziland National Nutrition Status Survey. Each document was printed in English (Appendix 2.1: Questionnaire) although the questions were administered in Siswati. Great care was taken during training to establish consistency among the survey workers regarding the meanings and Siswati translations of important survey terms and concepts. Translated forms are in Appendix 2.2: Siswati Translation of Questionnaire.

Pre-enumeration Form. The pre-enumeration form was used to list all homesteads within the chosen enumeration areas (EA's). Each homestead was assigned a number. The name of the homestead head, the total number of residents, and the number of children who were less than 5 years old were recorded on the pre-enumeration form. When possible, the information was

obtained from the homestead head or a responsible homestead member. Otherwise, partial information was obtained from a reliable neighbor.

Interview Control Form. This form was used to record the results of each attempt to interview members of the survey homesteads. Interview control information included the date of the visit, the number of homestead members eligible for detailed interview (i.e., survey-age children and mothers who had had live births in the previous 5 years), the actual number interviewed, the results of each visit, and the total number of visits made.

Homestead Census Questionnaire. This questionnaire was administered only to members of the selected survey homesteads. It provided a listing of all survey homestead members and some demographic information about each: sex, age, education, occupation, residential status, and fertility history of women between the ages of 12 and 49 years. It also supplied information on some general characteristics of the survey homestead: number of separate households (a household is a group of people who eat from the same cooking pot), source of water, waste disposal, socioeconomic status, distance to nearest clinic, agricultural status, agroecological zone, and land tenure.

The homestead census questionnaire was administered to the homestead head when he was available or, in his absence, to another reliable homestead member who was at least 15 years of age. If no eligible informant could be found after three interview visits, information on the number of homestead members and number of children less than five years old was collected from a reliable neighbor who was at least 15 years old.

Birth History Questionnaire. This questionnaire listed all live births within the previous 5 years to women who were members of survey homesteads.

In addition to sex of child and dates of birth and death, information was collected on prenatal and delivery care associated with the mother's most recent live birth. The birth history questionnaire was generally administered only to mothers. However, if the mother was not present at the second interview visit, the questions were asked of another reliable homestead resident who was at least 15 years of age.

Survey Child Questionnaire. This questionnaire was the single most important form. Specific information on the children eligible for the survey (i.e., those ≤59 months old) was collected on age, sex, residence status of biological parents, size of child's household, mother's employment history, maternal and child health clinic attendance, immunization status (for those <25 months of age), infant feeding history (including breastfeeding status), recent history of diarrhea, anthropometric measurements, and edema assessment. The questionnaire was administered whenever possible to the child's mother or when she was not available, to the child's primary caretaker. If the child was not present at any of the three interview visits, the anthropometric measurements were recorded as unknown.

Mortality Questionnaire. Information on deaths of liveborn children to survey mothers in the past 5 years was obtained on this questionnaire. Data were collected on the feeding status of the child before the onset of the illness leading to death, days ill before death, and major cause of death. The mortality questionnaire was administered only to the mother of the child who had died or to the primary caretaker at the time of death.

Subsample Questionnaire. Additional information on the child's dietary habits and the mother's or primary caretaker's attitude towards different

sources of child-feeding information was collected on a subsample questionnaire. It also included a 24-hour dietary recall for both the child and the child's family. The subsample questionnaire was administered only to mothers or caretakers of children who were <3 years of age and only at every fifth survey site (Appendix 2.3: Lists of Enumeration Areas).

Survey Limitations

The survey was primarily designed to provide information on the nutritional status and health of children and their mothers. The areas examined were socioeconomic and demographic characteristics of the homestead and household, nutritional status of children, mortality among children born within 5 years of the survey, and dietary practices of the infant and family. In addition, some limited information was collected on childhood diarrhea and the use of maternal and child health services. Because of the number of areas covered by the survey, the amount of information collected in any one area was necessarily limited.

A cross-sectional survey cannot provide the type of information necessary to show causal relationships. The presence of an association does not of itself indicate a causal relationship between a given characteristic and an indicator of malnutrition. The strength of an association, combined with biologic plausibility and previous information, can provide guidance in selecting areas for further inquiry.

Another general limitation of cross-sectional surveys includes difficulties of survey respondents in recalling past events. For example, women were asked to recall the birth date or age of their living children and their child(ren) who had died. Although much care was taken to obtain the most accurate information possible, perfect information cannot be expected.

Where recall errors were anticipated, we have examined the data for internal consistency and checked the observed against the expected distribution.

Accurate age determination is critically important in assessing children's anthropometric status. To evaluate a given child, his or her weight and height values are compared with those of other children of the same sex and age in both the study and reference populations. For the comparisons to be valid, the child's estimated age must be within 2 months of the correct age. During their training, the survey workers received extensive instructions and practice in obtaining accurate age information.

Age data for the survey children were obtained as dates of birth from clinic or immunization cards when available, or from the parent's declaration. For survey children whose exact dates of birth could not be reliably established, a historical calendar of local events (Appendix 2.4) was used to determine their ages.

Given these limitations, the overall reliability of the data is good. Where applicable, we will indicate limitations of the data.

SURVEY DESIGN

Sampling Plan

The size of survey samples reflects available resources, time and logistic constraints, and the precision desired for key sample attributes. Three universes were constructed for the survey: rural, peri-urban and special group. A two-stage procedure was used to select the sample. For the first stage, the basic sampling unit for all three universes was the enumeration area. Swaziland was divided into 822 EA's as defined by the 1976 census. The boundaries of the EA's were arbitrarily determined largely by topographic

features. For the second stage, the basic sampling unit was the homestead or dwelling unit, which was defined according to the area surveyed as follows:

- Rural areas: The basic sampling unit in the rural areas is the homestead (umuti), which is defined as a group of people living in adjacent housing units that share a common kraal (sibaya) or a common yard (libala). Homesteads may contain both family members and nonrelatives.
- Company town/peri-urban areas: The basic sampling unit in the company town and peri-urban areas is the dwelling unit intended for separate habitation. Dwelling units may be detached or semi-detached houses. In the case of attached houses intended for separate habitation (e.g., a duplex), each unit was considered a dwelling unit. Servants' quarters and flats within apartment buildings were considered separate dwelling units.

The sample frame and sampling procedures differed by universe and will be discussed separately for the rural, peri-urban, and special group universes.

Rural Universe. First-stage sampling. The relatively even distribution of the Swazi population among the different districts and agroecological zones made it possible to draw a single sample from rural Swaziland and yet make adequate estimates for each of the four districts and three of the four agroecological zones. (The Lubombo zone has a population too small to provide reliable statistics for some variables when analyzed separately, but can be combined with the Middleveld because both zones have similar elevations.) This single sample thus avoided the reduction of statistical precision that would have resulted from drawing separate samples for each district or zone.

The sampling frame for the rural universe included all EA's excep' those designated as urban or peri-urban areas of Mbabane and Manzini (EA's 5001, 5031, 6001-6023) as defined by the 1976 census.

The desired sample size was based on the number of children needed to ensure that no more than 5% sampling error would result for key survey items (Appendix 2.5: Determination of Sample Size). To permit inferences to be drawn for each of the four districts, 125 EA's were selected on a population-proportional basis. The steps used to select the rural sample were as follows:

- EA's were sorted by district, agroecological zone, land tenure and population (largest to smallest).
- The population for each EA was compared with published census summaries. The population figures agreed by district exactly, although there were small discrepancies by homestead, land tenure, and agroecological zone that could not be corrected.
- A cumulative population figure was computed for each EA. The value for each EA was its population count plus the sum of population counts for all EA's preceding it on the list.
- A systematic sample of 125 EA's was selected from the listing by using a random start and a skip interval equal to the total cumulative population divided by 125 as illustrated below:

$$\frac{\text{Total rural population}}{\text{Number of sample EA's}} = \text{skip interval}$$

$$\frac{442588}{125} = 3540.704$$

The sample EA's chosen are listed in Appendix 2.3. Figure 2.1 shows the distribution of the EA's within the country.

Second-stage sampling. The total number of homesteads to be included in each of the chosen EA's was based on the number of residents that had to be

interviewed in order to yield about 30 survey-age children from each EA. According to the 1976 census, there were 5.4 residents per child <5 years of age in the rural enumeration areas. Thus, surveying 180 residents per EA would yield approximately 33 children ≤5 years of age. (It was assumed that at least 30 of the 33 children would be of survey age--3 to 59 months). Since the number of residents per homestead varied considerably between enumeration areas, the number of homesteads to be included for each EA was calculated on the basis of the 1976 census figures by using the following formula:

$$\text{Homesteads needed} = \frac{180 \text{ X number of homesteads in EA}}{\text{Total population in EA}}$$

Survey teams pre-enumerated and assigned numbers to all inhabited homesteads in each enumeration area according to the methodology described in this chapter under "Pre-enumeration Form."

The method of sampling varied depending on the population structure of the enumeration area: interval sampling was used for company towns and cluster sampling for rural areas:

- Systematic interval sampling was used for the company town EA's because housing for people of similar status was contiguous and because status varied considerably within the EA. In all sample units the survey was limited to Swazi nationals so that whenever a survey complex mixed nationals and Europeans, the latter were excluded. In company town areas, the sampling interval was calculated as follows:

$$\text{Sampling interval} = \frac{\text{Total number of dwelling units}}{\text{Number of homesteads to be included}}$$

The initial homestead, the residents of which were to be interviewed, was selected by using a random number table. The second and subsequent homesteads

to be included were identified by adding the sampling interval to the number of the initial homestead. The smallest whole integer that would include 180 homesteads was used as the sampling interval.

Systematic sampling was not used in the rural areas not designated as company towns, where populations were relatively homogeneous. The initial homestead was selected by means of a random number table. Subsequent homesteads were selected in the sequence in which they were pre-numbered until the required number of homesteads was selected.

Peri-urban Universe. In contrast to the rural sample where EA's were systematically chosen to be representative of rural Swaziland, the sampling frame for the peri-urban sample was chosen from socioeconomically disadvantaged enumeration areas by the National Nutrition Council. This sampling frame included certain areas more densely populated around Mbabane and Manzini where the preschool children were considered for socioeconomic reasons to be at higher risk for nutritional and health deficiencies than in other nearby peri-urban areas. Four such areas were chosen: two in Mbabane (1528, 5027) and two in Manzini (6009, 6012). One of the Mbabane areas (1528) had already been selected for the general rural survey but was reclassified as peri-urban. All homesteads were surveyed from 5027, 6009, and 6012. Interval sampling was used for EA 1528; the skip interval was 5.

Special Group Sample. The National Nutrition Council decided that a group of children should be surveyed in areas having modern amenities and considered to have a privileged socioeconomic status. This special group was to serve as a comparison with the reference population. In Swaziland this class of children could only be found in the two major cities--Mbabane and Manzini.

The distinction between the higher class and the the peri-urban dwellers was difficult to make, however. Children in the special group were drawn from the areas that had modern facilities such as electricity, tap water, indoor toilets, and street planning. One criterion for this definition was whether or not the children came from an area that met construction standards set by the town council.

A quick evaluation of the urban EA's was made, and it was determined that of the 32 urban EA's in Mbabane, 20 were considered to be the most advantaged and thus qualified for inclusion. In Manzini, 11 enumeration areas qualified out of 23. After consultations with several ministries, the National Nutrition Council felt that some of the qualifying areas in both cities were primarily inhabited by foreigners and thus were out of the scope of the survey.

Consequently, the special group areas were defined as those whose population was stable, that is, established for more than 10 years, and predominantly of Swazi origin.

In Mbabane two such areas were purposely selected. The areas were Checkers and Sandla, which includes Selection Park. Similarly, in Manzini the selected areas were Fairview and Treelawny Park. In both areas all survey-age children present the day of the survey were interviewed.

Deviations from the Sampling Plan

The original rural sample was composed of 125 EA's. The final sample consisted of 122 EA's because:

(1) Surveyors accidentally went to EA 1519 instead of EA 1517. EA 1519 was in the same area as EA 1517, so the results from 1519 were included instead of those from 1517.

(2) EA 1528 was declared peri-urban and removed from the rural sample.

(3) EA 1537 was the Lobamba Royal Village, and admittance for surveying was denied.

(4) EA 4444 was listed in the census as having 46 homesteads, but only 1 was found. This cluster was excluded because the census was felt to be in error.

Data Preparation and Survey Analysis

Weighting. The original plan called for sampling the number of homesteads in each enumeration area expected to contain 180 total people. Because the number of residents per homestead according to the survey varied considerably from the numbers provided by the 1976 census, each EA in the rural sample was given a weight to adjust the total population sampled to 180.

Interpretation of Estimates. Most prevalence estimates are provided as percents with one decimal place; however, it is recommended that tenths of percents not be regarded as stable unless they are based on at least 500 cases. Prevalences are not included in tables unless they are based on more than 20 cases. Estimates based on more than 50 cases are flagged as statistically unreliable, because each case represents more than 2% of the estimate.

Statistical Precision Estimation. Statistical precision figures for the rural sample are presented for basic survey parameters at the end of each chapter; however, computation of precision estimates for every tabulation in the report would have required substantial computer time and was not done here. Precision estimation statistics were not prepared for the peri-urban sample, because it was not a representative sample of peri-urban Swaziland. The precision statistics were computed using PROC SESUDAAN in an extended

version of SAS. The statistics presented here are (1) the mean, (2) 90% confidence limits, and (3) survey design effect. For those not familiar with survey statistical terminology, the terms used in the precision section can be described briefly as follows:

Prevalence: An unbiased estimate of the proportion of the population having the attribute.

Standard Error: An estimate of the sampling distribution of the mean (prevalence) assuming the mean is normally distributed.

90% confidence: The true prevalence for the population can be assumed to be within the range of the prevalence estimate plus or minus the 90% confidence interval with 90% assurance.

Design effect: The design effect is the square of the ratio of the standard error based on simple random sampling and the standard error based on cluster sampling. This number is a "correction factor" that measures the effect of sample selection by cluster rather than by simple random sampling. Each statistical estimate of prevalence has its own design effect. To get an effective sample size for random sampling, the actual survey sample size must be divided by the design effect.

TRAINING AND FIELD PROCEDURES

Personnel Selection and Training

Most trainees were chosen on the basis of a written test, educational level, and previous experience from over 180 applicants responding to countrywide advertisements. In August 1983, the enumerator training began at the Swaziland Institute of Management and Public Administration (SIMPA) with

46 (Form V graduate) trainees. The training period lasted for three weeks and consisted of an orientation in survey methods, including map reading, questionnaire translation, interview techniques, anthropometric measurements, and practice interviews. Several practice sessions in anthropometry and interviewing were conducted at a maternal and child health clinic (Mbabane Health Center). At the end of the training period a full field test of survey methods was conducted in rural areas around Mbabane and the enumerator-trainees were put through a series of standardization exercises to quantify and improve their accuracy and precision in anthropometric measurement.

Field Logistics

At the end of the training period, 15 two-person teams were formed among the trainees. Five survey supervisors were either chosen from the ranks of the best trainees or from supervisors at the Central Statistics Office. The trainees not selected were placed on a reserve list and used as backup enumerators. Field staff participating in the survey are shown in Appendix 2.6.

Data collection started on September 5 when the teams were transported into the field over a period of several days. The 15 survey teams were divided into 5 three-team groups, each under the direction of one supervisor. All five groups worked in the same general area concurrently and each team was assigned an EA as close as possible to the other teams under the same supervisor. The supervisors supplied each of their teams with survey provisions and any necessary transport assistance in identifying EA boundaries, made sure that their team members followed the survey protocol, edited survey forms, and on occasion substituted for team members or other supervisors. For logistical convenience, the country was divided into nine subdivisions; each

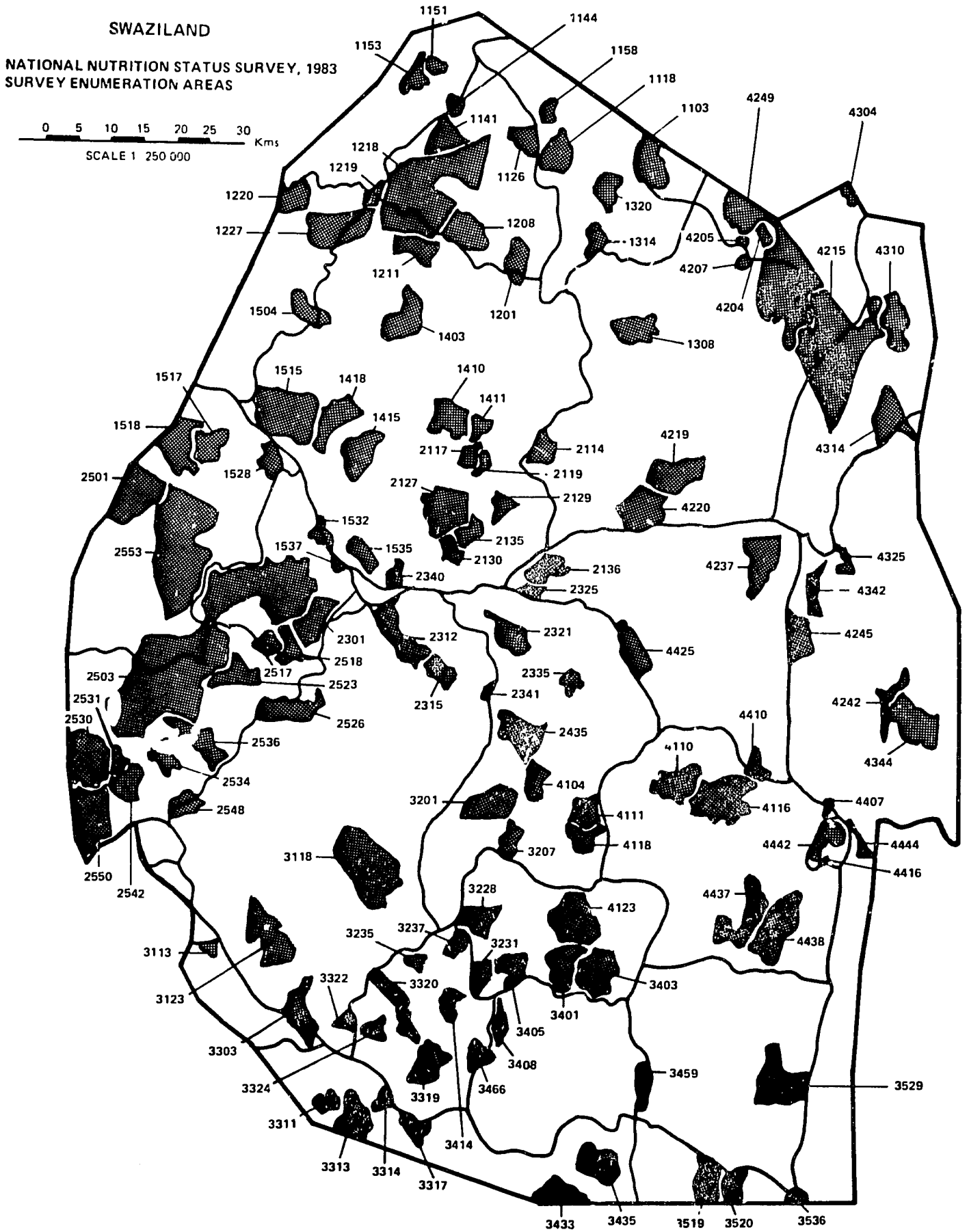
of the 15 teams visited about an equal number of the surveyed enumeration areas in each subdivision. As the survey activities shifted from one subdivision to the next, the field headquarters was moved to a central location within the new area. At different times, the field headquarters was located at hospitals, training and research centers, schools and other government installations provided by the Ministries of Health, Agriculture and Cooperatives, and Education.

Many of the selected EA's required advance preparation. Team supervisors or headquarters staff had to visit the locality to notify and coordinate efforts with local officials, secure accommodations for the survey workers, and recruit local assistants for the survey teams.

Seven small pickup trucks and drivers for the survey were furnished by the Ministry of Agriculture and Cooperatives, the Ministry of Health, and the Central Statistics Office. Petrol was provided by government fuel depots.

Field Editing and Quality Control

As each survey team completed their assigned enumeration areas, they gave the field-edited questionnaires to their supervisor. (Each questionnaire was edited independently by both enumerators.) After the supervisors completed the third field edit, they brought the questionnaires to the mobile field headquarters where senior survey staff prepared the forms for transport to CDC for processing and analysis. Two summary sheets, one for the pre-enumeration form and the other for anthropometric measurements, were completed by supervisors and their teams at headquarters. These summaries helped senior survey staff assess each team's progress rapidly. Throughout the survey, senior survey staff revisited selected homesteads to confirm unusual findings.


SWAZILAND
NATIONAL NUTRITION STATUS SURVEY, 1983
SURVEY ENUMERATION AREAS
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SCALE 1 250 000
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1158
1118
1103
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4304
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1218
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1126
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3536

PRE-ENUMERATION FORM

Sample site number |___|___|___| Enumeration Area |___|___|___|___|

Sub-sample site |___| Yes |___| No

Team # |___|___|

Date started _____ Date finished _____

Interviewer: This form is to be completed on all homesteads except those which are abandoned within the selected enumeration area. (Sample site)

*** THIS BOX IS TO BE FILLED IN AFTER PRE-ENUMERATION! ***

Team # |___|___| Name of Locality _____

Random Number Start |___|___|___| Number of Homesteads to be interviewed |___|___|___|

Homestead numbers to be interviewed:

No. _____ to No. _____

No. _____ to No. _____

Homestead Number	Identifying Location (if applicable)	Name (Head of Homestead)	Resident Members	
			Total Number of Persons	Total Number of Children (< 5 years)

Sample Site Number |___|___|___|

PRE-ENUMERATION FORM (contd.)

1. Sketch of Sample Site

2. Narrative Description of Difficulties

(Forms and interview techniques, sampling, definitions (such as residence), locating sample homesteads, return visits, etc.). List any problems you encountered which should be considered for future surveys.

Sample Site Number |_|_|_| Page Number ________ of ________

PRE-ENUMERATION FORM (contd.)

Homestead Number	Identifying Location (if applicable)	Name (Head of Homestead)	Resident Members	
			Total Number of Persons	Total Number of Children (< 5 years)

SWAZILAND NATIONAL NUTRITIONAL STATUS SURVEY, 1983
Interview Control Form

Sample Site Number |_|_|_| Enumeration Area |_|_|_|_| Team # |_|_|

Homestead Number |_|_|_|

FIRST VISIT	SECOND VISIT	THIRD VISIT
Date_____	Date_____	Date_____
Result_____	Result_____	Result_____
Revisit Needed Yes No	Revisit Needed Yes No	

Final Disposition:

1 |_| All interviews complete

2 |_| At least 1 interview not complete, if so why _____

3 |_| Refused

4 |_| Other

Field scrutinized |_| Yes |_| No Name_____ Date_____	EDITING Name_____ Date_____ CODING Name_____ Date_____
Spot checked |_| Yes |_| No Name_____ Date_____	CHECK EDITING Name_____ Date_____ CHECK CODING Name_____ Date_____

Sample Site Number [ ][ ][ ] Homestead Number [ ][ ][ ] Page Number _____ of _____

Interview Control Form (contd.)

Census # of Woman Aged 12 through 49	Birth History Form 2 Completed 1-Yes 3-Refused 2-No 9-Not Elig.	Children Born in Past 5 Years # Alive Today (Resident)	# of Form 3's Completed	# Dead	# of Form 4's Completed

FORM # [1] (1) Page [ ] (2) of [ ] (3) [ ] Editor

SWAZILAND NATIONAL NUTRITIONAL STATUS SURVEY, 1983

Homestead Census Questionnaire

Collect Homestead information from resident > 15 years of age. Record his/her census # here [ ] (4-5)

Complete only if no adult (> 15 years) present at homestead after 3 visits.

(27-28) [ ] Total number living in homestead (99-Unknown)

(29-30) [ ] Number children (< 59 months) (99-Unknown)

Where did homestead members go? _____

IDENTIFICATION INFORMATION

District (6) [ ] (7-10) Enumeration Area [ ] (11-13) Sample Site # [ ] (14-16) Homestead # [ ] (17-18) Team # [ ] (21-22) Month [ ] (23-24) Date of Visit Day [ ] (25-26) Year [ ]

Census Number	Name of Homestead Residents (List head of homestead first)	Relationship to Homestead Member	Household Number	Sex: 1-M 2-F	Age: How old is he/she? (Record in months if < 5 years of age) Yrs.	Age: Mos.	Occupation Age > 15 yrs.	Resident > 80% of time 1-Yes 2-No 8-Unk.	Literate 1-Yes 2-No 8-Unk.	Education*	Marital Status 1-Mar. 2-Never mar. 3-No longer mar. 8-Unk.	FOR FEMALES 12-49 ONLY: Status (Female is 1-Present 2-Absent 3-Refused 4-Not reliable)	Live Births (Total # of live births—including those who no-longer live here or who died)	Living Children (Total # still living—including those who no longer live here)	Child Deaths (Total # who have died)	Last Live Births: Month & year of most recent live birth Mo.	Last Live Births: Month & year of most recent live birth Yr.	Last Live Births: If unknown, how many years ago was it? Yrs.	Are you pregnant now? 1-Yes 2-No 8-Unk	Interview Status: Eligible** 1-Yes 2-No
(32-33)			(35-36)	(37)	(38-39)	(40-41)	(42-43)	(44)	(45)	(46)	(47)	(48)	(49-50)	(51-52)	(53-54)	(55-58)		(59-60)	(61)	(62)
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*1) No formal education, no adult education. 2) No formal education; adult education 3) Grade 1-2 4) Standard 1-5 5) Form 1-6 6) College/university 9) Unknown

**The following are eligible 1) All women with live births who are < 5 years old (< 59 months) born since this date, 1978) 2) All children living in the homestead who are < 5 years old (< 59 months) born since this date, 1978)

CHARACTERISTICS OF HOMESTEAD: Locality _____

Zone (65) 1 ☐ Highveld 2 ☐ Middleveld 3 ☐ Lowveld 4 ☐ Lubombo

Land Tenure (66) 1 ☐ SNL/RDA 2 ☐ SNL/Non RDA 3 ☐ ITF 4 ☐ Company 5 ☐ Government/Semi-government

Homestead Head (Surname, Christian, Local Name) _____

How many households (Indlu) within this homestead? (67-68) ☐☐

1. "Where do members of this homestead usually obtain water for drinking?" (69-70)
   - 01 ☐ Piped/Public Tap
   - 02 ☐ Piped/Tap in house
   - 03 ☐ Dam/Pond
   - 04 ☐ Bore hole/well
   - 05 ☐ Protected spring
   - 06 ☐ Unprotected spring
   - 07 ☐ River/Stream
   - 08 ☐ Rainwater/catchment
   - 09 ☐ Other, specify _____
   - 99 ☐ Unknown

2. "How is refuse disposed in this homestead?" (71)
   1 ☐ Pit 2 ☐ Open 3 ☐ Both 8 ☐ Other, specify _____ 9 ☐ Unknown

3. "Where do children from this homestead usually go to defecate?" (72)
   - 1 ☐ Open/bush
   - 2 ☐ Flush toilet
   - 3 ☐ Latrine (concrete)
   - 4 ☐ Latrine (wooden)
   - 8 ☐ Other, specify _____
   - 9 ☐ Unknown

4. "Do any members of this homestead have the following?"

		Yes 1	No 2	Unknown 9			Yes 1	No 2	Unknown 9
Working radio	(73)	☐	☐	☐	Maize milling machine	(78)	☐	☐	☐
Spring bed	(74)	☐	☐	☐	Car or light delivery van	(79)	☐	☐	☐
Stove	(75)	☐	☐	☐	Tractor	(80)	☐	☐	☐
Working sewing machine	(76)	☐	☐	☐	Truck or lorry	(81)	☐	☐	☐
Working refrigerator	(77)	☐	☐	☐					

5. "What is the main source of income for this homestead?" (82-83)
   - 01 ☐ Agriculture/Self-employed
   - 02 ☐ Agriculture/Employed
   - 03 ☐ Public sector (government, military)
   - 04 ☐ Private sector (receive salary from a non-government person in Swaziland)
   - 05 ☐ Private sector outside of Swaziland (e.g., in Africa)
   - 06 ☐ Self employed (not agriculture)
   - 07 ☐ Combination, specify _____
   - 08 ☐ Other, specify _____
   - 09 ☐ None
   - 99 ☐ Unknown

6. "How many cattle are owned by members of this homestead?" (84-86) ☐☐☐ (999-Unknown)

7. "How long does it take to reach the nearest health clinic (total travel time either by walking, bus, or other transport)?" (87)
   1 ☐ <½ hr. 2 ☐ ½ <1 hr. 3 ☐ 1-2 hrs. 4 ☐ >2 hrs. 5 ☐ Unk.

8. "Does this homestead have a vegetable garden?" (88) 1 ☐ Yes 2 ☐ No 9 ☐ Unk.

9. "Do members of this homestead cultivate land held by this homestead for their own use?" (90)
   1 ☐ Yes, ANSWER 10, 11, 12 2 ☐ No 9 ☐ Unknown → GO TO 13

10. If Yes, "What crops were cultivated by members of this homestead in the last 12 months and what was their main use?"
    INTERVIEWER: READ CROPS ACROSS; IF NOT GROWN, LEAVE BLANK. CHECK ONLY ONE USE FOR EACH CROP.

Uses	Sorghum	Maize	Peanuts	Sugar Cane	Jugo Beans, Beans and/or Cow peas	Pumpkins	Sweet Potatoes/ Yams	Citrus	Tobacco and/or Cotton	Other (specify)
Homestead food only	1 ☐	1 ☐	1 ☐	1 ☐	1 ☐	1 ☐	1 ☐	1 ☐	1 ☐	1 ☐ _____
Mostly homestead food	2 ☐	2 ☐	2 ☐	2 ☐	2 ☐	2 ☐	2 ☐	2 ☐	2 ☐	2 ☐ _____
Half food/half cash crop	3 ☐	3 ☐	3 ☐	3 ☐	3 ☐	3 ☐	3 ☐	3 ☐	3 ☐	3 ☐ _____
Mostly cash	4 ☐	4 ☐	4 ☐	4 ☐	4 ☐	4 ☐	4 ☐	4 ☐	4 ☐	4 ☐ _____
Cash only	5 ☐	5 ☐	5 ☐	5 ☐	5 ☐	5 ☐	5 ☐	5 ☐	5 ☐	5 ☐ _____
Other	8 ☐ (91)	8 ☐ (92)	8 ☐ (93)	8 ☐ (94)	8 ☐ (95)	8 ☐ (96)	8 ☐ (97)	8 ☐ (98)	8 ☐ (99)	8 ☐ _____ (100)

11. If Yes, "What agricultural inputs did this homestead use in the last year?"
    - Fertilizer (104) 1 ☐ Yes 2 ☐ No 9 ☐ Unk.
    - Insecticide/Pesticide (105) 1 ☐ Yes 2 ☐ No 9 ☐ Unk.
    - Improved Seed (106) 1 ☐ Yes 2 ☐ No 9 ☐ Unk.
    - Irrigation (107) 1 ☐ Yes 2 ☐ No 9 ☐ Unk.
    - Credit (108) 1 ☐ Yes 2 ☐ No 9 ☐ Unk.

12. If Yes, "Has anyone in this homestead been visited by an agricultural extension agent or attended an agricultural extension meeting/short course in the last year (for assistance in farming)?"
    1 ☐ Yes 2 ☐ No 9 ☐ Unknown (111)

13. "Was maize grown by this homestead in 1980?" (112) 1 ☐ Yes 2 ☐ No 9 ☐ Unknown

14. If Yes, "How was the maize used during that year?" (113)
    - 1 ☐ Homestead food only
    - 2 ☐ Mostly homestead food
    - 3 ☐ Half food/Half cash crop
    - 4 ☐ Mostly cash
    - 5 ☐ Cash only
    - 8 ☐ Other, specify _____
    - 9 ☐ Unknown

SWAZILAND NATIONAL NUTRITIONAL STATUS SURVEY, 1983
Birth History Questionnaire

FORM # [2] (3) [ ][ ][ ] Editor

INTERVIEWER: COMPLETE THIS FORM ONLY FOR WOMEN WHO HAVE HAD ONE OR MORE LIVE BIRTHS IN THE LAST 5 YEARS (MARKED ELIGIBLE ON FORM 1).

IDENTIFICATION INFORMATION	District	Enumeration Area	Sample Site #	Homestead #	Team #	Biological Mother's Census #	Date of Visit Month	Day	Year
	[ ] (6)	[ ][ ][ ] (7-10)	[ ][ ][ ] (11-13)	[ ][ ][ ] (14-16)	[ ][ ] (17-18)	[ ][ ] (19-20)	[ ][ ] (21-22)	[ ][ ] (23-24)	[ ][ ] (25-26)

INTERVIEWER: COMPLETE THE FOLLOWING CHART FOR ALL CHILDREN WHO ARE <5 YEARS OLD (<59 MONTHS BORN SINCE THIS DATE IN 1978) INCLUDING THOSE WHO WERE BORN ALIVE AND HAVE DIED. BEGIN WITH THE YOUNGEST AND WORK DOWN TO THE OLDEST.

1. Survey eligible woman's married (maiden) name _____

   Is this woman present? (30)

   1 [ ] Yes 2 [ ] No 3 [ ] Refused

   If No or Refused, why not? _____ When will she return? _____

   STOP INTERVIEW AND GO TO FORM 3.

   [If yes, read the following]

2. "I would like to ask you a few questions about each child you have given birth to that was born alive (cried at birth). It is very important to tell me about all births, even those who lived only a few hours or days or were not named.

   Please begin with your youngest child and continue through your oldest child."

Child #	Name	What Was Child's Sex?	Is The Child Still Living?	Date Of Birth	Age At Death*
[ ][ ] (31-32)		1 [ ] M 2 [ ] F (33)	1 [ ] Yes 2 [ ] No 9 [ ] Unk (34)	Month [ ][ ] (35-36) Year [ ][ ] (37-38)	Years [ ] Months [ ][ ] (39-41)
[ ][ ] (45-46)		1 [ ] M 2 [ ] F (47)	1 [ ] Yes 2 [ ] No 9 [ ] Unk (48)	[ ][ ] (49-50) [ ][ ] (51-52)	[ ] [ ][ ] (53-55)
[ ][ ] (61-62)		1 [ ] M 2 [ ] F (63)	1 [ ] Yes 2 [ ] No 9 [ ] Unk (64)	[ ][ ] (65-66) [ ][ ] (67-68)	[ ] [ ][ ] (69-71)
[ ][ ] (75-76)		1 [ ] M 2 [ ] F (77)	1 [ ] Yes 2 [ ] No 9 [ ] Unk (78)	[ ][ ] (79-80) [ ][ ] (81-82)	[ ] [ ][ ] (83-85)
[ ][ ] (91-92)		1 [ ] M 2 [ ] F (93)	1 [ ] Yes 2 [ ] No 9 [ ] Unk (94)	[ ][ ] (95-96) [ ][ ] (97-98)	[ ] [ ][ ] (99-101)
[ ][ ] (105-106)		1 [ ] M 2 [ ] F (107)	1 [ ] Yes 2 [ ] No 9 [ ] Unk (108)	[ ][ ] (109-110) [ ][ ] (111-112)	[ ] [ ][ ] (113-115)
[ ][ ] (121-122)		1 [ ] M 2 [ ] F (123)	1 [ ] Yes 2 [ ] No 9 [ ] Unk (124)	[ ][ ] (125-126) [ ][ ] (127-128)	[ ] [ ][ ] (129-131)

3. Before your last live birth, did you see a nurse or doctor for a medical check-up? (135)

   1 [ ] Yes 2 [ ] No 9 [ ] Unknown

4. Where did your last delivery take place? (136)

   1 [ ] Hospital
   2 [ ] Home of midwife/matron
   3 [ ] Own home, friends, relatives, neighbors
   4 [ ] Health center/clinic
   5 [ ] Home of traditional midwife
   6 [ ] Other, specify _____
   9 [ ] Unknown

5. Who assisted with your delivery? (137)

   1 [ ] Midwife/nurse/physician
   2 [ ] Traditional midwife
   3 [ ] Grandmother
   4 [ ] Other relative
   5 [ ] No assistance
   6 [ ] Other, specify _____
   9 [ ] Unknown

*Record 888 if child is still alive. If dead and age is unknown, estimate age

SWAZILAND NATIONAL NUTRITIONAL STATUS SURVEY, 1983
Survey Child Questionnaire

FORM # [3] (3) [ ][ ][ ] Editor

INTERVIEWER: COMPLETE THIS FORM ON ALL CHILDREN <5 YEARS OLD (<59 MONTHS OR BORN SINCE THIS DATE IN 1978). INTERVIEW THE BIOLOGIC/SUBSTITUTE MOTHER WHENEVER POSSIBLE.

IDENTIFICATION INFORMATION

District	Enumeration Area	Sample Site #	Homestead #	Team #	Biological Mother's Census #	Date of Visit Month	Day	Year
[ ] (6)	[ ][ ][ ] (7-10)	[ ][ ][ ] (11-13)	[ ][ ][ ] (14-16)	[ ][ ] (17-18)	[ ][ ] (19-20)	[ ][ ] (21-22)	[ ][ ] (23-24)	[ ][ ] (25-26)

RESPONDENT INFORMATION

Head of Homestead Name _____

Respondent's Name _____ Census # [ ][ ] (30-31)

SURVEY CHILD INFORMATION

A. Child's Name _____ Census # [ ][ ] (32-33) Sex 1 ☐ Male 2 ☐ Female (34)

Date of Birth. Month [ ][ ] Day [ ][ ] Year [ ][ ] (35-40) If unknown, estimate age in months [ ][ ] (42-43)

B. "Is the biological mother a member of this homestead?" (45) 1 ☐ Yes 2 ☐ No 9 ☐ Unk.

If Yes, Name _____ Census = [ ][ ] (46-47)

If Yes, "Was biological mother present at the homestead ≥50% of the last year?" (48)

1 ☐ Yes, GO TO C 2 ☐ No 9 ☐ Unk.

If No or not present ≥50% of the last year, "Why is the biological mother absent?" (49)

1 ☐ Dead 2 ☐ Lives in different homestead 3 ☐ Works away 4 ☐ Other, specify _____

If No, or not present ≥50% of the last year, "Who is the female person living in this homestead responsible for this child?

Name _____ Census = [ ][ ] (50-51)

C "Is the biological father a member of this homestead?" (52)

1 ☐ Yes 2 ☐ No 9 ☐ Unk

If Yes Name _____ Census = [ ][ ] (53-54)

If Yes, "Was biological father present at the homestead ≥50% of the last year?" (55)

1 ☐ Yes, GO TO D 2 ☐ No 9 ☐ Unk.

If No, or not present ≥50% of the last year, "Why was the biological father absent?" (56)

1 ☐ Dead
2 ☐ Lives at different homestead
3 ☐ Works away (in Swaziland)
4 ☐ Works away (out of country)
8 ☐ Other, specify _____
9 ☐ Unknown

D "How many persons are in the household (Indlu) of this child? [ ][ ] (57-58)

E. "Has this child ever visited a Maternal Child Health Clinic (Under five clinic) and received a growth chart?"

1 ☐ Yes, can locate chart 2 ☐ Yes, cannot locate chart → GO TO F 3 ☐ No 9 ☐ Unk

If Yes can locate chart, "Did the child visit the clinic in 1983?" (60) 1 ☐ Yes 2 ☐ No 9 ☐ Unk

BIOLOGICAL MOTHER (62)

1 ☐ Present
2 ☐ Absent

INTERVIEWER. (IF ABSENT OMIT F & G IN THIS SECTION.) ASK BIOLOGICAL MOTHER ONLY.

F "Was this child ever breastfed?" (63)

1 ☐ Yes 2 ☐ No → If No, "Why not?" (64-65) **(CHECK ONLY ONE ANSWER AND GO TO PART G.)**

01 ☐ Child ill or unable
02 ☐ Child well/refused
03 ☐ Mother ill
04 ☐ Mother worked away from home
05 ☐ Mother at school
06 ☐ Mother preferred bottle
07 ☐ Medical advice
08 ☐ No milk/weak milk
09 ☐ Previous child died
10 ☐ Other, specify
99 ☐ Unk.

"Is this child still breastfeeding?" (66)

1 ☐ Yes 2 ☐ No

If No, "Why not?" (67-68) **(CHECK ONLY ONE ANSWER.)**

01 ☐ Child ill/unable
02 ☐ Child well but refused
03 ☐ Mother ill
04 ☐ Mother worked away from home
05 ☐ Mother at school
06 ☐ Mother pregnant.
07 ☐ Medical advice
08 ☐ Mother wanted pregnancy/gogo recommendation
09 ☐ Mother preferred bottle
10 ☐ No milk, weak milk/milk dried up
11 ☐ Child reached weaning age/traditional to stop
12 ☐ Other, specify _____
99 ☐ Unk.

"At what age did this child last receive breast milk?" (69-70) [ ][ ] Months (99 Unk.)

G "Did this child receive any formula or milk other than breast milk?" (71) 1 ☐ Yes 2 ☐ No 9 ☐ Unk → GO TO H

If Yes,

"At what age did this child first receive formula or milk other than breast milk?" (76-77) [ ][ ] Months (99 Unk.)

"What other kind of formula or milk did this child usually receive at first?" (78)

1 ☐ Fresh cow, sheep, goat, or other animal milk
2 ☐ Infant formula (Peliargon NAN Lactogen Baby Milk Plus SMA S26 etc)
3 ☐ Other powdered milk (not commercial formula/dried skim milk (KLIM Nespray Everyday etc.)
4 ☐ Evaporated or condensed milk (sweetened condensed milk)
8 ☐ Other, specify _____
9 ☐ Unk

BIOLOGICAL MOTHER (continued)

H. "Did this child receive semi-solid/solid foods (excluding milk, water, and juices)?" (79)
1 ☐ Yes → If Yes, "At what age did he/she receive such foods?" (80-83) ☐☐ Months
2 ☐ No 9 ☐ Unk.

I. "In the past 14 days has this child had diarrhea?" (85) → GO TO J
1 ☐ Yes 2 ☐ No 9 ☐ Unk.

If Yes, "About how many watery stools per day?" (86-87) ☐☐ (99-Unk.)
"How many days did the diarrhea last?" (88-89) ☐☐ # of Days (99-Unk.)
"How many days ago did the diarrhea stop?" (90-91) ☐☐ # of Days (88-Not yet) (99-Unk.)
"What treatment did this child receive?" (92)
1 ☐ None
2 ☐ Oral rehydration salts/fluids
3 ☐ Home remedies (e.g., soup, tea, etc.)
4 ☐ Salt/sugar solutions
5 ☐ Intravenous therapy
6 ☐ Imbhita
8 ☐ Other, specify _____
9 ☐ Unknown

J. "Is Biological mother employed?" (95) 1 ☐ Yes 2 ☐ No
If Yes, "Where is she employed?" (96) 1 ☐ Inside home 2 ☐ Outside home

K. "What is Biological mother's marital status?" (97) → GO TO L
1 ☐ Married 2 ☐ Never married 3 ☐ No longer married 9 ☐ Unk.
If Married, "How many other Bozakwenu are there?" ☐☐ (98-99)

VACCINATION INFORMATION

INTERVIEWER: ASK ONLY FOR CHILDREN <24 MONTHS OF AGE.

L "Does this child have a vaccination certificate?" (If Yes, ask to see card.) (101)
1 ☐ Yes, can locate card
2 ☐ No or cannot locate card
9 ☐ Unk.
If No, "Has this child had any vaccinations?" (102) 1 ☐ Yes 2 ☐ No 9 ☐ Unk.
GO TO M

If Yes,
"How many documented doses of each of the following has this child received?"
(INTERVIEWER: USE VACCINATION CARD TO DETERMINE THE TYPES OF VACCINATION AND NUMBER OF DOSES. DO NOT RELY ON MOTHER'S MEMORY.)

Polio	(103)	1 ☐ One	2 ☐ Two	3 ☐ Three	8 ☐ None	9 ☐ Unk.
DPT	(104)	1 ☐ One	2 ☐ Two	3 ☐ Three	8 ☐ None	9 ☐ Unk.
Measles	(105)	1 ☐ One			8 ☐ None	9 ☐ Unk.
BCG	(106)	1 ☐ One			8 ☐ None	9 ☐ Unk.

MEASUREMENTS

Child (109)
Present 1 ☐
Absent 2 ☐

If Absent, reason. (110)
1 ☐ At hospital/clinic
2 ☐ Other, specify _____

M. **INTERVIEWER: MEASURE ONLY CHILDREN >3 MONTHS OF AGE.**

Arm Circ. ☐☐.☐ cms (111-113) Weight ☐☐.☐ kgs (114-116) Height ☐☐☐.☐ cms (117-120)

Pedal Edema (121) 1 ☐ Yes, both feet 2 ☐ Yes, one foot 3 ☐ No 9 ☐ Unk.

SWAZILAND NATIONAL NUTRITIONAL STATUS SURVEY, 1983
Mortality Questionnaire

FORM # 4 (1) ☐☐☐ Editor

IDENTIFICATION INFORMATION	District	Enumeration Area	Sample Area #	Household #	Team #	Biological Mother's Census #	Date of Visit Month	Day	Year
	☐ (6)	☐☐☐ (7-10)	☐☐☐ (11-13)	☐☐☐ (14-16)	☐☐ (17-18)	☐☐ (19-20)	☐☐ (21-22)	☐☐ (23-24)	☐☐ (25-26)

INTERVIEWER: COMPLETE THIS FORM FOR EACH CHILD BORN <60 MONTHS AGO (<5 YEARS: SINCE THIS DATE, 1978) WHO HAS DIED.

Name of child _____ (If no name, record no name)

Child's Number (32-33) ☐☐ (From Birth History Questionnaire – Form 2, Question 2)

A. What was the major cause of death? (34)
- 1 ☐ Too small/weak at birth
- 2 ☐ Injury/accident
- 3 ☐ Illness
- 8 ☐ Other
- 9 ☐ Unknown

B. How many days was this child ill before death? (35-36) ☐☐ (99-Unknown)

C. During the illness before death, did this child have any of the following symptoms:

Diarrhea (3 or more loose stools over a 24 hour period) (37) 1 ☐ Yes 2 ☐ No 9 ☐ Unknown

Illness with rash and fever (such as measles) (38) 1 ☐ Yes 2 ☐ No 9 ☐ Unknown

D. "Was this child ever breastfed?" (39)

1 ☐ Yes 2 ☐ No → If No, why not? (40-41) (CHECK ONLY ONE ANSWER)
- 01 ☐ Child ill or unable
- 02 ☐ Child well/refused
- 03 ☐ Mother ill
- 04 ☐ Mother worked away from home
- 05 ☐ Mother at school
- 06 ☐ Mother preferred bottle
- 07 ☐ Medical advice
- 08 ☐ No milk/weak milk
- 09 ☐ Previous child died
- 10 ☐ Other, specify _____
- 99 ☐ Unknown

GO TO PART E

Was this child still breastfeeding before illness (leading to death) began? (42)

1 ☐ Yes 2 ☐ No

If No Why not? (43-44) (CHECK ONLY ONE ANSWER)
- 01 ☐ Child ill/unable
- 02 ☐ Child well/refused
- 03 ☐ Mother ill
- 04 ☐ Mother worked away from home
- 05 ☐ Mother at school
- 06 ☐ Mother pregnant
- 07 ☐ Mother wanted pregnancy/ gogo recommendation
- 08 ☐ Medical advice
- 09 ☐ Mother preferred bottle
- 10 ☐ No milk/weak milk/milk dried up
- 11 ☐ Child reached weaning age/traditional to stop
- 12 ☐ Other, specify _____
- 99 ☐ Unknown

"At what age did this child last receive breast milk?" (45-46) ☐☐ Months

E. "Did this child ever receive any formula or milk other than breast milk before the illness leading to death began?" (51)

1 ☐ Yes 2 ☐ No → GO TO F 9 ☐ Unknown

If Yes,

"At what age did this child first receive formula or milk other than breast milk?" (52-53) ☐☐ Months (99-Unknown)

"What kind of formula or milk did this child receive at first?" (54)
- 1 ☐ Fresh cow, sheep, goat, or other animal milk
- 2 ☐ Powdered milk (not commercial formula/dried skim milk)
- 3 ☐ Infant formula (SMA, KLIM, NESPRAY, etc.)
- 4 ☐ Canned evaporated or condensed milk, sweetened condensed milk
- 8 ☐ Other, specify _____
- 9 ☐ Unknown

F INTERVIEWER: (EXCLUDE MILK, WATER AND JUICES)

"Did this child receive semi-solid/solid foods such as porridge before the illness leading to death began?" (55)

1 ☐ Yes If Yes "At what age did this child receive such foods?" (56-57) ☐☐ Months
2 ☐ No
9 ☐ Unknown

SWAZILAND NATIONAL NUTRITIONAL STATUS SURVEY, 1983
Subsample Questionnaire – Part 1

FORM # [5] (1) [ ][ ][ ] Editor

INTERVIEWER: COMPLETE THIS FORM FOR SUBSAMPLE ENUMERATION AREAS ONLY ON CHILDREN <3 YEARS OLD (<36 MONTHS).

IDENTIFICATION INFORMATION	District	Enumeration Area	Sample Site #	Homestead #	Team #	Biological Mother's Census #	Date of Visit: Month	Date of Visit: Day	Date of Visit: Year
	[ ] (6)	[ ][ ][ ][ ] (7-10)	[ ][ ][ ] (11-13)	[ ][ ][ ] (14-16)	[ ][ ] (17-18)	[ ][ ] (19-20)	[ ][ ] (21-22)	[ ][ ] (23-24)	[ ][ ] (25-26)

Respondent's Name _____ Respondent's Census # [ ][ ] (30-31)

Child's Name _____ Child's Census # [ ][ ] (32-33)

A. "Did (has) this child ever drink (drunk) from a bottle?" (34) 1 ☐ Yes 2 ☐ No → GO TO B 9 ☐ Unk.

If Yes, "Which of the following did (has) this child ever taken from a bottle?"

Milks (not including formula)	1 ☐ Yes	2 ☐ No	9 ☐ Unk.	(35)
Formulas	1 ☐ Yes	2 ☐ No	9 ☐ Unk.	(36)
Semi-Solids (Porridge)	1 ☐ Yes	2 ☐ No	9 ☐ Unk.	(37)
Cold Drinks (Sprite, Fanta, Coca Cola, etc.)	1 ☐ Yes	2 ☐ No	9 ☐ Unk.	(38)
Other Liquids (Fruit Drink, Tea, etc.)	1 ☐ Yes	2 ☐ No	9 ☐ Unk.	(39)

B. "Has water been boiled for cooking, mixing with food or drinking (excluding for coffee or tea) for household members within the last 24 hours?" (42) 1 ☐ Yes 2 ☐ No 9 ☐ Unk.

C. "Is this child's food or milk prepared with boiled water?" (43)

1 ☐ Boiled always
2 ☐ Boiled sometimes
3 ☐ Never or almost never boiled
4 ☐ Not applicable (breastfeeding only)
9 ☐ Unk.

D. "Is drinking water boiled for the rest of the household?" (44)

1 ☐ Always 2 ☐ Sometimes 3 ☐ Never 9 ☐ Unk.

E. How important are these sources of information in influencing you about how to feed your children during the first year of life?

	Very Important	Somewhat Important	Unimportant	Unknown
Family seniors (e.g., grandmother or head of household)	(46) ☐ 1	☐ 2	☐ 3	☐ 9
Friends	(47) ☐ 1	☐ 2	☐ 3	☐ 9
Chief or indvuna	(48) ☐ 1	☐ 2	☐ 3	☐ 9
Teacher or headmaster	(49) ☐ 1	☐ 2	☐ 3	☐ 9
Nurse/doctor at health clinic	(50) ☐ 1	☐ 2	☐ 3	☐ 9
Traditional healer	(51) ☐ 1	☐ 2	☐ 3	☐ 9
Home economist (lomakhaya)	(52) ☐ 1	☐ 2	☐ 3	☐ 9
Rural health motivator (Umgcugcuteli)	(53) ☐ 1	☐ 2	☐ 3	☐ 9
Radio	(54) ☐ 1	☐ 2	☐ 3	☐ 9
Newspapers/Magazines	(55) ☐ 1	☐ 2	☐ 3	☐ 9
Television	(56) ☐ 1	☐ 2	☐ 3	☐ 9

SWAZILAND NATIONAL NUTRITION STATUS SURVEY, 1983
Subsample Questionnaire – Part 2
Dietary Survey of Type Foods Eaten

☐☐☐ Editor

INTERVIEWER: COMPLETE THIS FORM ONLY ON CHILDREN <3 YEARS OLD (<35 MONTHS) IN THE SUBSAMPLE ENUMERATION AREAS.

Woman's Name _____ Child's Name _____

CHILD. WHAT DID THIS CHILD EAT YESTERDAY?

BABY FOODS:		Yes	No	Unk
MILK Breast Milk	(60)	☐1	☐2	☐9
Sour Milk (Emasi) Yogurt, Cheese	(61)	☐1	☐2	☐9
Fresh cow, goat, Sheep Milk	(62)	☐1	☐2	☐9
Sweetened milk/ condensed or evaporated	(63)	☐1	☐2	☐9
Pellargon NAN Lactogen Baby Milk Plus SMA S26	(64)	☐1	☐2	☐9
KLIM	(65)	☐1	☐2	☐9
Nestrey Everyday	(66)	☐1	☐2	☐9
Sungold Blend Make-O Milk Blend of Milk	(67)	☐1	☐2	☐9
Dried Skim Milk	(68)	☐1	☐2	☐9
Other Milk specify (include brand) _____	(69)	☐1	☐2	☐9
Commercial Cereals Nestum Cerelac Pronutro Purity	(70)	☐1	☐2	☐9
Commercial Foods Purity (Gerber) Strained Junior	(71)	☐1	☐2	☐9
Traditional Weaning Foods soft porridge (lindengane) sour porridge (incwencwa)	(72)	☐1	☐2	☐9
Inembe	(73)	☐1	☐2	☐9
CEREALS/STARCHES Irish potato	(80)	☐1	☐2	☐9
mealie meal, rice/ mealie rice samp	(81)	☐1	☐2	☐9
green maize, inhlanhla tinkhobe	(82)	☐1	☐2	☐9
bread brown/white maize bread wheat	(83)	☐1	☐2	☐9
sorghum	(84)	☐1	☐2	☐9

		Yes	No	Unk
cassava, emathapha, ematabhane	(85)	☐1	☐2	☐9
pasta, macaroni bashetti custard	(86)	☐1	☐2	☐9
rakes, biscuits	(87)	☐1	☐2	☐9
PROTEIN beef, mutton, goat meat bush meat	(90)	☐1	☐2	☐9
pork	(91)	☐1	☐2	☐9
fish – fresh & tinned	(92)	☐1	☐2	☐9
poultry/chicken	(93)	☐1	☐2	☐9
liver, spleen, kidney	(94)	☐1	☐2	☐9
tripe, intestines	(95)	☐1	☐2	☐9
other meats	(96)	☐1	☐2	☐9
legumes, beans, peas cowpeas, jogo beans	(97)	☐1	☐2	☐9
ground nuts peanut butter	(98)	☐1	☐2	☐9
eggs	(99)	☐1	☐2	☐9
VEGETABLES lipushu imbuve, chuchza etc	(102)	☐1	☐2	☐9
pumpkin tops, beet root tops, carrot tops	(103)	☐1	☐2	☐9
spinach (other dark green leafy vegetables)	(104)	☐1	☐2	☐9
carrots, melons (Lingulangal), other deep yellow vegetables	(105)	☐1	☐2	☐9
pumpkin (Lingulangal), sweet potato, butternut, green leafy, beet root	(106)	☐1	☐2	☐9
cabbage	(107)	☐1	☐2	☐9

		Yes	No	Unk
onions, garlic, green pepper, tomatoes	(108)	☐1	☐2	☐9
green beans other vegetables	(109)	☐1	☐2	☐9
FRUITS, citrus: orange grapefruit, lemon	(112)	☐1	☐2	☐9
mango, peaches guava, apricots	(113)	☐1	☐2	☐9
apples, pears, grapes, lychee, pineapple	(114)	☐1	☐2	☐9
wild fruit: emahewu (umagungumeze, umvugi)	(115)	☐1	☐2	☐9
banana	(116)	☐1	☐2	☐9
avocado	(117)	☐1	☐2	☐9
BEVERAGES cocoa milo, hot chocolate	(121)	☐1	☐2	☐9
powdered fruit drinks	(122)	☐1	☐2	☐9
pure fruit juices	(123)	☐1	☐2	☐9
cold drinks (carbonated) Coca Cola, Fanta, Sprite sugar water	(124)	☐1	☐2	☐9
emahewu	(125)	☐1	☐2	☐9
tea, coffee	(126)	☐1	☐2	☐9
squash drinks	(127)	☐1	☐2	☐9
Homebrew Beer (Tjwala)	(128)	☐1	☐2	☐9
FATS/OILS cooking oil margarine	(131)	☐1	☐2	☐9
butter, lard, hotsum droppings animal fat	(132)	☐1	☐2	☐9
SUGAR, white sugar sugar cane (ems)	(133)	☐1	☐2	☐9

FAMILY. WHAT DID OTHER FAMILY MEMBERS EAT YESTERDAY?

CEREALS/STARCHES		Yes	No	Unk
mealie meal, rice, mealie rice samp	(151)	☐1	☐2	☐9
green maize, tinkhobe inhlanhla	(152)	☐1	☐2	☐9
bread brown/white, maize bread wheat	(153)	☐1	☐2	☐9
irish potato	(154)	☐1	☐2	☐9
sorghum	(155)	☐1	☐2	☐9
cassava emathapha ematabhane	(156)	☐1	☐2	☐9
pasta, macaroni bashetti custard	(157)	☐1	☐2	☐9
rakes, biscuits	(158)	☐1	☐2	☐9
PROTEIN cow, goat, sheep milk	(162)	☐1	☐2	☐9
yogurt, sour milk (emasi) cheese	(163)	☐1	☐2	☐9
other milk	(164)	☐1	☐2	☐9
beef, mutton, goat, bush meat	(165)	☐1	☐2	☐9
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible] chicken	[illegible]	[illegible]	[illegible]	[illegible]
liver, spleen kidney	(169)	[illegible]	[illegible]	☐9
tripe, intestines	(170)	[illegible]	[illegible]	☐9

		Yes	No	Unk
other meats	(171)	☐1	☐2	☐9
legume, beans, peas cowpeas, jogo beans	(172)	☐1	☐2	☐9
ground nuts peanut butter	(173)	☐1	☐2	☐9
eggs	(174)	☐1	☐2	☐9
VEGETABLES lipushu imbuve, chuchza etc	(181)	☐1	☐2	☐9
pumpkin tops, beet root tops, carrot tops	(182)	☐1	☐2	☐9
spinach (other dark green leafy vegetables)	(183)	☐1	☐2	☐9
pumpkin (Lingulangal), sweet potato, squash – butternut, beet root	(184)	☐1	☐2	☐9
carrots, melons (Lingulangal), other deep yellow vegetables	(185)	☐1	☐2	☐9
cabbage	(186)	☐1	☐2	☐9
onions, garlic, green pepper, tomatoes	(187)	☐1	☐2	☐9
green beans [illegible]	(188)	☐1	☐2	☐9
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
mango, peaches [illegible]	(193)	[illegible]	[illegible]	[illegible]
apples, pears, grapes, lychee, pineapple	(194)	[illegible]	[illegible]	☐9
wild fruit: emahewu (umagungumeze, umvugi)	(195)	[illegible]	[illegible]	☐9

		Yes	No	Unk
banana	(196)	☐1	☐2	☐9
avocado	(197)	☐1	☐2	☐9
BEVERAGES tea, coffee	(201)	☐1	☐2	☐9
cocoa, milo, hot chocolate	(202)	☐1	☐2	☐9
powdered fruit drinks	(203)	☐1	☐2	☐9
pure fruit juices	(204)	☐1	☐2	☐9
cold drinks (carbonated) – Coca Cola, Fanta, Sprite, sugar water	(205)	☐1	☐2	☐9
emahewu	(206)	☐1	☐2	☐9
squash drinks	(207)	☐1	☐2	☐9
homebrew beer (tjwala) commercial beer	(208)	☐1	☐2	☐9
alcoholic spirits	(209)	☐1	☐2	☐9
FATS/OILS cooking oil, margarine	(215)	☐1	☐2	☐9
butter, lard, hotsum animal fat droppings	(216)	☐1	☐2	☐9
SUGAR white sugar sugar cane (ems)	(217)	☐1	☐2	☐9

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APPENDIX 2.2

SISWATI TRANSLATION OF QUESTIONNAIRE

The Siswati translation of key questions in the questionnaire is provided below.

HOMESTEAD CENSUS QUESTIONNAIRE

Names of homestead members:	Ngicela emagama ebantfu labahlala lakhaya nalabangekho kwannyalo.
Household number:	ngabe nidla bhodolinye yini lakhaya
Marital status:	
Females:	Ngabe kusekhakhakho yini lakhaya?
Males:	Ngabe sewutsetse yini?
Live births:	Bangaki bantfwana bakho lowababeleka baphila? (ngisho labakhala uma babelekwa). Bala nalegebashona nalabangahlali nawe.
Living children:	Bangaki bantfwana labatalwa nguwe labaphilako? Bala nalabangahlali nawe.
Child deaths:	Bangaki bantfwana bakho labashona?
Are you pregnant now?	Kwanyalo ngabe utetfwele yini make?

BIRTH HISTORY QUESTIONNAIRE

2. Ngicela kukubuta imibuzo lembadlwana ngebantfwana lowababeleka baphila (ngisha labakhala uma babelekwa). Kumqoka kutsi ungitshele ngabo bonkhe ngisho nalabo labaphila sikhashana lesincane. Ngicela ucale ngalomncane kunabo bonkhe ugcine ngalomdzala kepha longephansi kweminyaka lesihlanu.
3. Ngesikhatsi utetfwele umntfwana wekugcina, wabonwa yini bodokotela noma bonesi?
4. Wabelekela kuphi?
5. Wabelekiswa ngubani?

SURVEY CHILD QUESTIONNAIRE

B. Unina lomtalako uhlala lapha ekhaya yini Kulomnyaka lophelile ngabe unina sikhatsi lesiningi wasichitsa lakhaya yini?
   Ngubani umuntfu wesifazane lohlala lakhaya lomele unina walomntfwana?
C. Uyise lomtalako ngabe uhlala lakhaya yini?
   Ngabe uyise lomtalako sikhatsi lesiningi wasichitsa lakhaya kulomnyaka lophelili?
D. Ngabe bangaki bantfu labadla bhodo linye nalomntfwana?
E. Lomntfwana wake wavakashela emtfolamphilo wanikwa nelikhadi.
   Lomntfwana wake wavakashela emtfolamphilo kulomnyaka lesikuwo wa 1983
F. Walimunya libele yini lomntfwana?
   Usalimunya yini libele lomntfwana?
G. Lomntfwana wake wondliwa yini ngalokunye kudla noma lolunye nje lubisi ngaphandle kwelenina?
H. Ngabe lomntfwana uke wondliwa yini ngekudla lokucinacinile njenge ndengane etc, ngaphandle kwemanti, lubisi, netitselo letihlutiwe?

I. Uke washeka yini kulamaviki lamabili lengcile? Abesheka kangaki ngelilanga? Watsatsa emalanga lamangaki asheka? Welashwa ngani kulomsheko?

J. Unina lomtalako uyasebenta yini?

K. Ngabe unina walomntfwana sewusekhakhakhe yini? Ngabe nendze nibangaki la kulobabe?

L. Ngabe lomatfwana unalo yini likhadi lemjovo (lasemtfolamphilo)?

QUESTIONNAIRE 4

A. Wabulawa yini lomntfwana?

B. Wagula emalanga lamangaki?

C. Ekuguleni kwakhe, uke washeka yini noma waqubuka noma waphatfwa ngumkhuhlane?

D. Abeke wamunya yini (ngabe walimunya yini libele)?
Bekasamunya yini, angakaqalwa ngulokugula?

E. Lomntfwana wake wondliwa yini ngalokunyekudla noma lolunye lubisi ngaphandle kwelenina angakaqalwa ngulokugula?
Bese amdzala kanganani uma aqala kondliwa ngalokudla?
Ngabe kudla kuni noma luphi lubisi lekaqala ngalo?

F. Angakaqalwa ngulokugula ngabe lomntfwana uke wondliwa yini ngekudla lokucinacinile njenge ndengane, incwancwa, etc ngaphandle kwemanti, lubisi netitselo letihlutiwe.

APPENDIX 2.3: LISTING OF SAMPLE ENUMERATION AREAS
Page 1

HHOHHO DISTRICT

SITE #	EA	NAME	ECOLOGICAL ZONE	SUBSAMPLE	TENURE
1	1103	SHUMI	LOWVELD	NO	NON-RDA
2	1118	GONGODLWANE	LOWVELD	NO	NON-RDA
3	1126	MAYIWANE	MIDDLEVELD	NO	MAX. RDA
4	1141	MSHINANDE	MIDDLEVELD	YES	MAX. RDA
5	1144	LOMSHIYO	MIDDLEVELD	NO	MAX. RDA
6	1151	NORTH OF EMVEMBILI	MIDDLEVELD	NO	MAX. RDA
7	1153	HHOHHO AREA	MIDDLEVELD	NO	MAX. RDA
8	1158	BULANDZENI AREA	MIDDLEVELD	NO	MAX. RDA
9	1201	BULANDZENI AREA	MIDDLEVELD	YES	MAX. RDA
10	1208	NKAMANZINI	MIDDLEVELD	NO	NON-RDA
11	1211	NDZINGENI	HIGHVELD	NO	NON-RDA
12	1218	PEAK TIMBERS	HIGHVELD	NO	COMPANY
13	1219	PIGG'S PEAK URB AREA	HIGHVELD	NO	GOVERNMENT
14	1220	HAVELOCK MINE	HIGHVELD	YES	COMPANY
15	1227	MHLATANE PLANTATIONS	HIGHVELD	NO	COMPANY
16	1308	DUOKOLWAKO	LOWVELD	NO	MIN. RDA
17	1314	MPOTHI	LOWVELD	NO	MIN. RDA
18	1320	MAVULA	LOWVELD	NO	MIN. RDA
19	1403	MKHOMAZANE	MIDDLEVELD	YES	NON-RDA
20	1410	SINGWENI	MIDDLEVELD	NO	NON-RDA
21	1411	MBULUZI/ST. FLORENCE	MIDDLEVELD	NO	NON-RDA
22	1415	DLANGENI	HIGHVELD	NO	NON-RDA
23	1418	THEMBELIHLE	HIGHVELD	NO	ITF
24	1504	MALANTI	HIGHVELD	YES	NON-RDA
25	1515	DARLIACH	HIGHVELD	NO	ITF
26	1519	INSTEAD OF EA 1517	HIGHVELD	NO	MIN. RDA
27	1518	MAKHWANE (MABILISA F FARM)	HIGHVELD	NO	ITF
28	1528	SIPHOCOSINI FARM	HIGHVELD	NO	EXCLUDED
29	1532	ZULWINI FARM	MIDDLEVELD	YES	ITF
30	1535	LOBAMBA AREA	MIDDLEVELD	NO	MAX. RDA
31	1537	LOBAMBA ROYAL VILLAGE	MIDDLEVELD	NO	EXCLUDED

APPENDIX 2.3: LISTING OF SAMPLE ENUMERATION AREAS
Page 2

MANZINI DISTRICT

SITE #	EA	NAME	ECOLOGICAL ZONE	SUBSAMPLE	TENURE
32	2114	LUVE	MIDDLEVELD	NO	MIN. RDA
33	2117	NKILIJI	MIDDLEVELD	NO	MIN. RDA
34	2119	NKILIJI	MIDDLEVELD	YES	MIN. RDA
35	2127	SIGOMBENI FARM	MIDDLEVELD	NO	MAX. RDA
36	2129	NYAKENI	MIDDLEVELD	NO	MAX. RDA
37	2130	MPHEMBEKATI	MIDDLEVELD	NO	MAX. RDA
38	2135	NYAKENI	MIDDLEVELD	NO	MAX. RDA
39	2136	MAFUTSENI	MIDDLEVELD	YES	NON-RDA
40	2301	MALKERNS AREA	MIDDLEVELD	NO	ITF
41	2312	EDWALENI AREA FARM	MIDDLEVELD	NO	ITF
42	2315	RURAL MASUNDVINI	MIDDLEVELD	NO	NON-RDA
43	2321	GUNDWINI	MIDDLEVELD	NO	NON-RDA
44	2325	HHELEHHELE	MIDDLEVELD	YES	NON-RDA
45	2335	BULUNGA	MIDDLEVELD	NO	NON-RDA
46	2340	MPHEMBEKATI	MIDDLEVELD	NO	MAX. RDA
47	2341	SIDVOKODVO	LOWVELD	NO	COMPANY
48	2435	KAGWEBU	LOWVELD	NO	NON-RDA
49	2501	LUNDZI	HIGHVELD	YES	NON-RDA
50	2503	USUTHU FOREST	HIGHVELD	NO	COMPANY
51	2517	LAMGABHI	MIDDLEVELD	NO	NON-RDA
52	2518	LAMGABHI	MIDDLEVELD	NO	NON-RDA
53	2523	DVUDVUSI	HIGHVELD	NO	NON-RDA
54	2526	MNTIMANE FARM	HIGHVELD	YES	ITF
55	2530	MPONONO DWALILE FARM	HIGHVELD	NO	ITF
56	2531	MPONONO	HIGHVELD	NO	MAX. RDA
57	2534	BHADENI	HIGHVELD	NO	MAX. RDA
58	2536	VELEZIZWENI	HIGHVELD	NO	MAX. RDA
59	2542	LUSHIKISHINI	HIGHVELD	YES	MAX. RDA
60	2548	NKANYEZINI	HIGHVELD	NO	MAX. RDA
61	2550	BOSCHHOEK FARM	HIGHVELD	NO	ITF
62	2553	N USUTHU FOREST	HIGHVELD	NO	COMPANY

APPENDIX 2.3: LISTING OF SAMPLE ENUMERATION AREAS
Page 3

SHISELWENI DISTRICT

SITE #	EA	NAME	ECOLOGICAL ZONE	SUBSAMPLE	TENURE
63	3113	GEGE	HIGHVELD	NO	NON-RDA
64	3118	LANG GEWAG FARM	HIGHVELD	YES	NON-RDA
65	3123	KAGEOGEA	HIGHVELD	NO	ITF
66	3201	SKOJAAN'S HOEAK FARM	MIDDLEVELD	NO	ITF
67	3207	SINCENI HILLS FARM	MIDDLEVELD	NO	NON-RDA
68	3228	LUGOJE	HIGHVELD	NO	NON-RDA
69	3231	NTFONJENI	MIDDLEVELD	YES	MAX. RDA
70	3235	RURAL HLATSI	HIGHVELD	NO	MAX. RDA
71	3237	RURAL HLATSI	HIGHVELD	NO	MAX. RDA
72	3303	NSOKOMANE	HIGHVELD	NO	MAX. RDA
73	3311	MAKHOSINI	HIGHVELD	NO	MAX. RDA
74	3313	MAKHONZA	HIGHVELD	YES	MAX. RDA
75	3314	DVWALENI	HIGHVELD	NO	MAX. RDA
76	3317	ZOMBODZE	HIGHVELD	NO	MAX. RDA
77	3319	SOMTSEWU	MIDDLEVELD	NO	MAX. RDA
78	3320	MADVULINI	HIGHVELD	NO	MAX. RDA
79	3322	LUPHALA	MIDDLEVELD	YES	MAX. RDA
80	3324	NGWABI	MIDDLEVELD	NO	MAX. RDA
81	3326	SOMTSEWU	MIDDLEVELD	NO	MAX. RDA
82	3335	JABULANI	HIGHVELD	NO	MAX. RDA
83	3401	MAKHOSINI	MIDDLEVELD	NO	MIN. RDA
84	3403	NGUDZENI	MIDDLEVELD	YES	MIN. RDA
85	3405	EKUVUKENI	MIDDLEVELD	NO	MIN. RDA
86	3408	SANDLENI	MIDDLEVELD	NO	MIN. RDA
87	3414	SIGWE AREA	HIGHVELD	NO	MAX. RDA
88	3433	MKHWAKHWENI	MIDDLEVELD	NO	MIN. RDA
89	3435	HENWOODS FARM	MIDDLEVELD	YES	ITF
90	3459	HLUSHWANE	LOWVELD	NO	NON-RDA
91	3466	KASHIBA	MIDDLEVELD	NO	MIN. RDA
92	3519	MABANDE	LOWVELD	NO	NON-RDA
93	3520	MABANDE/SIKHALASABODWE	LOWVELD	NO	NON-RDA
94	3529	KOHRSBOOM FARM	LOWVELD	YES	ITF
95	3536	LAVUMISA	LOWVELD	NO	GOVERNMENT

APPENDIX 2.3: LISTING OF SAMPLE ENUMERATION AREAS
Page 4

LUBOMBO DISTRICT

SITE #	EA	NAME	ECOLOGICAL ZONE	SUBSAMPLE	TENURE
96	4104	SINCENI/KAPHUNGA	MIDDLEVELD	NO	NON-RDA
97	4110	NGCAMPHALALA	LOWVELD	NO	MIN. RDA
98	4111	LITFOVU	LOWVELD	NO	MIN. RDA
99	4116	NGCAMPHALALA & MAPHOBENI	LOWVELD	YES	MIN. RDA
100	4118	PENTOZ	LOWVELD	NO	MIN. RDA
101	4123	MBHOKE	MIDDLEVELD	NO	MIN. RDA
102	4204	MHLUME	LOWVELD	NO	COMPANY
103	4205	MHLUME	LOWVELD	NO	COMPANY
104	4207	MHLUME	LOWVELD	YES	COMPANY
105	4215	TAMBANKULU ESTATE	LOWVELD	NO	COMPANY
106	4219	SIKHUPHE	LOWVELD	NO	NON-RDA
107	4220	MALINDZA	LOWVELD	NO	NON-RDA
108	4237	KALANGA	LOWVELD	NO	NON-RDA
109	4242	MKHUTJANE	LOWVELD	YES	MAX. RDA
110	4245	MPOLONJENI	LOWVELD	NO	MAX. RDA
111	4249	MVUVULANE IRRIG FARMS	LOWVELD	NO	COMPANY
112	4304	MAPHUNDVWINI	LUBOMBO	NO	MAX. RDA
113	4310	SHEWULA	LUBOMBO	NO	MAX. RDA
114	4314	MBULUZI PEAK	LUBOMBO	YES	MAX. RDA
115	4325	SITEGI FARM	LUBOMBO	NO	GOVERNMENT
116	4342	TIKHUBA	LUBOMBO	NO	MAX. RDA
117	4344	MATSANJENI	LUBOMBO	NO	MAX. RDA
118	4407	BIG BEND	LOWVELD	NO	COMPANY
119	4410	TAMBUTI ESTATES	LOWVELD	YES	ITF
120	4416	S OF MKHIWANE FARM	LOWVELD	NO	MIN. RDA
121	4425	GILGAL SCHOOL AREA	LOWVELD	NO	MIN. RDA
122	4437	SINYAMABTULU	LOWVELD	NO	NON-RDA
123	4438	NCANDVU	LOWVELD	NO	NON-RDA
124	4442	BIG BEND	LOWVELD	YES	COMPANY
125	4444	TWIN RIDGE FARM	LOWVELD	NO	EXCLUDED

Appendix 2.4: Historical Calendar

CALENDAR OF EVENTS FOR COMPUTING AGE IN MONTHS

		Recurrent Events		1978	1979	1980	1981	1982	1983	Farming	
Jan.	Summer	School Opening	New Year's		Malaria in Lubombo						Jan.
Feb.				STBC starts on TV			Themba Ndaba trial				Feb.
Mar.											Mar.
Apr.	Autumn		Easter Flag Day	Malaria in Lowveld Maknosini Dias		Mnjoli Dam opens			P. M. Mabandla dismissed	Harvest maize	Apr.
May		School Holiday	Ascension Day			Simunye mill starts up					May
June						Indlovukati Bendelini dies Khlangano post office opens					June
July	Winter		King's Birthday		Ambrose Phesheya Zwane freed				Mrs. Mdluli hanged		July
Aug.			Reed Dance			King opens Simunye Mill	Philips Mdluli trial	King dies Reed Dance cancelled			
Sept.				10 years of independence			King's Jubilee			Till soil	Sept.
Oct.	Spring			Parliament elections Lozitha opens	Death of Prime Minister Maphevu	Cholera outbreak		Princess Ann visits			Oct.
Nov.					Prince Mabandla			Butterflies Mourning ended		Plant maize	Nov.
Dec.		School closes	Incwala Xmas			Cholera at Pigg's Peak		Incwala cancelled			Dec.
				1978	1979	1980	1981	1982	1983	Farming	
				5	4	3	2	1			

APPENDIX 2.5

DETERMINATION OF SAMPLE SIZE

A single country-wide sample has the advantage that subgroups such as districts or agroecological zones can be evaluated with precision. A single sample is only efficient when the subgroups of interest are of roughly equal population size. This was the case in Swaziland, with the exception of the Lubombo agroecological zone.

To determine the appropriate survey sample size for a subgroup of interest, binomial theory was used. Binomial theory is used in the analysis of attributes (yes/no variables or variables grouped into two classes based on the survey data).

According to binomial theory modified for cluster sampling, there are four variables affecting sample size "n."

Z = normal deviate for confidence level desired (1.96 for 95% confidence and 1.645 for 90% confidence).

p = proportion of population having the attribute measured.

D = Deviation from p due to sampling with confidence level chosen. The confidence limits for p would be $p \pm D$.

K = Adjustment for "cluster effect."

The formula for n is:

$$n = \frac{K\ Z^2(p)\ (1 - p)}{D^2}$$

Past experience with anthropometric variables has shown that K = 2 should provide at least the desired precision. The Z-score is generally chosen for 95% confidence (Z = 1.96).

While the value of D can be predetermined, it depends on the value of p and may or may not be acceptable; for example, 50% ± 5% might be considered acceptable, but 10% + 5% might not. The value of p yielding the largest n is 0.5 (50%), so if a number of different attributes are to be measured for the universe, it is usually safest to assume p = 0.5. After fixing K, Z, and p, the only values not determined are n and D.

By determining maximum deviation tolerable (D), n can be solved for as follows:

K = 2 (cluster effect)

Z = 1.96 (95% confidence)

p = 0.5 (50%)

D = 0.046 (4.6%) (arbitrarily selected as acceptable for n = 900)

$$n = \frac{2\ (1.96)^2\ (0.5)\ (0.5)}{(.046)^2}$$

n = 900

Thus 900 children had to be included in the survey for each population subgroup of interest, according to these calculations. At least 30 EA's (with an average of 30 children per EA) were selected per district and agroecological zone (except in Lubombo). An attribute (population characteristic) would have the following approximate precisions for a subgroup with 900 children.

Percent Having Characteristics	95% Confidence Limits
50.0%	± 4.6%
20.0% (80.0%)	± 3.7%
10.0% (90.0%)	± 2.8%

Of course a countrywide sample does not yield exactly 30 EA's per population group of interest. The presurvey estimates of precision by population group of interest are as follows:

Population Group	Expected Children	95% Confidence Limits for Attribute 50%	20%	10%
District				
Hhohho	930	± 4.5%	± 3.6%	± 2.7%
Manzini	900	± 4.6%	± 3.7%	± 2.8%
Lubombo	930	± 4.5%	± 3.6%	± 2.7%
Shiselweni	990	± 4.4%	± 3.5%	± 2.6%
Zone				
Lowveld	1,020	± 4.3%	± 3.5%	± 2.6%
Middleveld	1,410	± 3.7%	± 3.0%	± 2.2%
Highveld	1,140	± 4.1%	± 3.3%	± 2.5
Lubombo	180	±10.3%	± 8.3%	± 6.2%
Middleveld & Lubombo combined	1,590	± 3.5%	± 2.8%	± 2.1%
Total Rural	3,750	± 2.3%	± 1.8%	± 1.4%

Predetermination of sample size does not predetermine precision of survey estimation. Some variables will have greater precision than predicted and others will have less. Computation of precision estimates for every tabulation provided in the report would require substantial computer time and was not done.

APPENDIX 2.6
FIELD STAFF PARTICIPATING IN THE SURVEY

Survey Director: Paulos F. Kunene

Nutritionist/Interministerial Coordinator: Juliet Aphane

Field Coordinator/Administrator: David M. Gama

Advance Preparations/Map Reader: Gerald Dlamini

Supervisors:
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Enumerators:
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Nhlanhla Ginindza
Sindis Dlamini
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Lucky M. Motsa
Sara Nhlabatsi
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Sipho Gamedze
Reuben Maphalala
Rosemary Hlanze
John Matsebula
Musa Masinga
Anson Zwane
Timothy Nkambule
Sandile Dlamini
Alpheus Mdluli
Hezekiel Ndwandwe
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CHAPTER 3: SOCIOECONOMIC AND DEMOGRAPHIC CHARACTERISTICS

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CHAPTER 3: SOCIOECONOMIC AND DEMOGRAPHIC CHARACTERISTICS

INTRODUCTION

This chapter examines selected characteristics of the children surveyed, their parents, and the homesteads in which they live. The purpose is to provide an overview of the survey homesteads which contain preschool-age children.

METHODS

Survey workers visited selected homesteads and conducted a complete census of all members. They collected information on age, sex and residence status of all homestead members; on occupation, education, and marital status of all adults (i.e. those >15 years of age); and on recent-birth histories of adult females.

Age information was carefully collected for children by using documentation when available or with the aid of a local-events calendar. Ages of adult homestead members were recorded as reported by homestead informants without documentation.

Although census information was collected in all selected homesteads, this chapter reports only on survey homesteads which contained children 0-59 months of age; subsequent chapters are based on data for these homesteads.

RESULTS

Survey workers visited 122 rural and 4 peri-urban enumeration areas and included 2250 rural and 430 peri-urban homesteads with preschool-age children. Within these homesteads, information was collected on 4698 rural and 772 peri-urban children who were ≤59 months of age. Data on age, literacy, and education were available on 1718 rural and 321 peri-urban fathers and on 2806 rural and 531 peri-urban mothers of these children. Data were not collected on parents who were not members of their preschool age children's homestead.

Homestead Size and Number of Households

Rural homesteads tended to have slightly more members than peri-urban homesteads (Table 3.1); 38.0% of rural households contained ten or more residents compared with 32.1% for peri-urban households. There were ≥15 members in 12.4% of rural and 9.8% of peri-urban households.

Most homesteads consisted of only one household (rural=82.9%, peri-urban=73.7%) (Table 3.2). There were slightly more multi-household homesteads in the peri-urban sample; 2.3% of rural homesteads contained ≥4 households compared with 7.4% for peri-urban homesteads.

Age and Sex Distribution of Children

The age distribution has modest peaks at 12 and 24 months and pronounced peaks at 36 and 48 months (Figures 3.1 and 3.2). This kind of age "heaping" is common and unavoidable in African countries where birth dates are not normally considered important to remember.

Both the age and sex distributions were rather uniform for the rural and peri-urban samples (Table 3.3). The sex distribution was almost identical in

the rural sample; in the peri-urban sample there was a slightly higher percentage of males (51.6%) compared with that for females (48.4%).

Parental Residence Status

Fathers of 39.7% of rural and 42.1% of peri-urban children were not members of the survey homesteads (Table 3.4) compared with 12.0% for rural mothers and 10.0% for peri-urban mothers (Table 3.5). Nearly one-quarter (23.7%) of rural children's fathers, although considered homestead members, were away from the homesteads more than half the time compared with 7.6% of peri-urban children's fathers. The percentage of rural mothers who were homestead members but were away from the homesteads more than half the time was 3.5%; the percentage of peri-urban mothers was 1.4%.

Age of Parents

Rural fathers who were homestead members tended to be slightly older than their peri-urban counterparts (Table 3.6). Over half (60.8%) of the rural fathers were ≥35 years of age, compared with 48.6% of peri-urban fathers.

As a group, mothers were substantially younger than fathers (Figures 3.3 and 3.4). Of rural mothers, 79.1% were <35 years of age compared with 83.6% of peri-urban mothers (Table 3.7).

The peaks that occur in the parents' age distributions reflect the "heaping" that frequently occurs when adults are asked their ages in African countries where birth dates are not considered important.

Parental Literacy and Education

Rural fathers tended to be less educated than peri-urban fathers (Table 3.8); 73.7% of rural fathers were reported as literate compared with 91.9% of peri-urban fathers. About one-quarter (24.2%) of rural fathers had

no formal education compared with 6.9% of peri-urban fathers. About one-quarter (21.0%) of rural fathers had achieved at least a form 1 education compared with 45.5% of peri-urban fathers.

The literacy and education distributions for mothers (Table 3.9) tended to be similar to those for fathers (Table 3.8). Although more peri-urban mothers had achieved a form 1-6 education than had peri-urban fathers (mothers=54.8% vs fathers=45.5%), peri-urban mothers were less likely to be university graduates (4.9%) compared with peri-urban fathers (10.9%).

Occupation of Parents

Occupational information was available for all but 3.5% of rural and 4.7% of peri-urban fathers (Table 3.10) and 2.6% of rural and 1.7% of peri-urban mothers (Table 3.11).

The percentage of fathers reportedly working outside the country was substantially higher in rural areas (14.5%) than in the peri-urban areas (2.5%). Over one-quarter (26.0%) of fathers from the Shiselweni district worked outside the country compared with 13.8% for Lubombo, 9.5% for Manzini, and 8.7% for the Hhohho district. Few rural (0.4%) or peri-urban (0.2%) mothers were reported to be working outside the country.

Table 3.1

Percentage Distribution

By Size of Homestead

Swaziland National Nutrition Status Survey, 1983

	Number of Members in Survey Homesteads					
	<5	5-9	10-14	15-19	20+	Total Number
Residence						
Rural	11.8%	50.2%	25.6%	8.2%	4.2%	(2250)
Peri-urban	20.2%	47.7%	22.3%	4.2%	5.6%	(430)
District (Rural)						
Hhohho	11.8%	51.2%	24.7%	7.7%	4.5%	(559)
Lubombo	19.3%	50.4%	19.4%	7.0%	4.0%	(546)
Manzini	7.6%	47.0%	31.6%	7.9%	5.9%	(535)
Shiselweni	8.1%	52.0%	27.0%	10.1%	2.7%	(610)
Zone (Rural)						
Highveld	11.4%	52.0%	25.5%	7.6%	3.5%	(650)
Middleveld	7.2%	48.3%	29.5%	9.8%	5.1%	(837)
Lowveld	18.0%	50.1%	22.1%	6.4%	3.5%	(663)
Lubombo	10.4%	54.0%	18.5%	10.5%	6.5%	(100)
Tenure (Rural)						
Non-RDA*	6.0%	49.5%	30.5%	9.4%	4.5%	(646)
Minimum RDA	9.0%	46.5%	27.0%	12.1%	5.3%	(340)
Maximum RDA	6.9%	49.0%	27.9%	10.6%	5.6%	(673)
Company	33.3%	55.8%	10.5%	-	0.4%	(271)
Administrative	29.1%	48.5%	18.2%	4.2%	-	(64)
ITF**	9.5%	53.0%	27.5%	5.6%	4.4%	(256)

NOTE: Percentages are weighted on the basis of population proportions; actual number of homesteads surveyed is given in parenthesis.

* RDA = Rural Development Area.
** ITF = Individual Tenure Farm.

Table 3.2

Percentage Distribution
By Number of Households per Homestead
By Residence, District, Zone and Land Tenure
Swaziland National Nutrition Status Survey, 1983

	Number of Households Per Homestead				
	1	2	3	4+	Total Number
Residence					
Rural	82.9%	11.3%	3.4%	2.3%	(2250)*
Peri-urban	73.7%	13.0%	5.8%	7.4%	(430)
District (Rural)					
Hhohho	84.5%	11.0%	3.0%	1.5%	(559)
Lubombo	86.2%	9.7%	2.6%	1.6%	(546)
Manzini	80.7%	12.5%	4.3%	2.5%	(535)
Shiselweni	80.4%	12.2%	3.9%	3.5%	(610)
Zone (Rural)					
Highveld	86.3%	9.1%	3.8%	0.7%	(650)
Middleveld	80.1%	11.7%	4.4%	3.9%	(837)
Lowveld	83.2%	12.6%	2.1%	2.1%	(663)
Lubombo	80.6%	15.5%	1.8%	2.1%	(100)
Tenure (Rural)					
Non-RDA**	81.1%	13.1%	4.6%	1.2%	(646)
Minimum RDA	80.6%	12.3%	4.4%	2.7%	(340)
Maximum RDA	81.9%	12.0%	3.4%	2.8%	(673)
Company	92.1%	6.8%	0.4%	0.7%	(271)
Administrative	89.4%	6.8%	-	3.8%	(64)
ITF§	79.4%	11.2%	4.6%	4.9%	(256)

NOTE: Percentages are weighted on the basis of population proportions; actual number surveyed is given in parenthesis.

* Excludes one rural homestead with erroneous household information.
** RDA = Rural Development Area.
§ ITF = Individual Tenure Farm.

Table 3.3

Percentage Distribution of Children
By Age and Sex
Swaziland National Nutrition Status Survey, 1983

Age in Months	Rural			Peri-Urban		
	Male	Female	Total Number	Male	Female	Total Number
<3	2.9%	2.7%	(266)	4.5%	4.3%	(68)
3-5	2.7%	2.5%	(243)	2.5%	1.8%	(33)
6-11	5.1%	5.5%	(497)	5.3%	6.6%	(92)
12-17	6.1%	5.8%	(556)	5.3%	4.8%	(78)
18-23	4.9%	4.7%	(458)	6.0%	4.7%	(82)
24-35	10.6%	10.5%	(990)	8.9%	8.8%	(137)
36-47	10.1%	9.9%	(936)	10.6%	10.1%	(160)
48-59	7.3%	8.5%	(752)	8.4%	7.4%	(122)
Total	49.8%	50.2%	(4698)	51.6%	48.4%	(772)

NOTE: Percentages are weighted on the basis of population proportions; actual number surveyed is given in parenthesis.

Table 3.4

Percentage Distribution of Children
By Fathers' Homestead Membership and Residence Status
And by Residence, District, Zone, and Tenure
Swaziland National Nutrition Status Survey, 1983

	Fathers' Homestead Status				
	Member of Survey Homestead				
	Present ≥50% of Time	Present <50% of Time	Not a Member	Status Unknown	Total Number
Residence					
Rural	36.3%	23.7%	39.7%	0.3%	(4698)
Peri-urban	50.3%	7.6%	42.1%	-	(772)
District (Rural)					
Hhohho	32.9%	26.9%	40.2%	-	(1204)
Lubombo	48.2%	19.9%	31.3%	0.6%	(1123)
Manzini	31.8%	25.8%	42.3%	0.1%	(1156)
Shiselweni	32.0%	22.5%	44.9%	0.6%	(1215)
Zone (Rural)					
Highveld	32.9%	21.5%	45.4%	0.2%	(1259)
Middleveld	31.5%	28.0%	40.3%	0.3%	(1811)
Lowveld	46.4%	19.2%	33.7%	0.7%	(1402)
Lubombo	33.5%	29.4%	37.1%	-	(226)
Tenure (Rural)					
Non-RDA*	27.9%	28.8%	43.2%	0.1%	(1434)
Minimum RDA	31.1%	29.7%	38.2%	1.0%	(754)
Maximum RDA	31.5%	25.2%	43.1%	0.3%	(1453)
Company	64.6%	5.5%	29.9%	-	(428)
Administrative	50.7%	3.6%	43.3%	2.4%	(103)
ITF**	46.6%	21.1%	32.3%	-	(526)

NOTE: Percentages are weighted on the basis of population proportions; actual number surveyed is given in parenthesis.

* RDA = Rural development area.
** ITF = Individual tenure farm.

Table 3.5

Percentage Distribution of Children
By Mothers' Homestead Membership and Residence Status and
By Residence, District, Zone, and Tenure
Swaziland National Nutrition Status Survey, 1983

	Mothers' Homestead Status				
	Member of Survey Homestead				
	Present ≥50% of Time	Present <50% of Time	Not a Member	Status Unknown	Total Number
Residence					
Rural	84.3%	3.5%	12.0%	0.3%	(4698)
Peri-urban	88.5%	1.4%	10.0%	0.1%	(772)
District (Rural)					
Hhohho	82.5%	3.2%	14.3%	-	(1204)
Lubombo	88.1%	2.2%	9.2%	0.5%	(1123)
Manzini	81.2%	6.1%	12.5%	0.2%	(1156)
Shiselweni	85.1%	2.6%	12.0%	0.3%	(1215)
Zone (Rural)					
Highveld	81.8%	4.7%	13.4%	-	(1259)
Middleveld	83.7%	3.5%	12.4%	0.3%	(1811)
Lowveld	86.4%	2.7%	10.5%	0.4%	(1402)
Lubombo	90.0%	0.8%	8.7%	0.5%	(226)
Tenure (Rural)					
Non-RDA*	80.4%	3.3%	15.8%	0.5%	(1434)
Minimum RDA	83.1%	4.4%	12.1%	0.5%	(754)
Maximum RDA	86.6%	2.4%	10.8%	0.1%	(1453)
Company	87.5%	4.2%	8.3%	-	(428)
Administrative	78.6%	0.7%	19.6%	1.2%	(103)
ITF**	87.2%	5.5%	7.3%	-	(526)

NOTE: Percentages are weighted on the basis of population proportions; actual number surveyed is given in parenthesis.

* RDA = Rural development area.
** ITF = Individual tenure farm.

Table 3.6

Age Distribution of Fathers
By Residence and District
Swaziland National Nutrition Status Survey, 1983

	Unknown	<15	15-19	20-24	25-29	30-34	35-39	40-44	45-49	50+	Number Total
Residence											
Rural	1.4%	0.1%	0.3%	5.6%	15.7%	16.2%	18.1%	14.7%	13.2%	14.8%	(1718)
Peri-urban	-	-	0.3%	8.7%	22.1%	20.2%	15.9%	14.6%	7.8%	10.3%	(321)
District (Rural)											
Hhohho	0.7%	-	0.1%	5.3%	16.3%	16.7%	18.8%	14.9%	13.5%	13.7%	(443)
Lubombo	3.6%	0.3%	0.2%	6.4%	14.5%	18.7%	18.6%	15.1%	12.4%	10.4%	(444)
Manzini	-	-	0.7%	5.4%	16.6%	13.5%	16.7%	15.3%	14.3%	17.6%	(409)
Shiselweni	1.0%	-	0.2%	5.0%	15.7%	15.7%	18.1%	13.5%	12.7%	18.0%	(422)

NOTE: Percentages are weighted on the basis of population proportions; actual number surveyed is given in parenthesis.

Table excludes fathers who were not members of a homestead; therefore, their age was not determined.

Table 3.7

Age Distribution of Mothers
By Residence and District
Swaziland National Nutrition Status Survey, 1983

	Unknown	<15	15-19	20-24	25-29	30-34	35-39	40-44	45-49	50+	Number Total
Residence											
Rural	-	-	11.3%	29.4%	22.1%	16.3%	10.9%	6.0%	2.8%	0.4%	(2806)
Peri-urban	-	-	12.4%	31.5%	24.1%	15.6%	10.5%	4.1%	1.7%	-	(531)
District (Rural)											
Hhohho	-	-	11.0%	30.0%	23.0%	17.5%	9.7%	5.9%	2.6%	0.3%	(703)
Lubombo	-	-	13.1%	26.3%	24.7%	15.3%	10.8%	5.0%	2.1%	0.5%	(672)
Manzini	-	-	9.8%	32.5%	20.5%	15.9%	10.5%	6.5%	3.7%	0.4%	(690)
Shiselweni	-	-	11.4%	29.1%	20.5%	16.5%	12.5%	6.6%	2.8%	0.3%	(741)

NOTE: Percentages are weighted on the basis of population proportions; actual number surveyed is given in parenthesis.

Table excludes mothers who were not members of a homestead; therefore, their age information was not obtained.

Table 3.8

Percentage Distribution
Of Fathers' Literacy Rate and Education
By Residence, District, Zone, and Tenure
Swaziland National Nutrition Status Survey, 1983

	Literacy			Education						
	Literate	Illiterate	Unknown	Grades None	Standard Adult	Forms 1-2	Standard 1-5	Forms 1-6	University	Unknown
Residence										
Rural (N=1717)	73.7%	25.7%	0.6%	24.2%	8.9%	3.9%	34.1%	21.0%	2.8%	5.1%
Peri-urban (N=321)	91.9%	6.9%	1.2%	6.9%	2.2%	0.3%	30.5%	45.5%	10.9%	3.7%
District										
Hhohho (N=422)	73.4%	26.1%	0.5%	24.0%	10.5%	3.7%	29.9%	24.0%	3.1%	4.9%
Lubombo (N=444)	70.4%	29.0%	0.5%	27.7%	11.4%	4.2%	34.7%	14.7%	1.0%	6.3%
Manzini (N=409)	83.4%	16.2%	0.4%	16.9%	4.5%	3.7%	36.1%	29.1%	4.3%	5.5%
Shiselweni (N=422)	68.4%	30.4%	1.1%	27.6%	8.8%	4.1%	35.6%	17.3%	3.0%	3.6%
Zone										
Highveld (N=450)	77.1%	22.3%	0.5%	20.0%	7.9%	4.7%	31.7%	28.0%	2.3%	5.3%
Middleveld (N=649)	75.6%	23.6%	0.8%	22.8%	7.3%	3.5%	37.6%	21.0%	3.7%	4.0%
Lowveld (N=536)	69.1%	30.1%	0.7%	28.6%	12.2%	4.0%	30.0%	16.7%	2.6%	5.9%
Lubombo (N=82)	68.1%	31.9%	-	31.9%	6.5%	2.2%	46.4%	6.5%	-	6.4%
Tenure										
Non-RDA* (N=491)	68.7%	30.5%	0.8%	29.8%	9.8%	3.2%	35.2%	16.0%	3.2%	2.9%
Minimum RDA (N=274)	70.3%	28.3%	1.4%	25.8%	9.1%	4.3%	32.4%	20.2%	1.3%	7.0%
Maximum RDA (N=497)	74.8%	24.6%	0.6%	24.5%	7.6%	4.3%	38.0%	18.4%	1.6%	5.6%
Company (N=201)	80.8%	19.2%	-	17.8%	7.9%	4.4%	27.9%	32.7%	2.6%	6.5%
Administrative (N=41)	98.2%	-	1.8%	-	3.1%	-	44.1%	33.2%	17.8%	1.8%
ITF** (N=213)	72.3%	27.7%	-	22.6%	12.2%	4.6%	29.6%	22.3%	3.7%	5.1%

NOTE: Percentages are weighted on the basis of population proportions; actual number surveyed is given in parenthesis.

Table excludes fathers who were not members of a homestead; therefore, their literacy and education were not determined.

* RDA = Rural development area.
** ITF = Individual tenure farm.

Table 3.9

Percentage Distribution
By Mothers' Literacy Rate and Education
By Residence, District, Zone, and Tenure
Swaziland National Nutrition Status Survey, 1983

	Literacy			Education						
	Literate	Illiterate	Unknown	Grades None	Standard Adult	Forms 1-2	Standard 1-5	Form 1-6	University	Unknown
Residence										
Rural (N=2805)	75.9%	23.7%	0.4%	22.3%	4.2%	4.5%	42.2%	22.6%	1.9%	2.2%
Peri-urban(N=530)	91.7%	7.5%	0.8%	6.8%	0.9%	1.3%	28.1%	54.8%	4.8%	3.2%
District (Rural)										
Hhohho (N=702)	71.9%	27.6%	0.5%	27.2%	5.3%	2.1%	38.4%	23.1%	2.3%	1.5%
Lubombo (N=672)	70.6%	29.0%	0.3%	27.1%	6.5%	5.5%	39.5%	16.8%	1.6%	2.9%
Manzini (N=690)	85.2%	14.7%	0.1%	14.1%	1.7%	3.7%	47.3%	28.5%	2.9%	1.8%
Shiselweni (N=741)	76.1%	23.4%	0.5%	21.0%	3.2%	6.4%	43.5%	22.4%	1.0%	2.4%
Zone (Rural)										
Highveld (N=761)	82.9%	16.6%	0.5%	15.8%	3.6%	2.9%	44.6%	28.6%	2.7%	1.8%
Middleveld (N=1074)	77.7%	22.1%	0.2%	20.6%	3.6%	4.7%	43.1%	24.3%	1.6%	2.1%
Lowveld (N=836)	69.1%	30.3%	0.6%	28.6%	5.7%	6.0%	38.4%	16.7%	1.5%	3.1%
Lubombo (N=134)	61.6%	38.4%	0.0%	37.3%	3.1%	3.7%	43.8%	9.8%	2.3%	-
Tenure (Rural)										
Non-RDA* (N=819)	76.0%	23.4%	0.6%	22.5%	4.8%	5.2%	45.2%	17.6%	1.9%	2.7%
Minimum RDA (N=439)	74.3%	25.2%	0.5%	21.2%	5.1%	9.6%	40.2%	18.6%	0.8%	4.4%
Maximum RDA (N=877)	75.0%	24.7%	0.3%	23.3%	3.3%	2.6%	43.7%	23.6%	1.6%	1.8%
Company (N=284)	78.2%	21.5%	0.2%	21.5%	4.3%	2.1%	38.3%	30.7%	2.7%	0.5%
Administrative (N=57)	89.9%	10.1%	-	10.1%	1.3%	-	44.4%	38.3%	5.9%	-
ITF** (N=329)	75.1%	24.6%	0.3%	24.0%	4.7%	5.0%	37.5%	24.9%	2.8%	1.1%

NOTE: Percentages are weighted on the basis of population proportions; actual number surveyed is given in parenthesis.

Table excludes mothers who were not members of a homestead; therefore, their literacy and education were not determined.

* RDA = Rural development area.
** ITF = Individual tenure farm.

Table 3.10

Occupational Distribution of Fathers
By Residence, District, Zone, and Land Tenure
Swaziland National Nutrition Status Survey, 1983

	Cash/Sub-sistence Farmer	Paid Farm Worker	Worker Outside Swaziland	Worker Inside Swaziland	Business-man/Shop-keeper	Hawker/ Seller	Civil Servant	Student	Retired/ Disabled	Other/ Unemployed	Unknown*
Residence											
Rural (N=1718)	6.9%	0.7%	14.5%	40.4%	1.0%	2.3%	17.8%	0.5%	1.7%	10.6%	3.5%
Peri-urban (N=320)	-	0.3%	2.5%	49.8%	2.5%	3.1%	30.8%	1.2%	1.2%	3.7%	4.7%
District (Rural)											
Hhohho (N=443)	5.4%	0.3%	8.7%	48.4%	1.2%	0.7%	19.9%	0.2%	1.0%	11.4%	2.8%
Lubombo (N=444)	8.7%	0.8%	13.8%	43.3%	0.7%	2.2%	14.7%	0.5%	1.0%	10.7%	3.7%
Manzini (N=409)	5.6%	0.6%	9.5%	46.1%	1.2%	3.2%	21.6%	0.6%	1.0%	7.5%	3.2%
Shiselweni (N=422)	7.9%	1.2%	26.0%	23.8%	1.1%	3.1%	15.7%	0.5%	3.8%	12.7%	4.1%
Zone (Rural)											
Highveld (N=450)	4.0%	-	14.5%	48.8%	1.1%	2.7%	13.8%	0.2%	2.7%	9.1%	3.1%
Middleveld (N=649)	6.3%	0.9%	14.4%	32.0%	1.1%	3.2%	24.9%	0.7%	1.3%	11.1%	4.2%
Lowveld (N=537)	9.3%	0.6%	14.3%	46.1%	1.1%	1.1%	11.9%	0.5%	1.3%	11.1%	2.7%
Lubombo (N=82)	13.9%	4.2%	17.2%	19.0%	-	1.0%	25.9%	-	1.0%	12.6%	5.0%
Tenure (Rural)											
Non-RDA** (N=492)	8.9%	0.4%	18.8%	29.1%	0.9%	1.1%	19.6%	0.6%	2.7%	15.0%	3.1%
Minimum RDA (N=274)	7.8%	0.8%	19.2%	30.8%	2.4%	4.8%	15.6%	0.6%	2.4%	11.4%	4.2%
Maximum RDA (N=497)	8.9%	1.0%	18.0%	31.0%	0.7%	3.1%	20.2%	0.6%	1.5%	10.7%	4.2%
Company (N=201)	0.6%	-	-	92.4%	-	-	6.3%	-	-	0.6%	-
Administrative (N=41)	-	-	9.6%	9.0%	6.7%	-	56.5%	-	-	10.5%	7.8%
ITF§ (N=213)	5.9%	1.8%	9.5%	44.6%	0.4%	3.1%	16.4%	0.3%	1.5%	11.8%	4.7%

NOTE: Percentages are weighted on the basis of population proportions.

Table excludes mothers who were not members of a homestead, and therefore their literacy and education were not determined.

* "Other/unknown" includes unknown (rural = 0.3, Peri-urban = -), self-employed other (rural = 1.2, peri-urban = 2.5), homemaker (rural = 0.7, peri-urban = 0.3), traditional healer (rural = 0.9, peri-urban = 0.9), other (rural 0.2, peri-urban = 0.9).

**RDA = Rural development area.

§ ITF = Individual tenure farm.

Table 3.11

Occupational Distribution of Mothers
By Residence, District, Zone, and Land Tenures
Swaziland National Nutrition Status Survey, 1983

	Cash/Sub-sistence Farmer	Worker Outside Swaziland	Worker Inside Swaziland	Business-woman/ Shopkeeper	Hawker/ Seller	Civil Servant	Student	Home-Maker	Un-employed	Other/ Unknown*
Residence										
Rural (N=2805)	2.0%	0.4%	7.7%	0.3%	9.5%	4.8%	0.9%	54.7%	17.1%	2.6%
Peri-urban (N=530)	0.4%	0.2%	22.8%	-	10.2%	10.2%	2.3%	26.0%	26.4%	1.7%
District (Rural)										
Hhohho (N=702)	0.7%	-	7.8%	0.4%	11.5%	5.0%	0.5%	54.7%	16.7%	2.7%
Lubombo (N=672)	2.6%	-	8.3%	0.1%	9.9%	5.4%	0.7%	55.9%	13.3%	3.7%
Manzini (N=690)	2.0%	0.6%	10.8%	-	12.8%	5.6%	1.7%	47.0%	17.7%	1.8%
Shiselweni (N=741)	2.4%	0.9%	4.4%	0.7%	4.4%	3.1%	0.8%	60.5%	20.7%	2.0%
Zone (Rural)										
Highveld (N=761)	1.4%	0.7%	9.3%	0.3%	9.1%	5.0%	0.6%	55.7%	16.7%	1.2%
Middleveld (N=1075)	0.9%	0.3%	7.2%	0.3%	12.2%	5.2%	1.5%	49.1%	21.1%	2.3%
Lowveld (N=835)	3.7%	0.3%	7.6%	0.4%	6.7%	4.0%	0.4%	59.3%	13.7%	3.9%
Lubombo (N=134)	3.1%	-	3.8%	-	8.8%	4.9%	1.3%	63.3%	10.2%	4.5%
Tenure (Rural)										
Non-RDA** (N=819)	2.3%	0.4%	4.2%	0.1%	7.6%	3.2%	0.7%	58.9%	20.7%	1.9%
Minimum RDA (N=439)	1.3%	0.3%	5.9%	0.5%	11.0%	3.3%	1.0%	60.0%	11.5%	5.0%
Maximum RDA (N=877)	2.2%	0.6%	5.7%	0.3%	13.1%	4.1%	1.3%	54.3%	16.8%	1.7%
Company (N=284)	1.9%	-	19.9%	-	7.5%	7.2%	0.4%	42.2%	18.2%	2.6%
Administrative (N=57)	-	-	9.5%	2.2%	4.7%	13.6%	-	46.5%	21.4%	2.2%
ITF§ (N=329)	1.9%	0.5%	10.7%	0.5%	5.5%	7.6%	1.0%	54.2%	14.9%	3.2%

NOTE: Percentages are weighted on the basis of population proportions.

Table excludes mothers who were not members of a homestead and therefore their occupations were not determined.

* "Other/unknown" includes unknown (rural = 0.5, peri-urban = 0.2), private sector self-employed (rural = 1.4, peri-urban = 0.8), traditional healer (rural = 0.2, peri-urban = 0.4), paid farm worker (rural = 0.1, peri-urban = -), other (rural = 0.4, peri-urban = 0.4).

** RDA = Rural development area

§ ITF = Individual tenure farm

FIGURE 3.1
DISTRIBUTION OF ALL CHILDREN BY AGE
SWAZILAND NATIONAL NUTRITION STATUS SURVEY, 1983
(RURAL SAMPLE)

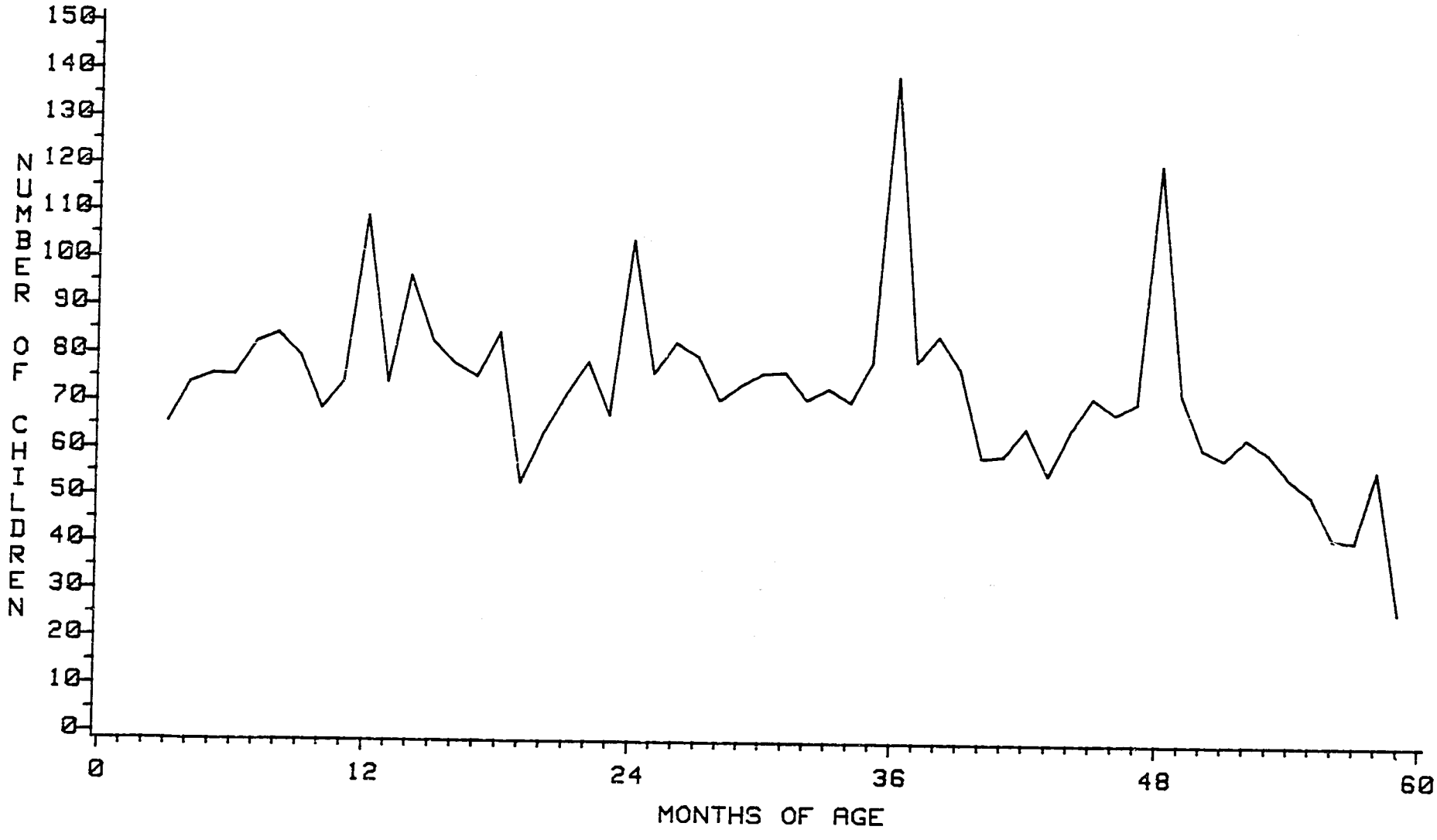


FIGURE 3.2
DISTRIBUTION OF ALL CHILDREN BY AGE
SWAZILAND NATIONAL NUTRITION STATUS SURVEY, 1983
(PERI-URBAN SAMPLE)

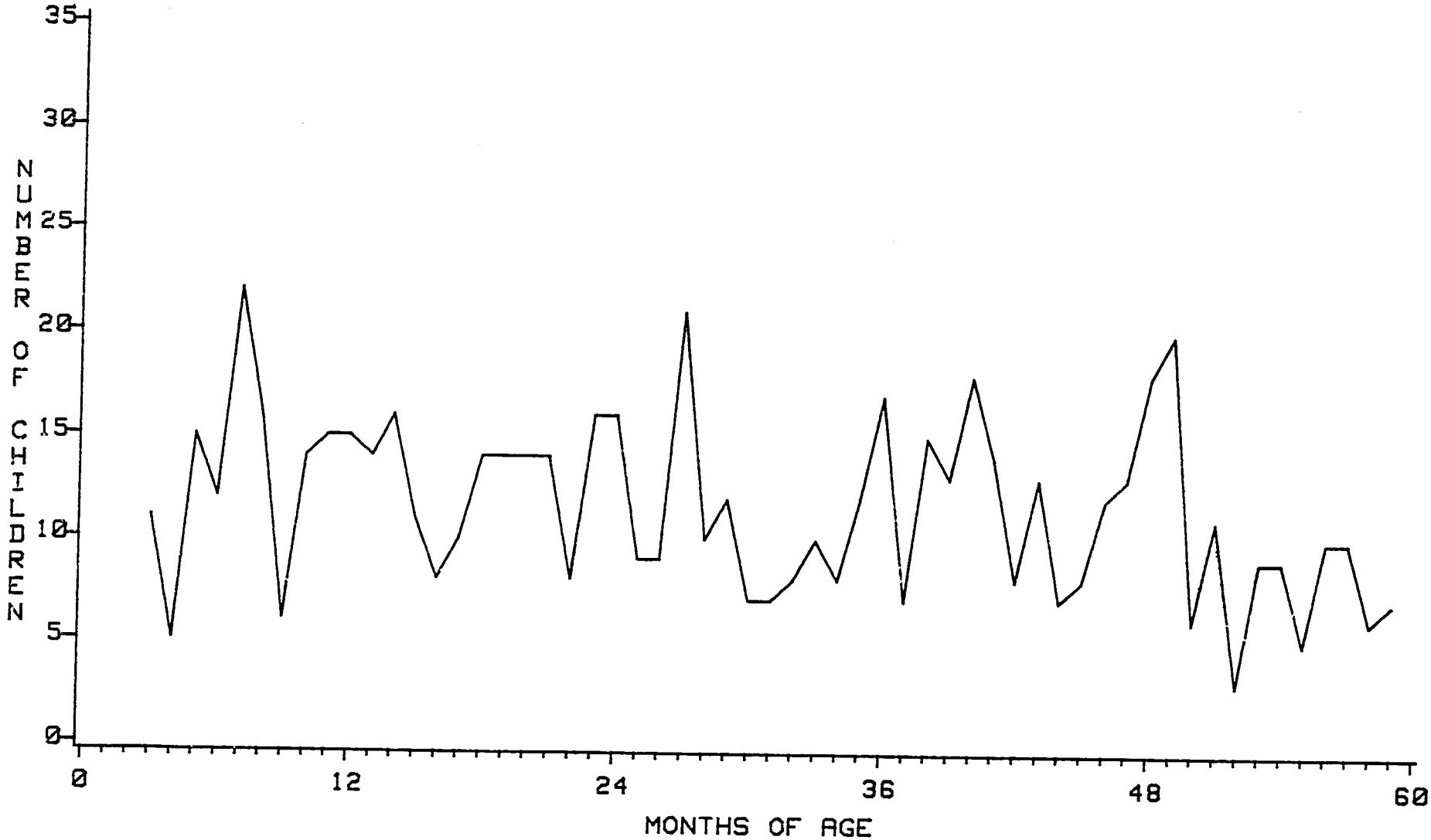


FIGURE 3.3
DISTRIBUTION OF PARENTS BY AGE
SWAZILAND NATIONAL NUTRITION STATUS SURVEY, 1983
(RURAL SAMPLE)

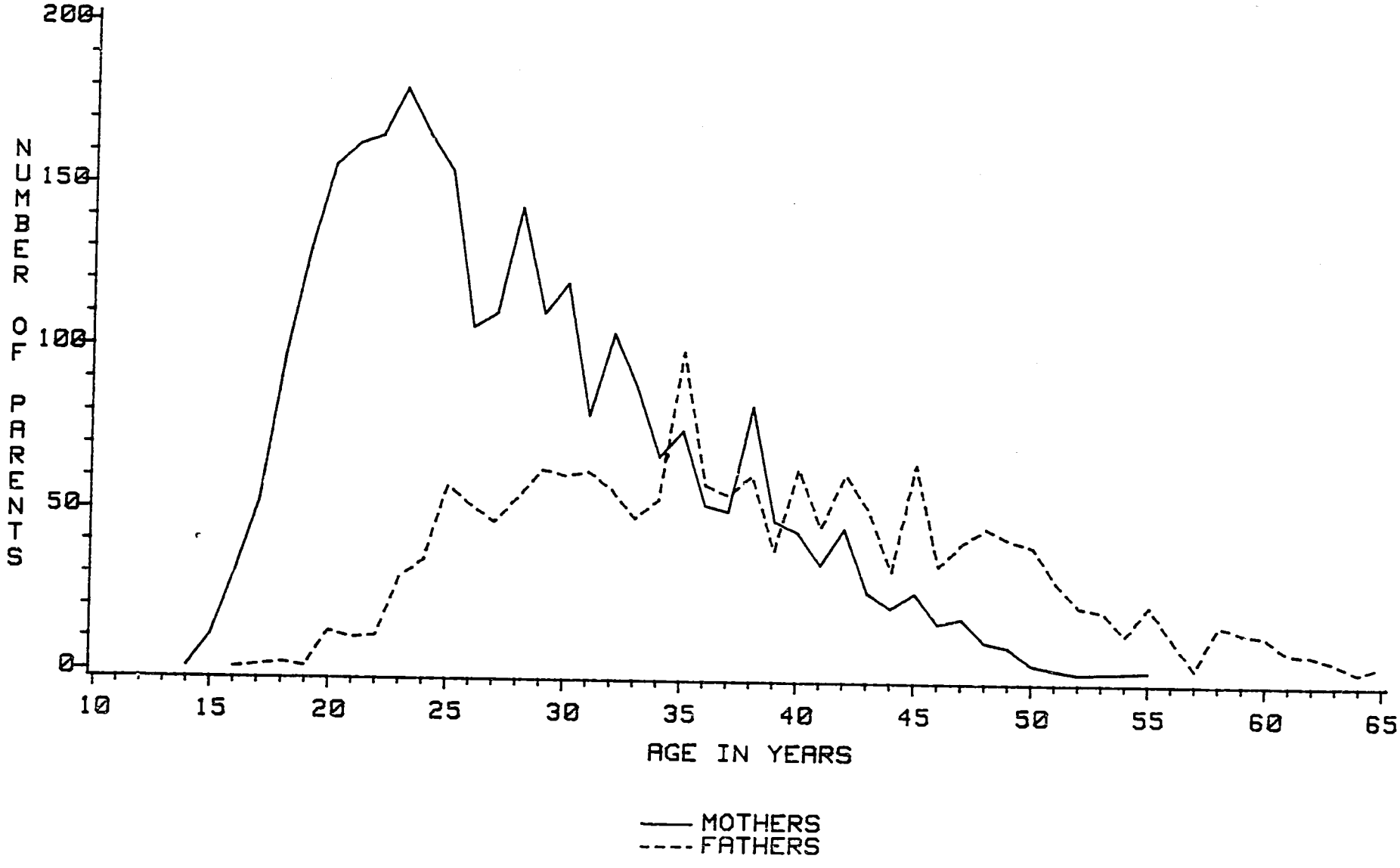
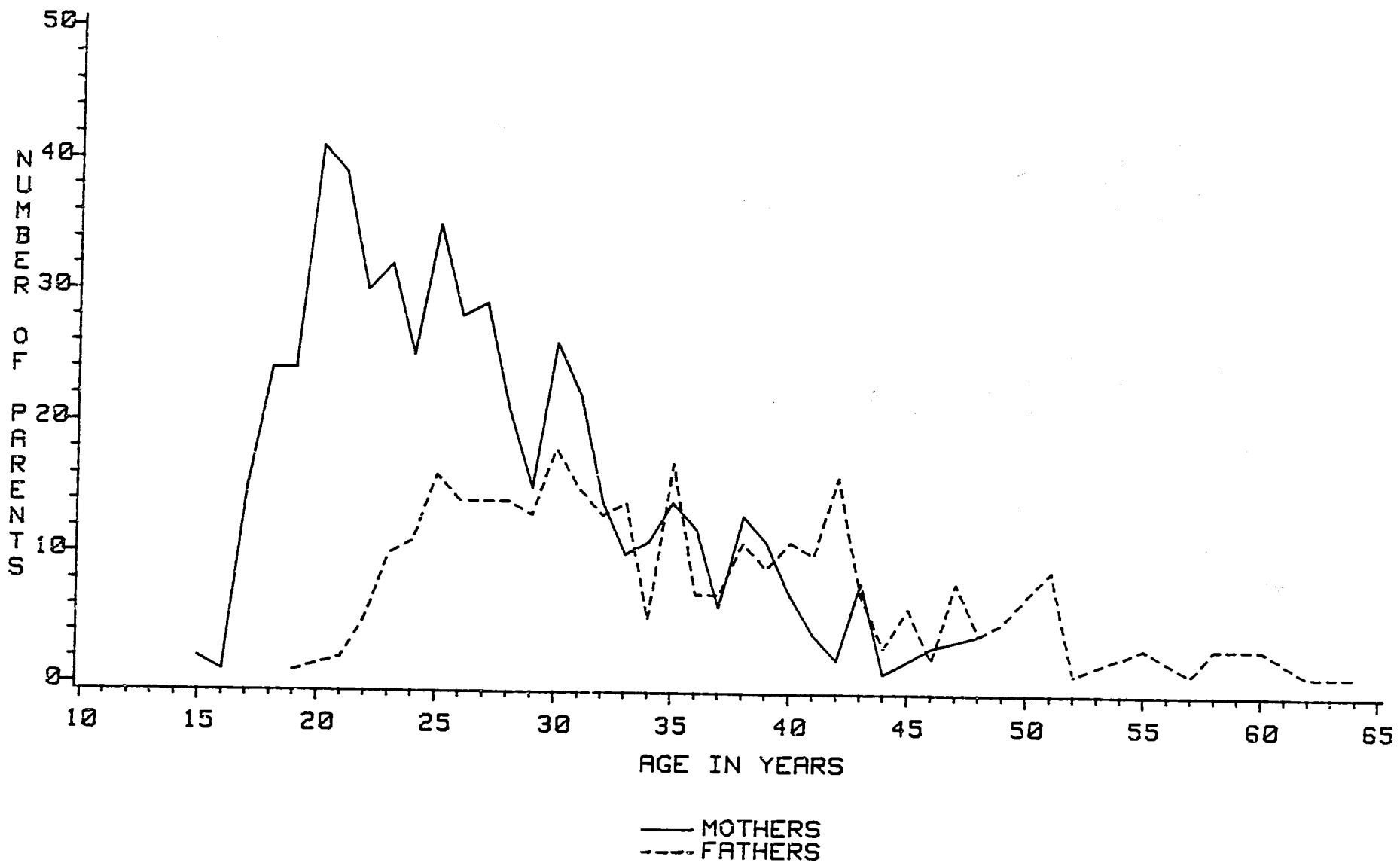


FIGURE 3.4
DISTRIBUTION OF PARENTS BY AGE
SWAZILAND NATIONAL NUTRITION STATUS SURVEY, 1983
(PERI-URBAN SAMPLE)



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Chapter 4

NUTRITIONAL STATUS

INTRODUCTION

The primary aim of this aspect of the survey was to measure the nutritional status of Swazi children during the season of highest risk--the traditional hunger season from June to November. Because of delays in starting, however, the survey period actually extended from September 1983 to January 1984.

BACKGROUND

Previous Nutrition Studies

Recent data on the nutritional status of Swazi children before this survey were unavailable. The only previous national nutrition survey was conducted in 1962 (Jones, 1963). At that time, the Swazi diet was found to be deficient in calories, calcium, vitamin A, riboflavin, and niacin. The most poorly nourished members of the population were children from the age of weaning to 5 years and pregnant and lactating women. The most deficient diets were in the peri-urban and Lowveld areas.

The Swaziland Rural Homestead Survey conducted by the Economics and Statistics Department of the University College of Swaziland seasonally monitored food consumption/dietary intake for about 100 rural families during June 1978 to May 1979 (Capetta, 1980). The mean per capita calorie intake was barely adequate (2200 kcal). Diets in the Middleveld and Highveld were more adequate than diets in the Lowveld. Households that raised a cash crop (and who did not sell food crops) had better diets than households selling food crops grown. Although diet varied by season (least adequate in the dry season, June-November), seasonal differences were thought to be diminished compared with earlier years.

Indices of Malnutrition

Anthropometry (measurements of linear growth and body mass) is considered the most practical indicator of the nutritional status of preschool children. However, the use of anthropometric indices depends on the choice of an appropriate reference population and selected cutoff values for defining both acute and chronic undernutrition.

This survey did not collect information on anemia and other manifestations of iron deficiency. This decision was made because data from all parts of the developing and industrialized world indicate that iron deficiency is a ubiquitous and highly prevalent pediatric problem. Efforts to improve the iron content of Swazi children's diet need not await additional data collection and analysis. Collection of hemoglobin and hematocrit data is costly in time and resources. In addition, a concern was raised that local people may not allow blood collection by nonmedical personnel or may attribute subsequent illness or other misfortunes to such a collection.

Reference Values. Since the influence of the environment (e.g., poverty, nutrition and infectious disease) is more important in determining growth than race or genetic factors, the use of an international reference to compare the growth of children from various populations has been generally recommended (Graitcer, 1981; Habicht, 1974). WHO has recommended the NCHS data base (Hamill, 1977; WHO, 1978) for use as an international reference population. Use of such an international reference allows comparison of Swazi data with data from different countries.

The NCHS reference values for the 2- to 5-year age groups are based on a large, representative cross-sectional survey of U.S. children. Most of these children are white, but black children and those of other ethnic groups are

also included. The NCHS reference values for children <2 years of age are based on a longitudinal study of upper middle class, almost exclusively white American children. The use of this international reference population, which has been recommended by WHO (World Health Organization, 1978), allows comparison of Swazi data with data from different countries.

Anthropometric Indices. Three indices of physical growth are commonly used to describe the nature and extent of malnutrition in children: weight-for-height (or length), height-for-age, and weight-for-age.

Weight-for-height, or body mass in relation to body length, provides an estimate of recent nutritional status. For the Swaziland survey results, wasting (acute undernutrition) was defined as any weight-for-height value less than 2 standard deviations (SD) below the mean of the reference value (<-2.00SD). As with height-for-age, weight-for-age requires an accurate estimation of the child's age for reliable results. Weight-for-height is relatively independent of age and may thus be of greater usefulness in situations where children's exact ages are not known.

Height-for-age is an index of linear growth and reflects past nutritional status. To be useful as an index of stunting or chronic undernutrition, height-for-age requires an accurate estimation of the child's age, which was sometimes difficult to determine in the course of field surveys. Stunting (chronic undernutrition) was defined as height-for-age below 2.00 SD's below the mean. Values below -3.00 SD were defined as severe stunting; values intermediate between -3.00 SD and -2.00 SD were defined as moderate stunting.

Weight-for-age, although commonly used, is a composite index of the other two and does not distinguish between a child who is underweight because

of thinness and one who is underweight because of shortness (Gomez, 1956). Children below -2.00 SD below the reference median were categorized as undernourished.

METHODS

Measurements

Each survey child aged 3-59 months was measured for length or stature to the nearest 0.1 cm and for weight to the nearest 0.1 kg. (Children $\leq$2 months old were not measured because length references are unavailable.) A standard portable measuring board and Salter spring scale were used to measure and weigh the children. The presence or absence of edema was determined by firm thumb pressure on the pretibial surface of both legs. Because most reported cases of edema were unilateral, of the nonpitting type, or of unknown severity, this indicator was not felt to be reliable and was not included in the tabulations. Information regarding other signs suggesting protein-calorie malnutrition (such as depigmentation of the hair or skin, straight hair or hair that could be easily plucked from the scalp, paint-flake dermatitis, etc.) was not collected because of the low reliability of such information in predicting protein-energy undernutrition, particularly when evaluated and recorded by inexperienced personnel.

The survey teams were trained in standard weighing and measuring techniques (see Appendix 4.1). Practice sessions were conducted at the maternal and child health clinic in Mbabane. Standardization exercises were also conducted to quantify and improve the level of accuracy and precision (Habicht, 1972).

Analysis

Data for all anthropometric indices are presented in terms of standard deviation scores in relation to the NCHS/CDC reference median values. This method of presenting anthropometric results has been recommended for international use (Waterlow, 1977). Z-score (standard deviation) values describe the approximate probability distribution of values and thus identify a fixed proportion of the reference population. For the reference population, approximately 15.85% of the children would be expected to fall below -1.00 SD; 2.25%, below -2.00 SD; and 0.15%, below -3.00 SD.

Values more than two standard deviations below the reference mean have been proposed as criteria for undernutrition (Waterlow, 1977) for each of the three anthropometric indices. The analysis of survey data was directed towards estimation of the levels of undernutrition and associated factors. These factors possibly associated were cross-tabulated against various nutritional categories.

An alternative method used in many studies is a comparison of observed prevalences below selected arithmetic percentages of the reference median value (percent of median). Percent of median, by definition, has a fixed relation to the median at all values of a given measurement, but percent-of-median value may not correspond to the same percentile rank at different ages or for different indicators (Waterlow, 1977). To facilitate comparison with other survey data, prevalences of low values of the three anthropometric indices (using percent-of-median cutoff), will be presented briefly after presentation by Z-scores. (See "Presentation of Data Using Percents of Median" in this chapter.)

Data from Swaziland will be compared with other countries following in the section entitled "Comparison of Swaziland Survey with Other African Surveys."

Anthropometric Editing Criteria

To exclude extreme values representing probable measurement errors, all records that met the following anthropometric criteria were excluded from the anthropometric analyses:

Height-for-age $\geq$6 SD's from the median in either direction.

Weight-for-age $\geq$6 SD's from the median in either direction.

Weight-for-height $\geq$6 SD's above or <4 SD's below the median.

Records that exceeded 3.09 SD's for both weight-for-height and height-for-age in opposite directions were excluded on the basis of probable height errors.

RESULTS

In the tabulations below, data are first presented for the rural sample and then for the peri-urban sample. Where the numbers in the peri-urban sample are too small for disaggregation or where tabulations are not useful, tabulations are not provided.

Response Rate

Of the 4,432 children between the ages of 3 and 59 months eligible for the rural sample, 4133 (93.2%) were included in the analysis of anthropometric results. Of the remaining number, 41 (.9%) were excluded on the basis of probable measurement error; and 258 were excluded (5.8%) either because the child was absent or the parents refused to cooperate.

Of the 704 age-eligible children from the peri-urban sample, 658 (93.5%) were included in the analysis of anthropometric results. Of the remaining,

5 (0.7%) were excluded on the basis of probable measurement error; and 41 were excluded (5.8%) because of absence or parental refusal.

Anthropometric Z-Scores: Height-for-Age

To examine factors associated with chronic undernutrition, the prevalence of stunting (below -2.00 standard deviations from the median) was cross-tabulated with enumeration area, homestead, household, maternal and paternal factors, utilization of medical care and infant feeding. The following discussion describes the relationship of these factors to the prevalence of stunting.

Rural Versus Peri-Urban. The overall percentage of stunting was significantly higher in rural areas (30.3%, 95% confidence intervals = 28.0%-32.6%) than in peri-urban areas (23.0%) (Table 4.3). Figure 4.1 shows the height-for-age distribution of the rural, peri-urban, and NCHS/CDC reference populations. The distribution of height-for-age Z-scores is shown in Tables 4.1 and 4.2.

Age. In the rural areas, the rates of stunting were lowest in younger age categories: 12.9% at 3-5 months and 16.9% at 6-11 months. The rates peaked in the 18- to 23-month age category at 41.7% and decreased in the older age categories ranging from 29.6% to 34.3% (Table 4.3). The difference between the prevalences in the 18- to 23-month age category and 24- 29-months age group may be, in part, artifactual because of the change in the reference population at 24 months (Table 4.3).

In peri-urban areas, stunting rates followed the same age pattern as in rural areas, but were consistently 6%-10% lower (Table 4.4).

Sex. In the rural sample, the overall rates of stunting were about the same for males (32.0%) and females (28.7%). However, males have lower rates

of stunting than females at 3-5 months (7.6% versus 18.4%) (Table 4.3). At 6-11 and 12-17 months, males have higher rates of stunting than females (21.3% versus 12.8% and 37.9% versus 22.7% respectively). At 18-23, 24-35, and 36-47 months, the rates of stunting are approximately the same for males and females. At 48-59 months, males have a higher rate of stunting (37.2% versus 30.3%).

In the peri-urban areas, males have a slightly higher overall rate of stunting (25.7%) than females (20.0%) and maintain slightly higher rates in all age categories (Table 4.4).

Characteristics of Enumeration Area (Zone, Land Tenure, District).

Agroecological Zone. In the rural sample, the percentage stunted were similar by agroecological zone (Table 4.5): Highveld (30.0%), Middleveld (31.7%), Lowveld (28.1%), and Lubombo (34.8%).

Land Tenure. In the rural sample, the percentage stunted varied by land tenure: company town (21.0%), adminstrative (25.0%), individual tenure farm (28.6%), Swazi Nation land non-Rural Development Area (RDA) (34.0%), minimum RDA (31.2%), and maximum RDA (30.9%) (Table 4.6).

Because the level of maternal education was higher for the company and administrative towns, the percentage stunted was examined by both maternal education and land tenure (Table 4.7). After stratification for maternal educational level, the differences in stunting by tenure disappeared for children of mothers with no education or adult education only. At higher maternal education levels, the company towns maintained a lower percentage of stunting compared with other groups. For children whose mothers were at the education level of grade 1-standard 5, 20.5% in company towns were stunted, compared with 31.9% in Swazi Nation land, 28.4% in individual tenure farms,

and 28.1% in administrative towns. For children whose mothers were at the educational level of form 1-University, 12.5% in company towns were stunted, compared with 22.8% in Swazi Nation land, 22.6% in Administrative towns, and 20.0% in individual tenure farms.

When stratified for age of the child, the differences in stunting by land tenure diminished for the older age groups (Table 4.8).

District. In the rural sample, the percentage stunted did not vary significantly by district (Table 4.9).

Homestead/Household Characteristics.

Possessions Owned by Homestead. For members in the rural sample, ownership of possessions by homestead members was generally associated with a lower than average percentage of stunting (Table 4.10). The prevalence of stunting was lower in homesteads that owned the following items as compared with those that did not: working refrigerator, vehicle, stove, tractor, sewing machine, radio and spring bed. Ownership of a maize milling machine was not associated with a lower prevalence of stunting.

In the peri-urban sample, there was no relationship between the prevalence of stunting and ownership of most of these items (Table 4.11). However, ownership of a car or truck was associated with a lower prevalence of stunting: 19.6% of children from homesteads owning a vehicle (car or truck) were of short stature compared with 24.1% for homesteads not owning a vehicle.

Highest Level of Education Within the Homestead. In the rural sample, prevalence of stunting was inversely associated with the highest educational level achieved within the homestead: university (17.7%), forms 1-6 (27.4%), standards 1-5 (33.3%), grades 1-2 (40.4%), and none/adult education (44.3%) (Table 4.12).

In the peri-urban areas, the differences were less consistent: university (23.0%), forms 1-6 (22.1%), and standards 1-5 (27.3%). Below standards 1-5, the numbers were too small for calculation (Table 4.13).

Cattle Ownership by Homestead. In the rural sample, the percentage of children with either moderate or severe stunting did not vary by homestead ownership of cattle (Table 4.14). A consistent relationship did not appear after stratification for education of the mother or land tenure.

Land Cultivation by Homestead. In rural areas, a higher percentage of children were stunted in homesteads where land was cultivated for homestead use (31.7%) than in homesteads where land was not cultivated for homestead use (21.0%) (Table 4.15). This relationship persisted after stratification for education. A similar pattern was seen in peri-urban homesteads (Table 4.16).

Homestead Vegetable Garden. In the rural samples, the overall percentage of stunting was somewhat higher for homesteads without a vegetable garden (32.4%) than for those with a vegetable garden (27.2%) (Table 4.15). Also, in the rural sample, the relationship of stunting to presence of a vegetable garden varied by education of the mother (Table 4.17).

Use and Cultivation of Crops. For homesteads that cultivated crops, the percentage distribution of height-for-age by type and use of crop cultivated is shown in Table 4.18. Most homesteads grew crops (maize, pumpkins, jugo beans, sweet potatoes/yams, sorghum, and tobacco) for homestead use only. Because of the small number of homesteads that grew crops for purposes other than homestead use, an examination of the relationship between percentage stunted and homestead use of crops was possible for only maize and jugo beans. For both these crops, the percentage stunted was lower in homesteads where half or more of the crop was sold for cash. Although the numbers from

"he homesteads that grew maize as a cash crop were small, this relationship persisted after stratification for maternal education (Table 4.19). The percentage stunted varied little by type of crop grown and by homestead use of the crop.

Main source of homestead income. In the rural sample, children of homesteads where the main source of homestead income was "agriculture/ self-employed" had a higher percentage of stunting (33.9%) than for all other categories (Table 4.20). Main sources of homestead income for the peri-urban areas are shown in Table 4.21.

Sanitation Facilities. In rural areas children from homesteads where children usually defecate in the open or in the bush had higher rates of stunting (34.5%) than children who use a wooden latrine (24.1%), concrete latrine (16.5%), or flush toilet (15.2%) (Table 4.22).

A similar relationship was seen in the peri-urban areas (Table 4.23).

Source of Water for the Homestead. In rural areas the percentage of stunting varied by the usual water source for the homestead (Table 4.24). The lowest percentage of stunting occurred in homesteads that usually obtained water from a private tap (15.8%), followed by public tap (26.3%), and by dam or pond water (28.9%). Other major sources of water ranged from well/bore hole (30.6%) to river/stream (33.7%).

In peri-urban areas, the lowest percentage of stunting occurred in homesteads that usually obtained water from a private tap (10.1%), followed by a river/stream (18.7%) and by public tap (26.5%) (Table 4.25). The small number of children make the percentages statistically unreliable in the other categories.

Because water source and sanitation facilities are interrelated, both were cross-tabulated against prevalence of stunting (Table 4.26). Prevalence of stunting was low for children with private tap regardless of sanitation facilities. For children with other sources of water, the prevalence of stunting was higher where children usually use the open bush compared with children who use a latrine or toilet. Because sanitation facilities may also be related to educational levels, sanitation facilities and maternal education levels were also cross-tabulated (Table 4.27). Generally within each educational level, lower prevalence of stunting was seen for children using a latrine or toilet.

Homestead/Household Size. In the rural sample, the percentage of children stunted did not vary consistently or greatly by number of persons per homestead or household or by number of persons <5 years of age per homestead. Although there appeared to be a slight trend for increasing stunting in homesteads of fewer than 5 to 15-19 persons per homestead/household, the trend reversed and percentages of stunted dropped in households of 20+ persons (Tables 4.28). Similarily, no consistent relationship was seen for number of persons <5 years old per homestead (Table 4.29).

No consistent relationship between stunting and homestead/household size was seen in the peri-urban sample (Tables 4.30-4.31).

<u>Maternal Characteristics</u>.

Membership and Residence Status. In the rural sample, the lowest percentage of stunting occurred among children whose mothers were members of the homestead but who were present <50% of the time (25.4%), compared with the percentage stunted for children of mothers who were present at least 50% of the time (29.9%) or who were not a member of the homestead (34.2%) (Table 4.32).

In the peri-urban sample, a lower percentage of stunting occurred among children whose mothers were members and present at least 50% of the time (22.2%), as compared with the percentage stunted for children of mothers who were not a member of the homestead (28.8%) (Table 4.33).

Employment Status. Similarly in the rural sample, the lowest percentage of stunting occurred among children whose mothers worked away from home (21.8%), compared with the percentage for mothers who worked at home (26.7) or mothers who did not work (31.5%) (Table 4.34). These associations were maintained after stratification for maternal membership/residence in the homestead and mother's employment status (Table 4.35).

In contrast, in the peri-urban sample the lowest percentage of stunting occurred among children whose mothers were employed inside the home (14.4%), compared with mothers who worked outside the home (25.4%) or who were unemployed (23.7%) (Table 4.36).

Occupation of the Mother. In the rural sample, in which mothers were members of the homestead, the percentage of stunted children ranged from 35.0% for farmers to 14.2% for salaried government workers (Table 4.37). In the peri-urban sample, the percentage of stunted children varied little (Table 4.38).

Maternal Education. In rural areas increasing maternal education was associated with a lower overall prevalence of stunting (Table 4.39). A similar pattern was noted in the peri-urban areas (Table 4.40). Interestingly, the percentage of stunting after stratification by maternal education was approximately the same for rural and peri-urban areas.

Maternal Age. In the rural sample, less stunting was found among the children of mothers <35 years of age. Among mothers <20 years old, this percentage was 27.1%; for 20- to 24-year-olds, 28.8%; 25- to 29-year-olds, 29.9%;

30- to 34-year-olds, 27.9%; 35- to 39-year-olds, 32.8%; and among mothers 39 years old, 32.4% (Table 4.41). After stratification by child's age, the difference was seen primarily for children <12 months old (Table 4.42).

No consistent pattern was noted in the peri-urban areas (Table 4.43).

Birth Order of Living Children. In the rural sample, children of mothers who had fewer than 4 living children had a lower percentage of both overall and severe stunting (birth order one, 25.2%; two to three, 28.9%) than children of mothers who had borne more (Table 4.44). Children whose mothers had at least 8 living children had the highest percentage of severe stunting (14.1%) compared with other children.

Because a child's age and birth order of living children were correlated, the percentage stunted was cross-tabulated by child's age and birth order (Table 4.45). However, the trend toward lower percentage of stunting among children whose mothers had ≤3 living children was not consistent within all age categories.

A similar pattern was found in the peri-urban sample (Table 4.46).

Sibling Deaths. In the rural sample, the prevalence of stunting increased slightly with the number of siblings who had died (Table 4.47). In the rural sample, 28.0% of children who had no dead siblings were stunted, compared with 30.9% of children with one dead sibling, 34.4% with two or more dead siblings, and 36.1% with three or more dead siblings. The percentage of severe stunting increased with number of sibling deaths from 8.0% for children who had no dead siblings to 17.6% for children with three or more dead siblings.

In the peri-urban sample, the prevalence of stunting did not vary consistently with the number of siblings who had died (Table 4.48).

Marital Status. In both the rural and peri-urban samples, the prevalence of stunting was similar for the children of mothers who were married compared with the percentage for children of mothers who were not married or who were divorced (Tables 4.49 - 4.50).

Paternal Characteristics.

Membership and Residence Status. In the rural sample, the percentage of stunting did not vary by the father's membership or residence status (Table 4.51). In the peri-urban areas, stunting was 13.4% among children whose fathers were members of the homestead but present <50% of the time, compared to children whose fathers were members but present ≥50% of the time (22.8%) and children whose fathers were not members 24.9% (Table 4.52).

Education of the Father. For those fathers who were members of the homestead in the rural sample, the percentage of both severely and moderately stunted children increased with decreasing paternal education: university 5.9%; grade 1 to standard 5, 29.3%; adult education only, 37.7%; and none, 36.2% (Table 4.53). A similar trend was apparent in the peri-urban areas, but the numbers were small (Table 4.54).

Marital Status and Number of Wives. In the rural sample, for those children whose mothers were married, the prevalence of stunted children increased with the number of the father's wives: 29.5% if the father had one wife; 32.8%, two wives; 35.6%, three wives; and 41.2%, four or more wives (Table 4.55). After stratification of paternal education, the association between increasing number of wives and increasing percentage of stunting remained for children of fathers with no education or adult education only (Table 4.56). In the peri-urban areas, the number of fathers with more than one wife was too small for comparison.

Occupation of the Father. In the rural sample where fathers were members of one homestead, the percentage of stunted children ranged from 39.2% for sellers or hawkers to 25.8% for salaried government workers (Table 4.57). The percentage of stunted children was 36.4% for farmers. In the peri-urban sample, most of these were salaried workers (Table 4.58). The low percentage of farmers in the rural sample (8.9%) and the low percentage of unemployment in both the rural (10.9%) and the peri-urban sample (3.9%) may indicate inaccuracy in these self-reported occupational categories.

Utilization of Medical Care.

Travel Time To Clinic. The percentage of children stunted rose with increasing travel time to the nearest health clinic (Table 4.59).

Attendance at Maternal Child Health Clinics. Children who had ever attended a maternal-child health (MCH) clinic were compared with those who had not. In both rural and peri-urban areas for all age groups combined, the percentages of both severe and moderate stunting were consistently lower for children who had ever attended such a clinic (Table 4.60 and 4.62). Because both the likelihood of clinic attendance and prevalence of stunting were strongly associated with age of the child, clinic attendance and height-for-age were cross-tabulated by the child's age for the rural sample (Table 4.61).

Method of Infant Feeding. No clear relationship between current method of infant feeding and percentage of stunting emerged. The small number of children exclusively breastfed or weaned from the breast prohibited comparison by feeding method after 3-5 months of age. At 6-11, 12-17, and 18-23 months of age, the children weaned from the breast had a lower percentage of stunting (Table 4.63).

Anthropometric Z-Scores: Weight-for-Height

Rural Versus Peri-Urban. The overall percentage of wasting was similar to that in the reference population: 0.9% of rural children (95% confidence interval = 1.2%-0.6%) and 0.6% of peri-urban children. The distribution of weight-for-height Z-scores is shown in Tables 4.64-4.65.

Age-Sex. The prevalence of wasting varied somewhat by age and sex, as shown in Tables 4.66-4.67, but because of low prevalences, these differences have little practical meaning. The weight-for-height distribution shows little variation by sex.

Zone, Tenure, District. The prevalence of wasting varied somewhat by district/agroecological zone and by administrative area; however, this variation in prevalence is not meaningful because of low prevalences of wasting (Tables 4.68-4.70).

Other Factors. Because the prevalence of wasting was generally equal to or lower than expected compared with the prevalence of wasting for the reference population, comparisons of wasting with other factors were not performed.

Anthropometric Z-Scores: Weight-for-Age

Rural Versus Peri-Urban. The overall percentage of underweight was similar in the rural (9.8%) (95% confidence interval = 10.9% -8.6%) and the peri-urban sample (8.2%) shown in Tables 4.73 - 4.74. The distribution of weight-for-age Z-scores is shown in Tables 4.71-4.72.

Age-Sex. In rural areas percentages of underweight children were lowest in younger age categories: 2.8% at 3-5 months and 7.4% at 6-11 months. The percentage peaked at 12.9% in the 18- to 23-month age category and leveled off at 8.8% to 10.7% for the older age categories (Table 4.73). The peak in

the 18- to 23-month age category may be artifactual because of the change in the reference population at 24 months. Overall, the percentage underweight was only slightly higher for males (10.8%) than for females (8.8%).

In the peri-urban areas, percentage of children underweight follow the same age-sex pattern as in the rural areas (Table 4.74).

Zone, Tenure, District. The percentage of underweight did not vary significantly by zone, tenure, or district (Tables 4.75-4.77).

Other Factors. Because weight-for-age is a composite index reflecting both long-term and recent nutritional status, examination of factors associated with low weight-for-age is unlikely to provide useful information beyond that provided by examination of height-for-age and weight-for-height for height results. However, because the current Ministry of Health nutrition surveillance system is based on the weight-for-age index, weight-for-age by attendance at the maternal-child health clinics was tabulated in relation to this indicator.

Attendance at Maternal-Child Health Clinics. For the combined rural sample, the percentage of children who were underweight was slightly lower for children who had ever attended an MCH clinic compared with those who had not (Table 4.78). Similar findings were seen for the peri-urban sample (Table 4.80). Because both the likelihood of clinic attendance and prevalence of underweight were associated with age of child, clinic attendance and prevalence of underweight were cross-tabulated by child's age (Table 4.79). At 0-11 months, the difference in percentage of children underweight who had a history of attendance versus those who did not was 2.3%; at 12-23 months, 8.2%; and at 24-59 months, 4.0% (Table 4.79).

Presentation of Data Using Percents of Median

To allow comparison with previous nutrition surveys, some of which have used percent-of-median cutoffs rather than Z-scores, comparable prevalences were presented by these two methods of tabulation (Table 4.81). The following commonly used percent-of-median levels are presented: 90% of median height-for-age, 80% of median weight-for-height, and 80% of median weight-for-age.

The prevalences of undernutrition as determined by these percent-of-median cutoffs for height-for-age and weight-for-height cutoffs are considerably lower than those determined by the -2.0 SD cutoff level. For the indices of height-for-age and weight-for-height, the standard deviation cutoff of <-2.5 SD's yields approximately equivalent prevalence rates for the percent-of-median cutoffs used. For the index weight-for-age, the standard deviation equivalent value lies slightly above the -2.0 SD cutoff.

COMPARISON OF SWAZILAND SURVEY WITH OTHER AFRICAN SURVEYS

For comparison purposes, prevalence rates of undernutrition in previous USAID-funded African national nutrition status surveys conducted by the Centers for Disease Control or the University of California, Los Angeles, are presented in Tables 4.82-4.85. The comparison rates presented here are adapted from Tables prepared by the Food Policy and Nutrition Division, FAO, UN.

Swaziland had the lowest percentage of children with stunting, wasting and underweight of all the African countries surveyed (Table 4.85). As in other African countries, rural children in Swaziland had higher prevalences of stunting, wasting and underweight than peri-urban children (Table 4.85).

Patterns of stunting and wasting followed the same age pattern as in other countries: the percentage of stunting was higher after age 6-11 months with some leveling after children reached 3 years of age (Table 4.84). Wasting decreased with age after 6-11 months of age in Swaziland, similar to the trend in Lesotho and Egypt (Table 4.85). For other countries, the percentage of wasting peaked at 12-23 months of age. The prevalence of wasting was generally lower in all countries in children older than 24 months of age.

DISCUSSION

The purpose of this survey was to (1) provide estimates of the nutritional status of children in Swaziland by using anthropometric indicators, (2) determine factors associated with undernutrition and thus identify children at high risk of undernutrition, and (3) determine where further studies, if needed, would be most productive. It was recognized from the outset that a cross-sectional survey of this nature would be unlikely to establish any cause-and-effect relationships. Nor was the survey designed to assess the prevalence of specific nutrient deficiencies such as pellagra. Such deficiencies are usually too infrequent to be reliably documented in the size of sample used.

The survey does assess the prevalence of protein-calorie malnutrition as reflected in the growth of children. In this regard, the finding of low prevalence of acute undernutrition (wasting) was impressive and unexpected because the survey was conducted after a 2-year drought during which time food supplies were lower than in previous years. However, the survey may not have been conducted when food supplies were at their absolute lowest level since the survey only partially overlapped a season when food is typically scarce.

Moreover, although diarrheal diseases can cause substantial loss in body weight in a short time, the survey was conducted during the season when rates of diarrhea are usually low; thus, the rates of wasting due to diarrheal illness would be expected to be low.

The survey revealed evidence of chronic undernutrition as measured by short stature in Swazi preschool children. The prevalence of stunting at 3-5 months (12.9) may reflect both prenatal and postnatal influences. The prevalence of stunting reached its highest levels among children 18-23 months of age and remained high at later ages. (The peak at 18-23 months may be, in part, artifactual because of changes in the reference population at 24 months.) The increased prevalence of stunting among the older children is consistent with the pattern in other developing countries. This pattern may be caused by inadequate weaning practices and the higher incidence of infectious diseases among children beyond infancy (Seward, 1984).

As has been found in surveys of other developing countries, peri-urban residence was generally associated with a lower prevalence of chronic undernutrition. Socioeconomic factors and availability of resources may account for this. The percentage stunted was approximately the same for rural and peri-urban children after controlling for maternal education. Interestingly, factors associated with higher levels of stunting were not consistent between rural and peri-urban areas.

No striking regional pattern was observed for agroecological zone or district. However, differences among land tenures were observed. The lowest prevalences of stunting were in the company towns, followed by administrative towns, individual tenure farms, and Swazi Nation land. After controlling for maternal education, the differences in percentage stunted disappeared for

children of mothers with no education or adult education only. In company towns, percentages of stunting were lower for children of mothers with at least a grade 1 education than for children of mothers with less education.

Many variables used in this survey serve as surrogates for socioeconomic status--educational level of the parents, homestead possessions, and sanitation. As expected, a negative association was found between prevalence of stunting and socioeconomic level. The highest prevalences of stunting were found in homesteads where homestead members had no education or adult education only; those without latrines or toilets; and those lacking homestead possessions, such as a spring bed, radio, etc.

The mechanisms by which socioeconomic status affects nutritional status remain unclear. For example, whether improved nutritional status associated with higher parental education results from increased knowledge and parental awareness of health, or from an ability to purchase more food, and/or from better housing and sanitation cannot be directly determined from the present analysis. Multivariate analysis might clarify the relative importance of various factors, but still would identify only association, not causal mechanisms.

The percentage of stunting was lower among children from homesteads where children usually use a latrine or toilet than where children do not use sanitation facilities. Several possibilities for this relationship exist. Sanitation facilities may lead to lower rates of contamination and hence infection. Another possibility is that homesteads possessing such facilities may practice other good sanitation and health habits.

The presence of both parents in the homestead and their marital status had a modest association with chronic undernutrition. Children of unmarried

mothers had about the same rates of stunting as married mothers. When children whose fathers were members of the homestead were compared with those whose fathers were not, the prevalence of stunting was about the same, regardless of residence status in the rural sample. In the peri-urban sample, children in homesteads where the father was a member but resided less than 50% of the time had lower rates of stunting. Maternal membership was associated with a slightly lower rate of stunting. In the rural sample, children of mothers who were members but resided less than 50% of the time had the lowest prevalence of stunting compared with children whose mothers were in other categories of residence status.

In the rural sample, several other family characteristics were associated with slightly higher levels of stunting: birth order of living children (≥ 4), and death of siblings. Older maternal age (35+) was associated with a higher rate of stunting for infants. Children whose mothers who were married and whose fathers were uneducated and had more than one wife were at higher risk of chronic undernutrition than if their fathers had only one wife.

Because of the potential importance of agricultural factors to the availability of food for children, several questions on cattle ownership, land use, and main source of homestead income were asked. Except for the possible exception of main source of homestead income, none of these variables appear to be risk factors for stunting. In the rural sample, children in homesteads where the main source of homestead income was "agriculture/self employed" had a higher percentage of stunting than other categories. Similarly, where fathers were members of the homestead, the percentage of stunted children was slightly higher for farmers than most other categories. However, the low percentage of farmers in the rural sample and the low percentage of

unemployment in both the rural and peri-urban sample may indicate inaccuracy in these self-reported occupational categories. Without more in-depth information on food and income distribution within the homestead, general information on land cultivation and use is of limited usefulness in identifying children at high risk. Homestead ownership of cattle apparently does not insure access to milk and meat by the children within the homestead. Cultivation of land for crops may reflect the need for income, and the sale of crops may reflect a crop surplus.

The inability to detect an association between infant feeding and attained height in this survey does not imply that an association does not exist. The effect that early termination of breastfeeding and/or introduction of alternative foods (any food other than breast milk) have on infant nutritional status depends on many factors. The most important of these are (1) adequacy of the alternative food compared with breast milk, (2) effect of introducing other foods on breast milk production, and (3) effect of infection on nutritional status and growth. Because of the relatively small numbers of children exclusively breastfeeding at 3-5 months of age and the confounding of method of feeding by socioeconomic status, this area requires further analysis. Previous studies in developing countries that have included adequate numbers of children have clearly demonstrated that breastfed infants have better growth than bottlefed infants in the first months of life (Seward, 1984). (For further discussion, see chapter 5, "Feeding Practices of Infants and Children.")

Travel time to the nearest clinic reflects distance to the clinic, ability to obtain transport, and remoteness of rural residence. Thus, the association between travel time and stunting may reflect many factors. Similarly, the

prevalence of stunting was lower among children who had visited an MCH clinic than among those who had not. Whether this represents an effect of clinic attendance or of increased health awareness or both cannot be determined.

The current nutrition surveillance system is based on weight-for-age data collected at MCH clinics. These data suggest that children who attend the clinics are less likely to be underweight. However, the relationship between stunting and clinic attendance may be due to many factors other than clinic attendance *per se*.

This survey identified linear growth retardation without concomitant wasting in the Swazi population. This pattern has recently been identified in several countries: Egypt, Israel, Bolivia (Brink, 1983; Dagan, 1983; Administrative of Bolivia, 1981). The reasons for this pattern are unclear and may vary between populations. Linear growth is a complex process affected directly or indirectly by numerous factors including the quality and energy content of the diet, infections, the health and nutritional status of the mother, and general socioeconomic status. These factors probably affect growth through inadequate dietary intake, increased infection, or both. The association of so many dietary and nondietary factors with growth complicates potential intervention programs. To be most effective, programs must address both the likelihood of infection (e.g., diarrhea control, immunizations) and the quality of the diet.

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Table 4.1

Percentage Distribution of Height-for-Age
For Children 3-23 Months of Age
Swaziland National Nutrition Status Survey, 1983

Height-for-Age Standard Deviation	Rural (n = 1600)		Peri-Urban (n = 270)	
	Percent	Cumulative Percent	Percent	Cumulative Percent
Under -3.50	4.0	4.0	3.7	3.7
-3.50 to -3.01	3.8	7.8	1.9	5.6
-3.00 to -2.51	7.6	15.4	5.6	11.2
-2.50 to -2.01	11.8	27.2	7.8	19.0
-2.00 to -1.51	14.8	42.0	14.8	33.8
-1.50 to -1.01	15.6	57.6	14.1	47.9
-1.00 to -0.51	14.3	71.9	14.4	62.3
-0.50 to -0.01	10.8	82.7	18.1	80.4
+0.00 to +0.50	6.5	89.2	8.5	88.9
+0.51 to +1.00	4.6	93.8	3.3	92.2
+1.01 to +1.50	2.1	95.9	3.3	95.5
+1.51 to +2.00	0.8	96.7	0.4	95.9
+2.01 or more	3.3	100.0	4.1	100.0

NOTE: Percentages are weighted on the basis of population proportions; actual number surveyed is given in parenthesis.

Table 4.2

Percentage Distribution of Height-for-Age
For Children 24-59 Months of Age
Swaziland National Nutrition Status Survey, 1983

Height-for-Age Standard Deviation	Rural (n = 2533)		Peri-Urban (n = 388)	
	Percent	Cumulative Percent	Percent	Cumulative Percent
Under -3.50	6.8	6.8	4.6	4.6
-3.50 to -3.01	4.7	11.5	4.6	9.2
-3.00 to -2.51	8.0	19.5	5.4	14.6
-2.50 to -2.01	12.8	32.3	11.1	25.7
-2.00 to -1.51	14.9	47.2	15.5	41.2
-1.50 to -1.01	17.1	64.3	18.0	59.2
-1.00 to -0.51	13.2	77.5	16.2	75.4
-0.50 to -0.01	10.1	87.6	12.9	88.3
+0.00 to +0.50	5.2	92.8	5.2	93.5
+0.51 to +1.00	3.0	95.8	3.4	96.9
+1.01 to +1.50	1.9	97.7	1.5	98.4
+1.51 to +2.00	0.9	98.6	0.3	98.7
+2.01 or more	1.4	100.0	1.3	100.0

NOTE: Percentages are weighted on the basis of population proportions; actual number surveyed is given in parenthesis.

Table 4.3

Percentage Distribution of Height-for-Age
By Age and Sex
Swaziland National Nutrition Status Survey, 1983
(Rural Sample Only)

Months of Age	Sex	Height-for-Age Z-Score: Stunting: Severe <-3.00	Moderate -3.00 to -2.00	≥-2.00	Number
3-5	Male	1.2%	6.4%	92.4%	(110)
	Female	4.4%	14.0%	81.5%	(107)
	Total	2.8%	10.1%	87.1%	(217)
6-11	Male	3.9%	17.4%	78.7%	(221)
	Female	1.5%	11.3%	87.2%	(237)
	Total	2.7%	14.2%	83.2%	(458)
12-17	Male	11.0%	26.9%	62.2%	(269)
	Female	3.2%	19.5%	77.3%	(240)
	Total	7.2%	23.3%	69.5%	(509)
18-23	Male	17.9%	25.2%	56.9%	(204)
	Female	15.3%	25.1%	59.7%	(212)
	Total	16.6%	25.1%	58.3%	(416)
24-35	Male	9.8%	19.1%	71.1%	(466)
	Female	11.3%	18.9%	69.7%	(462)
	Total	10.6%	19.0%	70.4%	(928)
36-47	Male	12.1%	22.3%	65.6%	(442)
	Female	11.7%	22.5%	65.8%	(446)
	Total	11.9%	22.4%	65.7%	(888)
48-59	Male	16.2%	21.0%	62.8%	(325)
	Female	8.6%	21.7%	69.7%	(392)
	Total	12.1%	21.4%	66.6%	(717)
Total	Male	11.2%	20.8%	67.9%	(2037)
	Female	8.9%	19.8%	71.4%	(2096)
	Total	10.0%	20.3%	69.7%	(4133)

NOTE: Percentages are weighted on the basis of population proportions; actual number surveyed is given in parenthesis.

Table 4.4

Percentage Distribution of Height-for-Age
By Age and Sex
Swaziland National Nutrition Status Survey, 1983
(Peri-Urban Sample Only)

Months of Age		Height-for-Age Z-Score: Stunting: Severe <-3.00	Moderate -3.00 to -2.00	≥-2.00	Number
3-5	Male	--	--	--	(17)+
	Female	--	--	--	(14)+
	Total	--	3.2%	96.8%	(31)+
6-11	Male	--	10.3%	89.7%	(39)+
	Female	2.2%	2.2%	95.7%	(46)+
	Total	1.2%	5.9%	92.9%	(85)
12-17	Male	2.7%	21.6%	75.7%	(37)+
	Female	--	18.9%	81.1%	(37)+
	Total	1.4%	20.3%	78.4%	(74)
18-23	Male	23.9%	15.2%	60.9%	(46)+
	Female	5.9%	23.5%	70.6%	(34)+
	Total	16.2%	18.8%	65.0%	(80)
2' 5	Male	7.6%	19.7%	72.7%	(66)
	Female	6.3%	14.3%	79.4%	(63)
	Total	7.0%	17.1%	76.0%	(129)
36-47	Male	6.7%	22.7%	70.7%	(75)
	Female	17.1%	8.6%	74.3%	(70)
	Total	11.7%	15.9%	72.4%	(145)
48-59	Male	6.9%	20.7%	72.4%	(58)
	Female	10.7%	12.5%	76.8%	(56)
	Total	8.8%	16.7%	74.6%	(114)
Total	Male	7.7%	18.0%	74.3%	(338)
	Female	7.8%	12.2%	80.0%	(320)
	Total	7.8%	15.2%	77.1%	(658)

NOTE: Percentages are weighted on the basis of population proportions; actual number surveyed is given in parenthesis.

+A number <50 is considered statistically unreliable. percentages are not provided for any number ≤20.

Table 4.5

Percentage Distribution of Height-for-Age
By Agroecological Zone
Swaziland National Nutrition Status Survey, 1983
(Rural Sample Only)

	Height-for-Age Z-Score			
	Stunting			
	Severe	Moderate		
	<-3.00	-3.00 to -2.00	≥-2.00	Number
Highveld	10.5%	19.5%	70.0%	(1108)
Middleveld	10.4%	21.3%	68.3%	(1603)
Lowveld	8.9%	19.2%	71.9%	(1226)
Lubombo	10.7%	24.1%	65.1%	(196)

NOTE: Percentages are weighted on the basis of population proportions; actual number surveyed is given in parenthesis.

Table 4.6

Percentage Distribution of Height-for-Age
By Land Tenure
Swaziland National Nutrition Status Survey, 1983
(Rural Sample Only)

	Height-for-Age Z-Score			
	Stunting			
	Severe	Moderate		
	<-3.00	-3.00 to -2.00	>-2.00	Number
Swazi Nation Land				
Non-Rural Development Areas	11.9%	22.1%	66.0%	(1248)
Minimum Rural Development Areas	10.6%	20.6%	68.9%	(659)
Maximum Rural Development Areas	8.7%	22.2%	69.0%	(1294)
Individual Tenure Farms	10.7%	17.9%	71.4%	(462)
Administrative Towns	9.8%	15.2%	75.0%	(96)
Company Towns	7.6%	13.4%	79.0%	(374)

NOTE: Percentages are weighted on the basis of population proportions; actual number surveyed is given in parenthesis.

Table 4.7

Percentage of Children Stunted,*
By Land Tenure and Education of Mother
Swaziland National Nutrition Status Survey, 1983
(Rural Sample Only)

	Education of Mother							
	None/Adult		Grade 1-Standard 5		Form 1- 6/ University		Unknown	
Swazi Nation Land	35.5%	(798)	31.9%	(1334)	22.8%	(552)	37.7%	(517)
Individual Tenure Farms	35.3%	(111)	28.4%	(200)	20.0%	(115)	33.8%	(36)+
Administrative Towns	--	(6)+	28.1%	(35)+	22.6%	(35)+	--	(20)+
Company Towns	33.7%	(91)	20.5%	(136)	12.5%	(110)	15.0%	(37)+

NOTE: Percentages are weighted on the basis of population proportions; actual number surveyed is given in parenthesis.

* Stunted is defined as height-for-age Z-score <-2.00 S.D.

+A number <50 is considered statistically unreliable; percentages are not provided for any number ≤20.

Table 4.8

Percentage of Children Stunted,*
By Land Tenure and Age of Child
Swaziland National Nutrition Status Survey, 1983
(Rural Sample Only)

Age in Months	Swazi Nation Land		Individual Tenure Farm		Administrative Town		Company Town	
3-5	16.1%	(161)	7.5%	(27)+	--	(4)+	3.3%	(25)+
6-11	18.1%	(347)	14.4%	(55)	--	(8)+	9.7%	(48)+
12-23	37.7%	(703)	41.1%	(108)	18.8%	(22)+	21.6%	(92)
24-35	31.7%	(725)	28.1%	(105)	--	(16)+	17.8%	(82)
36-47	35.9%	(704)	26.3%	(93)	31.2%	(27)+	31.0%	(64)
48-59	34.1%	(561)	33.2%	(74)	--	(19)+	30.2%	(63)

NOTE: Percentages are weighted on the basis of population proportions; actual number surveyed is given in parenthesis.

* Stunted is defined as height-for-age Z-score <-2.00 S.D.

+A number <50 is considered statistically unreliable.

Table 4.9

Percentage Distribution of Height-for-Age
By District
Swaziland National Nutrition Status Survey, 1983
(Rural Sample Only)

	Height-for-Age Z-Score			
	Stunting			
	Severe	Moderate		
	<-3.00	-3.00 to -2.00	≥-2.00	Number
Hhohho	11.2%	20.3%	68.5%	(1054)
Lubombo	8.7%	21.5%	69.9%	(982)
Manzini	9.1%	18.5%	72.4%	(1034)
Shiselweni	11.1%	20.9%	68.0%	(1063)

NOTE: Percentages are weighted on the basis of population proportions; actual number surveyed is given in parenthesis.

Table 4.10

Percentage Distribution of Height-for-Age
By Possessions Owned by Homestead
Swaziland National Nutrition Status Survey, 1983
(Rural Sample Only)

	Height-for-Age Z-Score			
	Stunting			
	Severe	Moderate		
	<-3.00	-3.00 to -2.00	≥-2.00	Number
Working Refrigerator				
Yes	2.6%	8.1%	89.2%	(245)
No	10.5%	21.0%	68.5%	(3870)
Vehicle				
Yes	6.2%	15.1%	78.7%	(666)
No	10.8%	21.3%	67.9%	(3454)
Stove				
Yes	6.4%	15.7%	77.9%	(1369)
No	12.0%	22.7%	65.3%	(2757)
Tractor				
Yes	7.0%	15.6%	77.4%	(212)
No	10.2%	20.6%	69.2%	(3910)
Sewing Machine				
Yes	7.4%	18.8%	73.8%	(1074)
No	11.0%	20.8%	68.2%	(3049)
Radio				
Yes	9.1%	20.4%	70.5%	(3672)
No	17.1%	19.9%	63.0%	(458)
Spring bed				
Yes	9.5%	19.9%	70.6%	(3808)
No	15.9%	25.0%	59.1%	(320)
Maize Milling Machine				
Yes	10.6%	21.8%	67.6%	(2448)
No	9.3%	18.3%	72.5%	(1674)

NOTE: Percentages are weighted on the basis of population proportions; actual number surveyed is given in parenthesis.
Unknowns are excluded because the number of unknowns is <50.

Table 4.11

Percentage Distribution of Height-for-Age
By Possessions Owned by Homestead
Swaziland National Nutrition Status Survey, 1983
(Peri-Urban Sample Only)

	Height-for-Age Z-Score			
	Stunting			
	Severe	Moderate		
	<-3.00	-3.00 to -2.00	>-2.00	Number
Working Refrigerator				
Yes	5.2%	17.2%	77.6%	(116)
No	8.4%	14.7%	76.9%	(537)
Vehicle				
Yes	6.1%	13.5%	80.4%	(163)
No	8.3%	15.8%	75.9%	(494)
Stove				
Yes	7.8%	16.1%	76.1%	(397)
No	7.7%	13.9%	78.4%	(259)
Sewing Machine				
Yes	7.1%	14.5%	78.4%	(241)
No	8.2%	15.6%	76.2%	(416)
Radio				
Yes	7.9%	15.0%	77.1%	(632)
No	3.8%	19.2%	76.9%	(26)+
Maize Milling Machine				
Yes	6.7%	16.7%	76.7%	(30)+
No	7.8%	15.2%	77.0%	(626)

NOTE: Percentages are weighted on the basis of population proportions; actual number surveyed is given in parenthesis.
Unknowns are excluded because the number of unknowns is <50.

+A number <50 is considered statistically unreliable.

Table 4.12

Percentage Distribution of Height-for-Age
By Highest Level of Education Achieved Within Homestead
Swaziland National Nutrition Status Survey, 1983
(Rural Sample Only)

Highest Level of Education	Height-for-Age Z-Score: Stunting: Severe <-3.00	Moderate -3.00 to -2.00	≥-2.00	Number
None/Adult	16.7%	27.6%	55.7%	(205)
Grades 1-2	7.0%	33.4%	59.6%	(120)
Standards 1-5	12.6%	20.7%	66.7%	(1525)
Forms 1-6	8.1%	19.3%	72.6%	(2007)
College/University	5.3%	12.4%	82.3%	(269)

NOTE: Percentages are weighted on the basis of population proportions; actual number surveyed is given in parenthesis.
Unknowns are excluded because the number of unknowns is <50.

Table 4.13

Percentage Distribution of Height-for-Age
By Highest Level of Education Achieved Within Homestead
Swaziland National Nutrition Status Survey, 1983
(Peri-Urban Sample Only)

Highest Level of Education	Height-for-Age Z-Score: Stunting: Severe ≤-3.00	Moderate -3.00 to -2.00	≥-2.00	Number
None/Adult	--	--	--	(7)+
Grades 1-2	--	--	--	(2)+
Standards 1-5	12.1%	15.2%	72.7%	(66)
Forms 1-6	7.0%	15.1%	77.9%	(470)
College/University	8.0%	15.0%	77.0%	(113)

NOTE: Percentages are weighted on the basis of population proportions; actual number surveyed is given in parenthesis.
Unknowns are excluded because the number of unknowns is <50.

+A number <50 is considered statistically unreliable.
Percentages are not provided for any number ≤20.

Table 4.14

Percentage Distribution of Height-for-Age
By Number of Cattle Owned
Swaziland National Nutrition Status Survey, 1983
(Rural Sample Only)

	Height-for-Age Z-Score			
	Stunting			
	Severe	Moderate		
Number of Cattle	<-3.00	-3.00 to -2.00	≥-2.00	Number
0	8.8%	19.0%	72.2%	(1552)
1-2	7.7%	20.1%	72.2%	(90)
3-4	9.7%	16.7%	73.6%	(164)
5-9	13.1%	23.1%	63.8%	(507)
10-14	11.1%	17.7%	71.1%	(522)
15-19	11.4%	22.3%	66.3%	(344)
20-24	9.1%	19.7%	71.2%	(342)
≥25	9.6%	21.2%	69.3%	(479)
Unknown	10.6%	33.1%	56.3%	(133)

NOTE: Percentages are weighted on the basis of population proportions; actual number surveyed is given in parenthesis.

Table 4.15

Percentage Distribution of Height-for-Age
By Cultivation of Land
Swaziland National Nutrition Status Survey, 1983
(Rural Sample Only)

	Height-for-Age Z-Score			
	Stunting			
	Severe	Moderate		
	<-3.00	-3.00 to -2.00	>-2.00	Number
Land Cultivated for Homestead Use				
Yes	10.4%	21.3%	68.4%	(3642)
No	7.5%	13.5%	79.0%	(479)
Homestead Vegetable Garden				
Yes	8.4%	18.8%	72.8%	(1578)
No	11.1%	21.3%	67.6%	(2505)
Unknown	7.4	19.1	73.5	(50)

NOTE: Percentages are weighted on the basis of population proportions; actual number surveyed is given in parenthesis.
Unknowns are excluded when the number of unknowns is <50.

Table 4.16

Percentage Distribution of Height-for-Age
By Cultivation of Land for Homestead Use
Swaziland National Nutrition Status Survey, 1983
(Peri-Urban Sample Only)

	Height-for-Age Z-Score			
	Stunting			
	Severe	Moderate		
	<-3.00	-3.00 to -2.00	≥-2.00	Number
Land Cultivated for Homestead Use				
Yes	10.0%	19.9%	70.1%	(201)
No	6.8%	13.0%	80.2%	(454)
Homestead Vegetable Garden				
Yes	9.8%	14.0%	76.2%	(235)
No	6.7%	15.9%	77.4%	(421)

NOTE: Percentages are weighted on the basis of population proportions; actual number surveyed is given in parenthesis.

Table 4.17

Percentage Distribution of Height-for-Age
By Presence of a Homestead Vegetable Garden
And by Maternal Education
Swaziland National Nutrition Status Survey, 1983
(Rural Sample Only)

Education of Mother	Vegetable Garden	Height-for-Age Z-Score Stunting <-2.00	≥-2.00	Number
None/Adult	Yes	36.4%	63.6%	(310)
	No	34.7%	65.3%	(684)
Grade 1-Standard 5	Yes	27.0%	73.0%	(646)
	No	32.5%	67.5%	(1037)
Forms 1-6/University	Yes	17.9%	82.1%	(392)
	No	23.9%	76.1%	(411)
Unknown	Yes	30.8%	69.2%	(230)
	No	37.8%	62.2%	(373)

NOTE: Percentages are weighted on the basis of population proportions; actual number surveyed is given in parenthesis.

Table 4.18

Percentage Distribution of Height-for-Age
By Use of Crops Grown by the Homestead
Swaziland National Nutrition Status Survey, 1983
(Rural Sample Only)

	Height-for-Age Z-Score			
	Stunting			
	Severe	Moderate		
Use of Crops Grown	<-3.00	-3.00 to -2.00	≥-2.00	Number
Maize				
Homestead Only	11.1%	21.7%	67.2%	(3131)
Mostly Homestead	8.6%	23.1%	68.3%	(220)
Cash (half or more)	2.5%	13.2%	84.3%	(115)
Pumpkins				
Homestead Only	10.2%	21.1%	68.6%	(2043)
Mostly Homestead	9.3%	22.3%	68.4%	(108)
Cash (half or more)	--	20.0%	80.0%	(23)+
Jugo Beans, Beans and/or Cowpeas				
Homestead Only	11.0%	20.4%	68.6%	(1307)
Mostly Homestead	7.4%	18.1%	74.5%	(92)
Cash (half or more)	5.5%	16.4%	78.1%	(67)
Sweet Potatoes/Yams				
Homestead Only	9.9%	22.5%	67.6%	(620)
Mostly Homestead	13.8%	11.6%	74.6%	(33)+
Cash (half or more)	8.9%	27.1%	64.0%	(38)+
Sorghum				
Homestead Only	10.3%	22.9%	66.7%	(307)
Mostly Homestead	5.8%	35.1%	59.1%	(32)+
Cash (half or more)	--	--	--	(6)+
Tobacco/Cotton				
Homestead Only	7.0%	34.5%	58.5%	(44)+
Mostly Homestead	--	--	--	(7)+
Cash (half or more)	12.2%	16.4%	71.4%	(372)

NOTE: Percentages are weighted on the basis of population proportions; actual number surveyed is given in parenthesis.
Table excludes 491 children from homesteads in which land was not cultivated for homestead use.

+A number <50 is considered statistically unreliable.
Percentages are not provided for any number ≤20.

Table 4.19

Percentage Distribution of Height-for-Age
By Use of Maize Grown by the Homestead
And by Maternal Education
Swaziland National Nutrition Status Survey, 1983
(Rural Sample Only)

Education of Mother	Use of Maize If Grown	Height-for-Age Z-Score Stunting <-2.00	≥-2.00	Number
None/Adult	Homestead Only	37.0%	63.0%	(770)
	Mostly Homestead	24.1%	75.9%	(80)
	Cash (half or more)	--	--	(20)+
Grade 1-Standard 5	Homestead Only	32.6%	67.4%	(1334)
	Mostly Homestead	32.8%	67.2%	(81)
	Cash (half or more)	17.4%	82.6%	(43)+
Forms 1-6/University	Homestead Only	23.9%	76.1%	(543)
	Mostly Homestead	30.8%	69.2%	(29)+
	Cash (half or more)	7.3%	92.7%	(29)+
Unknown	Homestead Only	36.7%	63.3%	(484)
	Mostly Homestead	47.8%	52.2%	(30)+
	Cash (half or more)	20.6%	79.4%	(23)+

NOTE: Percentages are weighted on the basis of population proportions; actual number surveyed is given in parenthesis.
Table excludes 491 children from homesteads where maize was not grown.

+A number <50 is considered statistically unreliable.
Percentages are not provided for any number ≤20.

Table 4.20

Percentage Distribution of Height-for-Age
By Main Source of Homestead Income
Swaziland National Nutrition Status Survey, 1983
(Rural Sample Only)

Main Source of Income	Height-for-Age Z-Score: Stunting: Severe <-3.00	Moderate -3.00 to -2.00	≥-2.00	Number
Agriculture/ Self-Employed	11.7%	22.2%	66.1%	(1152)
Agriculture/ Employed	14.0%	16.7%	69.2%	(118)
Salaried, Government	5.4%	18.2%	76.4%	(514)
Salaried, Non-Government Inside Swaziland	10.3%	20.3%	69.4%	(1234)
Salaried, Non-Government Outside Swaziland	9.7%	19.9%	70.4%	(427)
Self-Employed	8.9%	18.3%	72.9%	(260)
Combination	9.2%	21.5%	69.4%	(304)
Other/Unknown	13.8%	18.4	67.9%	(124)

NOTE: Percentages are weighted on the basis of population proportions; actual number surveyed is given in parenthesis.

Table 4.21

Percentage Distribution of Height-for-Age
By Main Source of Homestead Income
Swaziland National Nutrition Status Survey, 1983
(Peri-Urban Sample Only)

Main Source of Income	Height-for-Age Z-Score: Stunting: Severe <-3.00	Moderate -3.00 to -2.00	≥-2.00	Number
Agriculture/ Ag/Self-Employed	--	--	--	(4)+
Salaried, Government	9.9%	12.3%	77.8%	(162)
Salaried, Non-Government Inside Swaziland	8.4%	16.7%	74.9%	(275)
Salaried, Non-Government Outside Swaziland	--	--	--	(11)+
Self-Employed	6.8%	14.8%	78.4%	(88)
Combination	3.8%	12.8%	83.3%	(78)
Other/Unknown	7.5%	15.0%	77.5%	(40)

NOTE: Percentages are weighted on the basis of population proportions; actual number surveyed is given in parenthesis.

+A number <50 is considered statistically unreliable.
Percentages are not provided for any number ≤20.

Table 4.22

Percentage Distribution of Height-for-Age
By Usual Place of Defecation for Homestead Children
Swaziland National Nutrition Status Survey, 1983
(Rural Sample Only)

	Height-for-Age Z-Score			
	Stunting			
	Severe	Moderate		
	<-3.00	-3.00 to -2.00	≥-2.00	Number
Open/Bush	11.8%	22.7%	65.5%	(3018)
Wooden Latrine	7.0%	17.1%	75.9%	(522)
Concrete Latrine	4.7%	11.8%	83.5%	(219)
Flush Toilet	5.0%	10.2%	84.8%	(325)
Other/Unknown	--	23.4%	26.6%	(49)+

NOTE: Percentages are weighted on the basis of population proportions; actual number surveyed is given in parenthesis.

+A number <50 is considered statistically unreliable.
Percentages are not provided for any number ≤20.

Table 4.23

Percentage Distribution of Height-for-Age
By Usual Place of Defecation for Homestead Children
Swaziland National Nutrition Status Survey, 1983
(Peri-Urban Sample Only)

	Height-for-Age Z-Score			
	Stunting			
	Severe	Moderate		
	<-3.00	-3.00 to -2.00	≥-2.00	Number
Open/Bush	10.0%	17.8%	72.2%	(180)
Wooden Latrine	8.5%	14.0%	77.6%	(272)
Concrete Latrine	5.9%	13.3%	80.7%	(135)
Flush Toilet	--	7.4%	92.6%	(27)+
Other/Unknown	4.5%	22.7%	72.7%	(44)+

NOTE: Percentages are weighted on the basis of population proportions; actual number surveyed is given in parenthesis.

+A number <50 is considered statistically unreliable.
Percentages are not provided for any number ≤20.

Table 4.24

Percentage Distribution of Height-for-Age
By Usual Source of Water for Homestead
Swaziland National Nutrition Status Survey, 1983
(Rural Sample Only)

	Height-for-Age Z-Score			
	Stunting			
	Severe	Moderate		
	<-3.00	-3.00 to -2.00	≥-2.00	Number
Private tap	5.1%	10.7%	84.2%	(279)
Public tap	7.9%	18.4%	73.7%	(720)
Dam/pond	7.6%	21.3%	71.1%	(184)
Well/borehole	4.5%	26.1%	69.4%	(136)
Protected spring	11.5%	19.9%	68.6%	(247)
Unprotected spring	11.8%	21.2%	67.0%	(825)
River/stream	11.5%	22.2%	66.2%	(1681)
Other/Unknown	8.2%	14.4%	77.4%	(61)

NOTE: Percentages are weighted on the basis of population proportions; actual number surveyed is given in parenthesis.

Table 4.25

Percentage Distribution of Height-for-Age
By Usual Source of Water for Homestead
Swaziland National Nutrition Status Survey, 1983
(Peri-Urban Sample Only)

	Height-for-Age Z-Score			
	Stunting			
	Severe	Moderate		
	<-3.00	-3.00 to -2.00	≥-2.00	Number
Private tap	2.5%	7.6%	89.9%	(79)
Public tap	8.6%	17.9%	73.5%	(408)
Dam/pond	---	---	--	(1)+
Well/borehole	--	--	--	(11)+
Protected spring	6.1%	15.2%	78.8%	(33)+
Unprotected spring	7.1%	11.9%	81.0%	(42)+
River/stream	8.7%	10.0%	81.3%	(80)
Other/Unknown	--	--	--	(4)+

NOTE: Percentages are weighted on the basis of population proportions; actual number surveyed is given in parenthesis.

+A number <50 is considered statistically unreliable.
Percentages are not provided for any number ≤20.

Table 4.26

Percentage of Children Stunted
By Usual Place of Defecation
And Usual Source of Water for Homestead
Swaziland National Nutrition Status Survey, 1983
(Rural Sample Only)

Sanitation Facility	Water Source: Public Tap %	Public Tap Number	Private Tap %	Private Tap Number	Other %	Other Number
Open/Bush	32.1	(398)	16.5	(29)+	35.1	(2591)
Latrine/ Toilet	20.1	(307)	15.9	(247)	21.3	(512)

NOTE: Percentages are weighted on the basis of population proportions; actual number surveyed is given in parenthesis.

+A number <50 is considered statistically unreliable.

Table 4.27

Percentage of Children Stunted
By Usual Place of Defecation
And Maternal Education
Swaziland National Nutrition Status Survey, 1983
(Rural Sample Only)

Sanitation Facility	Maternal Education: None/Adult %	None/Adult Number	Grade 1--Standard 5 %	Grade 1--Standard 5 Number	Form 1--University %	Form 1--University Number	Unknown %	Unknown Number
Open/Bush	36.7	(852)	34.3	(1292)	26.5	(411)	38.2	(463)
Latrine/ Toilet	27.5	(147)	18.4	(388)	15.3	(393)	27.0	(138)

NOTE: Percentages are weighted on the basis of population proportions; actual number surveyed is given in parenthesis.

Sanitation facilities other than those listed are not included because the number is <50.

Table 4.28

Percentage Distribution of Height-for-Age
By Number of Homestead and Household Members
Swaziland National Nutrition Status Survey, 1983
(Rural Sample Only)

	Height-for-Age Z-Score			
	Stunting			
No. of Persons	Severe <-3.00	Moderate -3.00 to -2.00	≥-2.00	Number
Homestead				
<5	8.1%	20.6%	71.3%	(250)
5-9	9.1%	19.4%	71.5%	(1636)
10-14	11.4%	20.1%	68.6%	(1163)
15-19	11.1%	23.3%	65.7%	(557)
20+	10.0%	20.7%	69.3%	(527)
Household				
<5	9.7%	18.8%	71.5%	(455)
5-9	9.8%	20.5%	69.7%	(2040)
10-14	10.7%	20.2%	69.1%	(1104)
15-19	10.8%	21.3%	67.9%	(392)
20+	7.0%	20.3%	72.8%	(142)

NOTE: Percentages are weighted on the basis of population proportions; actual number surveyed is given in parenthesis.

Table 4.29

Percentage Distribution of Height-for-Age
By Number of Homestead Members <5 Years of Age
Swaziland National Nutrition Status Survey, 1983
(Rural Sample Only)

Number of Homestead Members <5 Years of Age	Height-for-Age Z-Score: Stunting: Severe <-3.00	Moderate -3.00 to -2.00	≥-2.00	Number
1	8.8%	17.9%	73.3%	(803)
2	9.2%	20.2%	70.6%	(1404)
3	12.0%	19.9%	68.1%	(829)
4	12.0%	25.2%	62.8%	(402)
5+	9.6%	21.3%	69.1%	(691)

NOTE: Percentages are weighted on the basis of population proportions; actual number surveyed is given in parenthesis.
Unknowns are excluded because the number of unknowns is <50.

Table 4.30

Percentage Distribution of Height-for-Age
By Number of Homestead and Household Members
Swaziland National Nutrition Status Survey, 1983
(Peri-Urban Sample Only)

	Height-for-Age Z-Score			
	Stunting			
No. of Persons	Severe <-3.00	Moderate -3.00 to -2.00	≥-2.00	Number
Homestead				
<5	2.5%	20.3%	77.2%	(79)
5-9	9.2%	11.0%	79.9%	(273)
10-14	10.8%	17.5%	71.7%	(166)
15-19	5.7%	18.9%	75.5%	(53)
20+	3.4%	17.2%	79.3%	(87)
Household				
<5	3.7%	13.7%	82.5%	(160)
5-9	8.6%	15.0%	76.4%	(326)
10-14	11.7%	18.8%	69.5%	(128)
15-19	--	13.3%	86.7%	(30)+
20+	--	--	--	(14)+

NOTE: Percentages are weighted on the basis of population proportions; actual number surveyed is given in parenthesis.

+A number <50 is considered statistically unreliable.
Percentages are not provided for any number ≤20.

Table 4.31

Percentage Distribution of Height-for-Age
By Number of Homestead Members <5 Years of Age
Swaziland National Nutrition Status Survey, 1983
(Peri-Urban Sample Only)

Number of Homestead Members <5 Years of Age	Height-for-Age Z-Score Stunting: Severe <-3.00	Moderate -3.00 to -2.00	≥-2.00	Number
1	7.7%	13.7%	78.6%	(168)
2	8.3%	16.3%	75.4%	(252)
3	8.8%	14.0%	77.2%	(114)
4	5.7%	17.0%	77.4%	(53)
5+	4.3%	15.7%	80.0%	(70)

NOTE: Percentages are weighted on the basis of population proportions; actual number surveyed is given in parenthesis.

Table 4.32

Percentage Distribution of Height-for-Age
By Maternal Membership and Residence Status
Swaziland National Nutrition Status Survey, 1983
(Rural Sample Only)

Maternal Membership and Residence Status	Height-for-Age Z-Score: Stunting: Severe <-3.00	Moderate -3.00 to -2.00	≥-2.00	Number
Homestead Member and Resident ≥50% of the Time	9.7%	20.2%	70.1%	(3444)
Homestead Member and Resident <50% of the Time	8.1%	17.3%	74.6%	(137)
Not a Member	12.4%	21.8%	65.9%	(539)

NOTE: Percentages are weighted based on population proportions; actual number surveyed is given in parenthesis.
Unknowns are excluded because the number of unknowns is <50.

Table 4.33

Percentage Distribution of Height-for-Age
By Maternal Membership and Residence Status
Swaziland National Nutrition Status Survey, 1983
(Peri-Urban Sample Only)

Maternal Membership and Residence Status	Height-for-Age Z-Score: Stunting: Severe <-3.00	Moderate -3.00 to -2.00	≥-2.00	Number
Homestead Member and Resident ≥50% of the Time	7.7%	14.5%	77.9%	(574)
Homestead Member and Resident <50% of the Time	--	--	--	(10)+
Not a Member	9.6%	19.2%	71.2%	(73)

NOTE: Percentages are weighted based on population proportions; actual number surveyed is given in parenthesis.
Unknowns are excluded because the number of unknowns is <50.

+A number <50 is considered statistically unreliable.
Percentages are not provided for any number ≤20.

Table 4.34

Percentage Distribution of Height-for-Age
By Maternal Employment Status
Swaziland National Nutrition Status Survey, 1983
(Rural Sample Only)

Maternal Employment Status	Height-for-Age Z-Score: Stunting: Severe ≤-3.00	Moderate -3.00 to -2.00	≥-2.00	Number
Unemployed	10.2%	21.3%	68.5%	(2693)
Employed				
Inside Home	8.1%	18.6%	73.4%	(464)
Outside Home	8.4%	13.4%	78.2%	(415)

NOTE: Percentages are weighted on the basis of population proportions; actual number surveyed is given in parenthesis.
Table excludes 539 children whose mothers were not members of the homestead and therefore their employment status was not ascertained.
Unknowns are excluded because the number of unknowns is <50.

Table 4.35

Percentage of Children Stunted,*
By Maternal Employment Status
And Maternal Membership and Residence Status
Swaziland National Nutrition Status Survey, 1983
(Rural Sample Only)

Maternal Membership and Residence Status	Maternal Employment Status					
	Unemployed		Employed Inside Home		Employed Outside Home	
Homestead Member and Resident ≥50% of the Time	31.6%	(26.4)	26.4%	(456)	21.8%	(326)
Homestead Member and Resident <50% of the Time	28.8%	(43)+	--	(7)+	22.3%	(87)
Not a Member	36.3%	(282)	--	(4)+	29.7%	(223)

NOTE: Percentages are weighted on the basis of population proportions; actual number surveyed is given in parenthesis.

*"Stunted" is defined as height-for-age Z-score <-2.00 S.D.

+A number <50 is considered statistically unreliable. Percentages are not provided for any number ≤20.

Table 4.36

Percentage Distribution of Height-for-Age
By Maternal Employment Status
Swaziland National Nutrition Status Survey, 1983
(Peri-Urban Sample Only)

Maternal Employment Status	Height-for-Age Z-Score: Stunting: Severe <-3.00	Moderate -3.00 to -2.00	≥-2.00	Number
Unemployed	7.0%	16.7%	76.3%	(287)
Employed				
Inside Home	5.6%	8.9%	85.6%	(90)
Outside Home	9.5%	14.9%	75.6%	(201)

NOTE: Percentages are weighted on the basis of population proportions; actual number surveyed is given in parenthesis.
Table excludes 73 children whose mothers were not members of the homestead and therefore their employment statuses were not ascertained.
Unknowns are excluded because the number of unknowns is <50.

Table 4.37

Percentage Distribution of Height-for-Age
By Occupation of Mother
Swaziland National Nutrition Status Survey, 1983
(Rural Sample Only)

Occupation of Mother	Height-for-Age Z-Score: Stunting: Severe <-3.00	Moderate -3.00 to -2.00	≥-2.00	Number
Salaried (Government)	3.9%	10.3%	85.7%	(179)
Salaried (Nongovernment, Nonagriculture), Inside Swaziland	11.4%	16.6%	72.0%	(238)
Seller or Hawker	6.8%	22.6%	70.6%	(349)
Homemaker/Unemployed	10.0%	21.1%	68.9%	(2617)
Cash Subsistence, Farmer	14.5%	20.5%	64.9%	(70)
Other/Unknown	13.1%	13.4%	73.5%	(141)

NOTE: Percentages are weighted on the basis of population proportions; actual number surveyed is given in parenthesis.
Table excludes 539 children whose mothers were not members of the homestead and therefore their occupational statuses were not ascertained.
Unknowns are excluded because the number of unknowns is <50.

Table 4.38

Percentage Distribution of Height-for-Age
By Occupation of Mother
Swaziland National Nutrition Status Survey, 1983
(Peri-Urban Sample Only)

Occupation of Mother	Height-for-Age Z-Score: Stunting: Severe <-3.00	Moderate -3.00 to -2.00	≥-2.00	Number
Salaried (Government)	8.5%	13.6%	78.0%	(59)
Salaried (Nongovernment, Nonagriculture), Inside Swaziland	10.5%	12.1%	77.4%	(124)
Seller or Hawker	5.9%	19.1%	75.0%	(68)
Homemaker/Unemployed	6.5%	15.7%	77.8%	(306)
Cash/Subsistence Farmer	--	--	--	(3)+
Other/Unknown	4.0	8.0	88.0	(25)+

NOTE: Percentages are weighted on the basis of population proportions; actual number surveyed is given in parenthesis.
Table excludes 73 children whose mothers were not members of the homestead and therefore their occupational statuses were not ascertained.
Unknowns are excluded because the number of unknowns is <50.

+A number <50 is considered statistically unreliable.
Percentages are not provided for any number ≤20.

Table 4.39

Percentage Distribution of Height-for-Age
By Education of the Mother
Swaziland National Nutrition Status Survey, 1983
(Rural Sample Only)

	Height-for-Age Z-Score			
	Stunting			
	Severe	Moderate		
Education of Mother	<-3.00	-3.00 to -2.00	≥-2.00	Number
None	13.1%	22.2%	64.7%	(853)
Adult	12.2%	23.0%	64.8%	(153)
Grade 1 - Standard 5	9.7%	20.6%	69.7%	(1705)
Forms 1-6	5.5%	16.4%	78.1%	(740)
University, College	2.0%	6.0%	92.1%	(72)
Unknown	14.6%	28.4%	57.0%	(71)

NOTE: Percentages are weighted on the basis of population proportions; actual number surveyed is given in parenthesis.
Table excludes 539 children whose mothers were not members of a homestead, and therefore their educational statuses were not ascertained.

Table 4.40

Percentage Distribution of Height-for-Age
By Education of the Mother
Swaziland National Nutrition Status Survey, 1983
(Peri-Urban Sample Only)

	Height-for-Age Z-Score			
	Stunting			
	Severe	Moderate		
Education of Mother	<-3.00	-3.00 to -2.00	>-2.00	Number
None	8.3%	27.1%	64.6%	(48)+
Adult	--	--	--	(5)+
Grade 1 - Standard 5	11.2%	14.0%	74.9%	(179)
Forms 1-6	5.7%	13.3%	81.0%	(315)
University, College	--	--	--	(20)+

NOTE: Percentages are weighted on the basis of population proportions; actual number surveyed is given in parenthesis.
Table excludes 73 children whose mothers were not members of a homestead and therefore their educational levels were not ascertained.
Unknowns are excluded because the number of unknowns is <50.

+A number <50 is considered statistically unreliable.
Percentages are not provided for any number ≤20.

Table 4.41

Percentage Distribution of Height-for-Age
By Mother's Age
Swaziland National Nutrition Status Survey, 1983
(Rural Sample Only)

	Height-for-Age Z-Score			
	Stunting			
	Severe	Moderate		
Mother's Age	<-3.00	-3.00 to -2.00	≥-2.00	Number
<20	10.2%	16.9%	72.9%	(286)
20-24	7.5%	21.3%	71.2%	(1060)
25-29	9.4%	20.5%	70.2%	(873)
30-34	9.1%	18.8%	72.1%	(618)
35-39	14.4%	18.4%	67.2%	(417)
40+	11.7%	20.7%	67.6%	(319)

NOTE: Percentages are weighted on the basis of population proportions; actual number surveyed is given in parenthesis.
Table excludes 539 children whose mothers were not members of a homestead, and therefore their ages were not ascertained.
Unknowns are excluded because the number of unknowns is <50.

Table 4.42

Percentage of Children Stunted,*
By Maternal Age and Age of Child
Swaziland National Nutrition Status Survey, 1983
(Rural Sample Only)

Age of Child In Months	Maternal Age In Years <35		Maternal Age In Years ≥35	
3-5	11.6%	(195)	24.9%	(21)+
6-11	15.5%	(381)	24.6%	(60)
12-23	35.0%	(685)	36.8%	(156)
24-59	31.3%	(1576)	32.6%	(499)

NOTE: Percentages are weighted on the basis of population proportions; actual number surveyed is given in parenthesis.
Table excludes 539 children whose mothers were not members of a homestead, and therefore their ages were not ascertained.
Unknowns are excluded because the number of unknowns is <50.

* Stunted is defined as height-for-age Z-score <-2.00 S.D.

+A number <50 is considered statistically unreliable.
Percentages are not provided for any number ≤20.

Table 4.43

Percentage Distribution of Height-for-Age
By Mother's Age
Swaziland National Nutrition Status Survey, 1983
(Peri-Urban Sample Only)

	Height-for-Age Z-Score			
	Stunting			
	Severe	Moderate		
Mother's Age in Years	<-3.00	-3.00 to -2.00	≥-2.00	Number
<20	5.6%	11.1%	83.3%	(54)
20-24	6.2%	14.6%	79.2%	(178)
25-29	6.1%	19.6%	74.3%	(148)
30-34	14.3%	8.6%	77.1%	(105)
35-39	7.6%	13.6%	78.8%	(66)
40+	3.0%	21.2%	75.8%	(33)+

NOTE: Percentages are weighted on the basis of population proportions; actual number surveyed is given in parenthesis.
Table excludes 73 children whose mothers were not members of a homestead, and therefore their ages were not ascertained.
Unknowns are excluded because the number of unknowns is <50.

+A number <50 is considered statistically unreliable.
Percentages are not provided for any number ≤20.

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Table 4.44

Percentage Distribution of Children Stunted
By Birth Order of Children Born Alive
Swaziland National Nutrition Status Survey, 1983
(Rural Sample Only)

Birth Order of Children Born Alive	Height-for-Age Z-Score: Stunting: Severe <-3.00	Moderate -3.00 to -2.00	≥-2.00	Number
1	7.9%	17.3%	74.7%	(479)
2-3	8.3%	20.6%	71.1%	(1383)
4-5	10.9%	22.0%	67.1%	(835)
6-7	10.2%	19.2%	70.6%	(566)
8+	14.1%	18.9%	67.0%	(300)
Unknown	12.3	21.5	66.2	(570)

NOTE: Percentages are weighted on the basis of population proportions; actual number surveyed is given in parenthesis.

Table 4.45

Percentage Distribution of Children Stunted
By Birth Order of Children Born Alive
Swaziland National Nutrition Status Survey, 1983
(Rural Sample Only)

Birth Order of Children Born Alive	Age in Months							
	3-5		6-11		12-23		24-59	
1	5.1%	(42)+	18.1%	(103)	32.1%	(157)	28.1%	(177)
2-3	16.4%	(85)	16.5%	(175)	35.6%	(312)	30.3%	(811)
4-5	11.2%	(42)+	11.4%	(82)	40.6%	(187)	35.3%	(524)
6-7	6.6%	(33)+	23.2%	(59)	29.5%	(111)	32.3%	(363)
8+	--	(10)+	22.1%	(25)+	36.7%	(68)	32.7%	(197)
Unknown		(5)+	--	(14)+	37.1	(90)	34.0	(461)

NOTE: Percentages are weighted on the basis of population proportions; actual number surveyed is given in parenthesis.

+A number <50 is considered statistically unreliable.
Percentages are not provided for any number ≤20.

Table 4.46

Percentage Distribution of Children Stunted
By Birth Order of Children Born Alive
Swaziland National Nutrition Status Survey, 1983
(Peri-Urban Sample Only)

Birth Order of Children Born Alive	Height-for-Age Z-Score: Stunting: Severe ≤-3.00	Moderate -3.00 to -2.00	≥-2.00	Number
1	6.3%	12.6%	81.1%	(111)
2-3	5.4%	14.6%	80.0%	(240)
4-5	11.6%	17.1%	71.3%	(129)
6-7	10.1%	13.9%	75.9%	(79)
8+	-	-	-	(20)+
Unknown	8.9	19.0	72.2	(79)

NOTE: Percentages are weighted on the basis of population proportions; actual number surveyed is given in parenthesis.

+A number <50 is considered statistically unreliable. Percentages are not provided for any number ≤20.

Table 4.47

Percentage Distribution of Height-for-Age
By Number of Deaths of Mother's Live-Born Children
Swaziland National Nutrition Status Survey, 1983
(Rural Sample Only)

Total Sibling Deaths	Height-for-Age Z-Score: Stunting: Severe <-3.00	Moderate -3.00 to -2.00	≥-2.00	Number
0	8.0%	20.0%	72.0%	(2222)
1	10.2%	20.7%	69.1%	(795)
2	13.6%	20.8%	65.6%	(332)
3+	17.6%	18.5%	63.9%	(231)
Unknown	12.6	21.4	66.0	(553)

NOTE: Percentages are weighted on the basis of population proportions; actual number surveyed is given in parenthesis.
Table excludes 539 children whose mothers were not members of a homestead, and therefore their birth histories were not ascertained.

Table 4.48

Percentage Distribution of Height-for-Age
By Number of Deaths of Mother's Live-Born Children
Swaziland National Nutrition Status Survey, 1983
(Peri-Urban Sample Only)

Total Sibling Deaths	Height-for-Age Z-Score: Stunting: Severe <-3.00	Moderate -3.00 to -2.00	≥-2.00	Number
0	7.7%	14.1%	78.2%	(418)
1	7.4%	13.7%	78.9%	(95)
2	13.2%	21.1%	65.8%	(38)+
3+	--	19.4%	80.6%	(31)+
Unknown	9.2	18.4	72.4	(76)

NOTE: Percentages are weighted on the basis of population proportions; actual number surveyed is given in parenthesis.
Table excludes 73 children whose mothers were not members of a homestead, and therefore their birth histories were not ascertained.

+A number <50 is considered statistically unreliable.
Percentages are not provided for any number ≤20.

Table 4.49

Percentage Distribution of Height-for-Age
By Mother's Marital Status
Swaziland National Nutrition Status Survey, 1983
(Rural Sample Only)

	Height-for-Age Z-Score			
	Stunting			
	Severe	Moderate		
	<-3.00	-3.00 to -2.00	≥-2.00	Number
Married	9.7%	20.8%	69.5%	(2801)
Not Married/Divorced	9.5%	17.6%	72.9%	(789)

NOTE: Percentages are weighted on the basis of population proportions; actual number surveyed is given in parenthesis.
Table excludes 539 children whose mothers were not members of a homestead, and therefore their marital statuses were not ascertained.
Unknowns are excluded because the number of unknowns is <50.

Table 4.50

Percentage Distribution of Height-for-Age
By Mother's Marital Status
Swaziland National Nutrition Status Survey, 1983
(Peri-Urban Sample Only)

	Height-for-Age Z-Score			
	Stunting			
	Severe	Moderate		
	<-3.00	-3.00 to -2.00	≥-2.00	Number
Married	6.7%	15.7%	77.6%	(388)
Not Married/Divorced	9.4%	13.1%	77.5%	(191)

NOTE: Percentages are weighted on the basis of population proportions; actual number surveyed is given in parenthesis.
Table excludes 73 children whose mothers were not members of a homestead, and therefore their marital statuses were not ascertained.
Unknowns are excluded because the number of unknowns is <50.

Table 4.51

Percentage Distribution of Height-for-Age
By Father's Membership and Residence Status
Swaziland National Nutrition Status Survey, 1983
(Rural Sample Only)

Father's Membership and Residence Status	Height-for-Age Z-Score: Stunting: Severe <-3.00	Moderate -3.00 to -2.00	≥-2.00	Number
Homestead Member and Resident ≥50% of the Time	9.2%	19.4%	71.4%	(1484)
Homestead Member and Resident <50% of the Time	10.2%	21.2%	68.6%	(1012)
Not a member	10.7%	20.6%	68.7%	(1623)

NOTE: Percentages are weighted on the basis of population proportions; actual number surveyed is given in parenthesis.
Unknowns are excluded because the number of unknowns is <50.

Table 4.52

Percentage Distribution of Height-for-Age
By Father's Membership and Residence Status
Swaziland National Nutrition Status Survey, 1983
(Peri-Urban Sample Only)

Father's Membership and Residence Status	Height-for-Age Z-Score: Stunting: Severe <-3.00	Moderate -3.00 to -2.00	≥-2.00	Number
Homestead Member and Resident ≥50% of the Time	7.2%	15.6%	77.2%	(333)
Homestead Member and Resident <50% of the Time	1.9%	11.5%	86.5%	(52)
Not a Member	9.5%	15.4%	75.1%	(273)

NOTE: Percentages are weighted on the basis of population proportions; actual number surveyed is given in parenthesis.
Unknowns are excluded because the number of unknowns is <50.

Table 4.53

Percentage Distribution of Height-for-Age
By Education of Father
Swaziland National Nutrition Status Survey, 1983
(Rural Sample Only)

	Height-for-Age Z-Score			
	Stunting			
	Severe	Moderate		
Education of Father	<-3.00	-3.00 to -2.00	≥-2.00	Number
None	13.9%	22.3%	63.8%	(648)
Adult	13.4%	24.3%	62.2%	(210)
Grade 1 - Standard 5	9.0%	20.3%	70.7%	(925)
Forms 1-6	5.1%	17.1%	77.9%	(510)
University, College	3.1%	2.8%	94.1%	(79)
Unknown	7.9	21.8	70.3	(135)

NOTE: Percentages are weighted on the basis of population proportions; actual number surveyed is given in parenthesis.
Table excludes 1626 children whose fathers were not members of a homestead, and therefore their educational levels were not ascertained.

Table 4.54

Percentage Distribution of Height-for-Age
By Education of Father
Swaziland National Nutrition Status Survey, 1983
(Peri-Urban Sample Only)

	Height-for-Age Z-Score			
	Stunting			
Education of Father	Severe <-3.00	Moderate -3.00 to -2.00	≥-2.00	Number
None	16.7%	13.3%	70.0%	(30)+
Adult	--	--	--	(9)+
Grade 1 - Standard 5	9.9%	15.7%	74.4%	(121)
Forms 1-6	2.8%	15.8%	81.4%	(177)
University, College	5.6%	8.3%	86.1%	(36)+

NOTE: Percentages are weighted on the basis of population proportions; actual number surveyed is given in parenthesis.
Table excludes 273 children whose fathers were not members of a homestead, and therefore their educational levels were not ascertained.
Unknowns are excluded because the number of unknowns is <50.

+A number <50 is considered statistically unreliable.
Percentages are not provided for any number ≤20.

Table 4.55

Percentage Distribution of Height-for-Age
By Number of Father's Wives
Swaziland National Nutrition Status Survey, 1983
(Rural Sample Only)

	Height-for-Age Z-Score			
	Stunting			
	Severe	Moderate		
	≤-3.00	-3.00 to -2.00	≥-2.00	Number
1 Wife	9.5%	20.0%	70.5%	(2078)
2 Wives	10.3%	22.5%	67.3%	(605)
3 Wives	12.1%	23.5%	64.4%	(184)
≥4 Wives	15.6%	25.6%	58.8%	(83)

NOTE: Percentages are weighted on the basis of population proportions; actual number surveyed is given in parenthesis.
Table excludes 1156 children whose mothers were not married at the time of the survey.
Unknowns are excluded because the number of unknowns is <50.

Table 4.56

Percentage of Survey Children Stunted*
By Education of Father and
By Number of Father's Wives
Swaziland National Nutrition Status Survey, 1983
(Rural Sample Only)

	Education of Father				
	None/Adult	Grade 1 Standard 5	Form 1 University	Unknown	Total
1 Wife	34.6% (539)	28.8% (611)	20.7% (425)	32.3% (503)	29.5% (2078)
2 Wives	36.3% (183)	32.5% (186)	18.7% (85)	36.6% (151)	32.7% (605)
≥3 Wives	47.8% (111)	30.2% (80)	21.6% (30)+	35.0% (46)+	37.3% (267)

NOTE: Percentages are weighted on the basis of population proportions; actual number surveyed is given in parenthesis.
Table excludes 1156 children whose mothers were not married at the time of the survey.
Unknowns are excluded because the number of unknowns is <50.

* Stunted is defined as height-for-age Z-score <-2.00 S.D.

+A number <50 is considered statistically unreliable.
Percentages are not provided for any number ≤20.

Table 4.57

Percentage Distribution of Height-for-Age
By Occupation of Father
Swaziland National Nutrition Status Survey, 1983
(Rural Sample Only)

Occupation of Father	Height-for-Age Z-Score: Stunting: Severe <-3.00	Moderate -3.00 to -2.00	≥-2.00	Number
Salaried (Government)	6.9%	18.9%	74.2%	(444)
Salaried (Nongovernment, Nonagriculture), Inside Swaziland	9.0%	18.7%	72.3%	(957)
Businessman/Shopkeeper	16.7%	12.8%	70.4%	(23)+
Unemployed	10.5%	19.8%	69.8%	(272)
Agricultural	12.6%	23.8%	63.6%	(224)
Seller or Hawker	6.0%	33.2%	60.8%	(65)
Other/Unknown	11.4%	21.2%	67.4%	(523)

NOTE: Percentages are weighted on the basis of population proportions; actual number surveyed is given in parenthesis.
Table excludes 1626 children whose fathers were not members of a homestead, and therefore their occupational statuses were not ascertained.

+A number <50 is considered statistically unreliable.
Percentages are not provided for any number ≤20.

Table 4.58

Percentage Distribution of Height-for-Age
By Occupation of Father
Swaziland National Nutrition Status Survey, 1983
(Peri-Urban Sample Only)

Occupation of Father	Height-for-Age Z-Score: Stunting: Severe ≤-3.00	Stunting: Moderate -3.00 to -2.00	≥-2.00	Number
Salaried (Government)	9.6%	16.7%	73.7%	(114)
Salaried (Nongovernment, Nonagriculture), Inside Swaziland	6.3%	13.6%	80.1%	(191)
Businessman/Shopkeeper	--	--	--	(14)+
Unemployed	-	--	---	(15)+
Seller or Hawker	--	--	--	(15)+
Other/Unknown	2.5	12.5	85.0	(40)+

NOTE: Percentages are weighted on the basis of population proportions; actual number surveyed is given in parenthesis.
Table excludes 273 children whose fathers were not members of a homestead, and therefore their occupational statuses were not ascertained.

+A number <50 is considered statistically unreliable.
Percentages are not provided for any number ≤20.

Table 4.59

Percentage Distribution of Height-for-Age
By Total Travel Time
To Nearest Health Clinic
Swaziland National Nutrition Status Survey, 1983
(Rural Sample Only)

	Height-for-Age Z-Score			
	Stunting			
	Severe	Moderate		
Travel Time	<-3.00	-3.00 to -2.00	>-2.00	Number
<30 Minutes	6.9%	13.2%	79.8%	(865)
30-59 Minutes	9.6%	21.5%	68.9%	(1309)
1-2 Hours	11.1%	23.1%	65.8%	(1142)
2 Hours	12.1%	22.2%	65.7%	(789)

NOTE: Percentages are weighted on the basis of population proportions; actual number surveyed is given in parenthesis.
Unknowns are excluded because the number of unknowns is <50.

Table 4.60

Percentage Distribution of Height-for-Age
By Attendance at Maternal and Child Health Clinics
Swaziland National Nutrition Status Survey, 1983
(Rural Sample Only)

	Height-for-Age Z-Score			
	Stunting			
	Severe	Moderate		
	<-3.00	-3.00 to -2.00	>-2.00	Number
History of Attendance	9.1	19.7	71.2	(3202)
Clinic Card, 1983 Visit	8.5%	18.0%	73.5%	(1264)
Clinic Card, No 1983 Visit	8.9%	22.2%	68.9%	(689)
No Clinic Card	9.9%	20.2%	69.9%	(1249)
History of No Attendance	13.4%	22.2%	64.4%	(839)
Unknown	11.5%	22.9%	65.6%	(92)

NOTE: Percentages are weighted on the basis of population proportions; actual number surveyed is given in parenthesis.

Table 4.61

Percentage Distribution of Height-for-Age
By Attendance at Maternal and Child Health Clinics and
By Age of Child
Swaziland National Nutrition Status Survey, 1983
(Rural Sample Only)

Age in Months	Clinic Attendance	Height-for-Age Z-Score: Underweight: Severe <-3.00	Moderate <-3.00 to >-2.00	≥-2.00	Number
3-11	History of Attendance	1.9	12.6	85.5	(521)
	Clinic Card, 1983 Visit	1.9%	11.3%	86.7%	(358)
	Clinic Card, No 1983 Visit	--	--		(19)+
	No Clinic Card	2.0%	14.3%	83.7%	(144)
	History of No Attendance	5.9%	13.4%	80.8%	(143)
12-23	History of Attendance	10.2	23.1	66.7	(746)
	Clinic Card,1983 Visit	10.4%	21.5%	68.1%	(412)
	Clinic Card, No 1983 Visit	11.7%	26.2%	62.1%	(96)
	No Clinic Card	9.2%	24.6%	66.2%	(238)
	History of No Attendance	17.1%	28.7%	54.2%	(167)
24-59	History of Attendance	10.7	20.3	69.0	(1935)
	Clinic Card, 1983 Visit	11.6%	19.9%	68.5%	(494)
	Clinic Card, No 1983 Visit	8.7%	21.4%	69.9%	(574)
	No Clinic Card	11.3%	19.9%	68.8%	(867)
	History of No Attendance	14.2%	22.6%	63.1%	(529)

NOTE: Percentages are weighted on the basis of population proportions; actual number surveyed is given in parenthesis.
Unknowns are excluded when the number of unknowns is <50.
+A number <50 is considered statistically unreliable.
Percentages are not provided for any number ≤20.

Table 4.62

Percentage Distribution of Height-for-Age
By Attendance at Maternal and Child Health Clinics
Swaziland National Nutrition Status Survey, 1983
(Peri-Urban Sample Only)

	Height-for-Age Z-Score			
	Stunting			
	Severe	Moderate		
	<-3.00	-3.00 to -2.00	≥-2.00	Number
History of Attendance	6.6	14.8	78.6	(467)
Clinic Card, 1983 Visit	6.5%	12.5%	81.0%	(200)
Clinic Card, No 1983 Visit	6.3%	17.5%	76.2%	(80)
No Clinic Card	7.0%	16.0%	77.0%	(187)
History of No Attendance	9.3%	17.0%	73.6%	(182)

NOTE: Percentages are weighted on the basis of population proportions; actual number surveyed is given in parenthesis.
Unknowns are excluded because the number of unknowns is <50.

Table 4.63

Percentage of Children Stunted,*
By Method of Feeding and
By Age of Child
Swaziland National Nutrition Status Survey, 1983
(Rural Sample Only)

Age in Months	Exclusively Breastfed (Breast Milk Only)		Partially Breastfed (Breast Milk Plus Other)		Weaned From Breast	
	%	Number	%	Number	%	Number
3-5	6.5	22+	13.2	(199)	-	(21)+
6-11	-	7	17.2	(425)	6.7	(89)
12-17	-	4	31.9	(318)	25.4	(221)
18-23	-	-	46.9	(104)	39.1	(353)

NOTE: Percentages are weighted on the basis of population proportions; actual number surveyed is given in parenthesis.
Unknowns are excluded because the number of unknowns is <50.

* Stunted is defined as height-for-age Z-score <-2.00 S.D.

+A number <50 is considered statistically unreliable.
Percentages are not provided for any number ≤20.

Table 4.64

Percentage Distribution of Weight-for-Height
For Children 3-23 Months of Age
Swaziland National Nutrition Status Survey, 1983

Weight-for-Height Standard Deviation	Rural (n = 1600)		Peri-Urban (n = 270)	
	%	Cumulative %	%	Cumulative %
Under -3.50	0.1	0.1	--	--
-3.50 to -3.01	0.1	0.2	--	--
-3.00 to -2.51	0.5	0.7	--	--
-2.50 to -2.01	1.0	1.7	--	--
-2.00 to -1.51	2.1	3.8	2.2	2.2
-1.50 to -1.01	4.4	8.2	4.8	7.0
-1.00 to -0.51	9.4	17.6	8.9	15.9
-0.50 to -0.00	17.9	35.5	18.1	34.0
+0.00 to +0.50	24.0	59.5	21.9	55.9
+0.51 to +1.00	15.3	74.8	18.1	74.0
+1.01 to +1.50	10.8	85.6	10.4	84.4
+1.51 to +2.00	6.1	91.7	6.7	91.1
+2.01 or more	8.3	100.0	8.9	100.0

NOTE: Percentages are weighted on the basis of population proportions; actual number surveyed is given in parenthesis.

+A number <50 is considered statistically unreliable.
Percentages are not provided for any number ≤20.

Table 4.65

Percentage Distribution of Weight-for-Height
For Children 24-59 Months of Age
Swaziland National Nutrition Status Survey, 1983

Weight-for-Height Standard Deviation	Rural (n = 2533)		Peri-Urban (n = 388)	
	%	Cumulative %	%	Cumulative %
Under -3.50	--	--	--	--
-3.50 to -3.01	--	--	--	--
-3.00 to -2.51	0.1	0.1	--	--
-2.50 to -2.01	0.3	0.4	1.0	1.0
-2.00 to -1.51	1.3	1.7	0.8	1.8
-1.50 to -1.01	4.3	6.0	3.6	5.4
-1.00 to -0.51	12.3	18.3	14.2	19.6
-0.50 to -0.00	22.1	40.4	21.1	40.7
+0.00 to +0.50	30.1	70.5	31.7	72.4
+0.51 to +1.00	16.8	87.3	15.5	87.9
+1.01 to +1.50	7.9	95.2	6.4	94.3
+1.51 to +2.00	3.3	98.5	3.6	97.9
+2.01 or more	1.5	100.0	2.1	100.0

NOTE: Percentages are weighted on the basis of population proportions; actual number surveyed is given in parenthesis.

+A number <50 is considered statistically unreliable.
Percentages are not provided for any number ≤20.

Table 4.66

Percentage Distribution of Children
By Weight-for-Height and
By Age and Sex
Swaziland National Nutrition Status Survey, 1983
(Rural Sample Only)

Age in Months	Sex	Weight-for-Height Z-Score Wasted <-2.00	≥-2.00	Number
3-5	Male	0.9%	99.1%	(110)
	Female	2.5%	97.5%	(107)
	Total	1.7%	98.3%	(217)
6-11	Male	1.3%	98.7%	(221)
	Female	1.8%	98.2%	(237)
	Total	1.6%	98.4%	(458)
12-17	Male	2.4%	97.6%	(269)
	Female	0.8%	99.2%	(240)
	Total	1.6%	98.4%	(509)
18-23	Male	4.0%	96.0%	(204)
	Female	--	100.0%	(212)
	Total	2.0%	98.0%	(416)
24-35	Male	0.3%	99.7%	(466)
	Female	0.2%	99.8%	(462)
	Total	0.2%	99.8%	(928)
36-47	Male	0.6%	99.4%	(442)
	Female	--	100.0%	(446)
	Total	0.3%	99.7%	(888)
48-59	Male	0.5%	99.5%	(325)
	Female	0.7%	99.3%	(392)
	Total	0.6%	99.4%	(717)
Total	Male	1.2%	98.8%	(2037)
	Female	0.6%	99.4%	(2096)
	Total	0.9%	99.1%	(4133)

NOTE: Percentages are weighted on the basis of population proportions; actual number surveyed is given in parenthesis.

+A number <50 is considered statistically unreliable.
Percentages are not provided for any number ≤20.

Table 4.67

Percentage Distribution of Children
By Weight-for-Height and
By Age and Sex
Swaziland National Nutrition Status Survey, 1983
(Peri-Urban Sample Only)

Age in Months	Sex	Weight-for-Height Z-Score Wasted <-2.00	≥-2.00	Number
3-5	Male	--	--	(17)+
	Female	--	--	(14)+
	Total	--	100.0%	(31)+
6-11	Male	--	100.0%	(39)+
	Female	--	100.0%	(46)+
	Total	--	100.0%	(85)
12-17	Male	--	100.0%	(37)+
	Female	--	100.0%	(37)+
	Total	--	100.0%	(74)
18-23	Male	--	100.0%	(46)+
	Female	--	100.0%	(34)+
	Total	--	100.0%	(80)
24-35	Male	--	100.0%	(66)
	Female	1.6%	98.4%	(62)
	Total	0.8%	99.2%	(128)
36-47	Male	1.3%	98.7%	(74)
	Female	1.4%	98.6%	(69)
	Total	1.4%	98.6%	(143)
48-59	Male	1.7%	98.3%	(57)
	Female	--	100.0%	(56)
	Total	0.9%	99.1%	(113)
TOTAL	Male	0.6%	99.4%	(336)
	Female	0.6%	99.4%	(318)
	Total	0.6%	99.4%	(654)

NOTE: Percentages are weighted on the basis of population proportions; actual number surveyed is given in parenthesis.

+A number <50 is considered statistically unreliable.
Percentages are not provided for any number ≤20.

Table 4.68

Percentage Distribution of Children,
By Weight-for-Height and Agroecological Zone
Swaziland National Nutrition Status Survey, 1983
(Rural Sample Only)

Agroecological Zone	Weight-for-Height Z-Score Wasted ≤-2.00	≥-2.00	Number
Highveld	0.8%	99.2%	(1108)
Middleveld	0.6%	99.4%	(1603)
Lowveld	1.2%	98.8%	(1226)
Lubombo	2.0%	98.0%	(196)

NOTE: Percentages are weighted on the basis of population proportions; actual number surveyed is given in parenthesis.

Table 4.69

Percentage Distribution of Children,
By Weight-for-Height and Land Tenure
Swaziland National Nutrition Status Survey, 1983
(Rural Sample Only)

	Weight-for-Height Z-Score		
	Wasted <-2.00	≥-2.00	Number
Swazi Nation Land			
Non-Rural Development Areas	0.5%	99.5%	(1248)
Minimum Rural Development Areas	0.8%	99.2%	(659)
Maximum Rural Development Areas	0.9%	99.1%	(1294)
Individual Tenure Farms	1.2%	98.8%	(462)
Administrative Towns	-	100.0%	(96)
Company Towns	1.8%	98.2%	(374)

NOTE: Percentages are weighted on the basis of population proportions; actual number surveyed is given in parenthesis.

Table 4.70

Percentage of Children
By Weight-for-Height and District
Swaziland National Nutrition Status Survey, 1983
(Rural Sample Only)

	Weight-for-Height Z-Score		
	Wasted		
	<-2.00	≥-2.00	Number
Hhohho	0.1%	99.9%	(1054)
Lubombo	1.4%	98.6%	(982)
Manzini	0.9%	99.1%	(1034)
Shiselweni	1.1%	98.9%	(1063)

NOTE: Percentages are weighted on the basis of population proportions; actual number surveyed is given in parenthesis.

Table 4.71

Percentage Distribution of Weight-for-Age
Of Children 3-23 Months Old
Swaziland National Nutrition Status Survey, 1983

Weight-for-Age Standard Deviation	Rural (n = 1600)		Peri-Urban (n = 270)	
	%	Cumulative %	%	Cumulative %
Under -3.50	0.5	0.5	-	-
-3.50 to -3.01	1.1	1.7	0.4	0.4
-3.00 to -2.51	3.1	4.8	1.5	1.9
-2.50 to -2.01	5.0	9.8	4.4	6.3
-2.00 to -1.51	10.2	19.9	9.3	15.6
-1.50 to -1.01	14.3	34.1	10.7	26.3
-1.00 to -0.51	17.5	51.7	15.6	41.9
-0.50 to -0.00	15.3	66.9	15.9	57.8
+0.00 to +0.50	11.7	78.6	18.9	76.7
+0.51 to +1.00	8.1	86.8	8.9	85.6
+1.01 to +1.50	6.5	93.3	5.6	91.2
+1.51 to +2.00	2.7	96.0	3.3	94.5
+2.01 or more	4.0	100.0	5.6	100.0

NOTE: Percentages are weighted on the basis of population proportions; actual number surveyed is given in parenthesis.

Table 4.72

Percentage Distribution of Weight-for-Age
For Children 24-59 Months of Age
Swaziland National Nutrition Status Survey, 1983

Weight-for-Age Standard Deviation	Rural (n = 2533)		Peri-Urban (n = 388)	
	%	Cumulative %	%	Cumulative %
Under -3.50	0.3	0.3	-	-
-3.50 to -3.01	1.0	1.3	0.5	0.5
-3.00 to -2.51	2.6	3.9	2.1	2.6
-2.50 to -2.01	5.9	9.8	7.0	9.6
-2.00 to -1.51	13.2	23.0	9.8	19.4
-1.50 to -1.01	18.1	41.1	17.3	36.7
-1.00 to -0.51	20.4	61.5	21.6	58.3
-0.50 to -0.00	16.0	77.5	19.6	77.9
+0.00 to +0.50	12.7	90.2	12.9	90.8
+0.51 to +1.00	6.0	96.2	6.4	97.2
+1.01 to +1.50	2.2	98.4	1.5	98.7
+1.51 to +2.00	1.0	99.4	0.8	99.5
+2.01 or more	0.5	100.0	0.5	100.0

NOTE: Percentages are weighted on the basis of population proportions; actual number surveyed is given in parenthesis.

Table 4.73

Percentage Distribution of Weight-for-Age
By Age and Sex
Swaziland National Nutrition Status Survey, 1983
(Rural Sample Only)

Age in Months	Sex	Weight-for-Age Z-Score Underweight <-2.00	≥-2.00	Number
3-5	Male	2.1%	97.9%	(110)
	Female	3.5%	96.5%	(107)
	Total	2.8%	97.2%	(217)
6-11	Male	8.4%	91.6%	(221)
	Female	6.5%	93.5%	(237)
	Total	7.4%	92.6%	(458)
12-17	Male	16.5%	83.5%	(269)
	Female	7.7%	92.3%	(240)
	Total	12.3%	87.7%	(509)
18-23	Male	15.1%	84.9%	(204)
	Female	10.9%	89.1%	(212)
	Total	12.9%	87.1%	(416)
24-35	Male	9.7%	90.3%	(466)
	Female	10.5%	89.5%	(462)
	Total	10.1%	89.9%	(928)
36-47	Male	8.5%	91.5%	(442)
	Female	9.1%	90.9%	(446)
	Total	8.8%	91.2%	(888)
48-59	Male	12.6%	87.4%	(325)
	Female	9.1%	90.9%	(392)
	Total	10.7%	89.3%	(717)
Total	Male	10.8%	89.2%	(2037)
	Female	8.8%	91.2%	(2096)
	Total	9.8%	90.2%	(4133)

NOTE: Percentages are weighted on the basis of population proportions; actual number surveyed is given in parenthesis.

Table 4.74

Percentage Distribution of Weight-for-Age
By Age and Sex
Swaziland National Nutrition Status Survey, 1983
(Peri-Urban Sample Only)

Age in Months	Sex	Weight-for-Age Z-Score Underweight <-2.00	≥-2.00	Number
3-5	Male	--	--	(17)+
	Female	--	--	(14)+
	Total	--	--	(31)+
6-11	Male	2.6%	97.4%	(39)+
	Female	--	100.0%	(46)+
	Total	1.2%	98.8%	(85)
12-17	Male	13.5%	86.5%	(37)+
	Female	5.4%	94.6%	(37)+
	Total	9.5%	90.5%	(74)
18-23	Male	17.4%	82.6%	(46)+
	Female	2.9%	97.1%	(34)+
	Total	11.2%	88.7%	(80)
24-35	Male	9.1%	90.9%	(66)
	Female	9.5%	90.5%	(63)
	Total	9.3%	90.7%	(129)
36-47	Male	10.7%	89.3%	(75)
	Female	14.3%	85.7%	(70)
	Total	12.4%	87.6%	(145)
48-59	Male	5.2%	94.8%	(58)
	Female	7.1%	92.9%	(56)
	Total	6.1%	93.9%	(114)
TOTAL	Male	9.2%	90.8%	(338)
	Female	7.2%	92.8%	(320)
	Total	8.2%	91.8%	(658)

NOTE: Percentages are weighted on the basis of population proportions; actual number surveyed is given in parenthesis.

+A number <50 is considered statistically unreliable.
Percentages are not provided for any number ≤20.

Table 4.75

Percentage Distribution of Weight-for-Age
By Agroecological Zone
Swaziland National Nutrition Status Survey, 1983
(Rural Sample Only)

Agroecological Zone	Weight-for-Age Z-Score Underweight		Number
	<-2.00	>-2.00	
Highveld	10.6%	89.4%	(1108)
Middleveld	8.7%	91.3%	(1603)
Lowveld	10.2%	89.8%	(1226)
Lubombo	10.6%	89.4%	(196)

NOTE: Percentages are weighted on the basis of population proportions; actual number surveyed is given in parenthesis.

Table 4.76

Percentage of Children Stunted
By Weight-for-Age and Land Tenure
Swaziland National Nutrition Status Survey, 1983
(Rural Sample Only)

	Weight-for-Age Z-Score Underweight		
	<-2.00	≥-2.00	Number
Swazi Nation Land			
Non-Rural Development Areas	12.1%	87.9%	(1248)
Minimum - Rural Development Areas	11.0%	89.0%	(659)
Maximum - Rural Development Areas	7.9%	92.1%	(1294)
Individual Tenure Farms	9.6%	90.4%	(462)
Administrative Towns	8.8%	91.2%	(96)
Company Towns	8.1%	91.9%	(374)

NOTE: Percentages are weighted on the basis of population proportions; actual number surveyed is given in parenthesis.

Table 4.77

Percentage Distribution of Weight-for-Age
By District
Swaziland National Nutrition Status Survey, 1983
(Rural Sample Only)

	Weight-for-Age Z-Score Underweight		
	<-2.00	≥-2.00	Number
Hhohho	9.9%	90.1%	(1054)
Lubombo	10.1%	89.9%	(982)
Manzini	7.6%	92.4%	(1034)
Shiselweni	11.4%	88.6%	(1063)

NOTE: Percentages are weighted on the basis of population proportions; actual number surveyed is given in parenthesis.

Table 4.78

Percentage Distribution of Weight-for-Age
By Attendance at Maternal and Child Health Clinics
Swaziland National Nutrition Status Survey, 1983
(Rural Sample Only)

Clinic Attendance	Weight-for-Age Z-Score Underweight <-2.00	>-2.00	Number
History of Attendance	8.8%	91.2%	(3202)
Clinic Card, Visit 1983	9.0%	91.0%	(1264)
Clinic Card, No Visit 1983	9.4%	90.6%	(689)
No Clinic Card	8.3%	91.7%	(1249)
History of No Attendance	13.3%	86.7%	(839)
Unknown	12.3%	87.7%	(92)

NOTE: Percentages are weighted on the basis of population proportions; actual number surveyed is given in parenthesis.

Table 4.79

Percentage Distribution of Weight-for-Age
By Attendance at Maternal and Child Health Clinics and
Age of Child
Swaziland National Nutrition Status Survey, 1983
(Rural Sample Only)

Age in Months	Clinic Attendance	Weight-for-Age Z-Score Underweight <-2.00	≥-2.00	Number
3-11	History of Attendance	5.3%	94.7%	(521)
	Clinic Card, 1983 Visit	4.3%	95.7%	(358)
	Clinic Card, No 1983 Visit	--	--	(19)+
	No Clinic Card	6.8%	93.2%	(144)
	History of No Attendance	7.6%	92.4%	(143)
12-23	History of Attendance	11.1%	88.9%	(746)
	Clinic Card, 1983 Visit.	12.8%	87.2%	(412)
	Clinic Card, No 1983 Visit	10.7%	89.3%	(96)
	No Clinic Card	8.4%	91.6%	(238)
	History of No Attendance	19.3%	80.7%	(167)
24-59	History of Attendance	8.9%	91.1%	(1935)
	Clinic Card, 1983 Visit	9.3%	90.7%	(494)
	Clinic Card, No 1983 Visit	9.0%	91.0%	(574)
	No Clinic Card	8.5%	91.5%	(867)
	History of No Attendance	12.9%	87.1%	(529)
	Unknown	13.1%	86.9%	(69)

NOTE: Percentages are weighted on the basis of population proportions; actual number surveyed is given in parenthesis.
Unknowns are excluded when the number of unknowns is <50.

+A number <50 is considered statistically unreliable.
Percentages are not provided for any number ≤20.

Table 4.80

Percentage Distribution of Weight-for-Age
By Attendance at Maternal and Child Health Clinics
Swaziland National Nutrition Status Survey, 1983
(Peri-Urban Sample Only)

(Rural Sample Only)

Clinic Attendance	Weight-for-Age Z-Score Underweight <-2.00	≥-2.00	Number
History of Attendance	7.1%	92.9%	467
Clinic Card, 1983 Visit	6.0%	94.0%	(200)
Clinic Card, No 1983 Visit	10.0%	90.0%	(80)
No Clinic Card	7.0%	93.0%	(187)
History of No Attendance	10.4%	89.6%	(182)

NOTE: Percentages are weighted on the basis of population proportions; actual number surveyed is given in parenthesis.
Unknowns are excluded because the number of unknowns is <50.

Table 4.81

Prevalence of Undernutrition in Children
Standard Deviations and Percents of Median
Swaziland National Nutrition Status Survey, 1983

	Height-for-Age			Weight-for-Height			Weight-for-Age		
	Standard Deviation		Percent of Median	Standard Deviation		Percent of Median	Standard Deviation		Percent of Median
	<-2.5	<-2.0	<90	<-2.5	<-2.0	<80	<-2.5	<-2.0	<80
Rural	17.9	30.3	16.6	0.3	0.9	0.4	4.2	9.8	12.4
Peri-urban	13.2	22.9	12.9	--	0.6	0.2	2.3	8.2	9.7

Table 4.82

Prevalence of Undernutrition
Among African Children ≤59 Months of Age

Country and Date of Survey	Age in Months	Chronic Undernutrition "Stunting" <90% of Median Ht/Age	Acute Undernutrition "Wasting" <80% of Median Wt/Ht	Underweight <80% of Median Wt/Age
Swaziland. . 1983	3-59	16.6%	0.4%	12.4%
Senegal. . . 1982 (Sine-Saloum)	0-59	26.1%	4.4*	22.7%**
Cameroon . . 1978	3-59	22.1%	1.0%	21.1%
Egypt. . . . 1978	6-71	21.2%	0.6%	8.8%*
Sierra Leone 1978	3-59	24.2%	3.0%	30.5%
Togo 1977	6-71	19.1%	2.0%	15.3%*
Liberia. . . 1976	0-59	18.0%	1.6%	24.0%
Lesotho. . . 1976	3-59	22.7%	1.1%	22.0%

NOTE: All surveys conducted by CDC or UCLA. Percentages are based on representative samples only. Adapted from table prepared by Food Policy and Nutrition Division, FAO, UN.

*3-59 months only.
**Underweight is defined as <75% of the reference median weight-for-age.

Table 4.83

Prevalence of Undernutrition
Among African Children ≤59 Months of Age
By Rural/Urban Location
(Percentage of Children in Each Category)

		Chronic Undernutrition Stunting <90% of Median Ht/Age		Acute Undernutrition Wasting <80% of Median Wt/Ht		Underweight <80% of Median Wt/Age	
Country and Date of Survey		Rural	Urban	Rural	Urban	Rural	Urban
Swaziland	1983	16.6	12.9	0.4	0.2	12.4	9.7
Cameroon	1978	22.4	15.5	1.1	0.7	23.0	12.2
Egypt	1978	23.8	15.0	0.7	0.5	9.9*	6.1*
Sierra Leone	1978	26.2	17.4	3.2	3.2	32.4	24.3
Togo	1977	20.4	11.4	2.2	0.8	16.5*	8.9*
Liberia	1976	20.2	13.8	1.6	1.7	25.5	N/A
Lesotho	1977	23.7	17.2	4.3	3.0	24.9	17.3

NOTE: All surveys conducted by CDC or UCLA. Percentages are based on representative and convenience samples (for urban areas in some countries). Adapted from table prepared by Food Policy and Nutrition Division, FAO, UN.

*Underweight is defined as <75% of the reference median weight-for-age.

Table 4.84

Prevalence of Stunting
Among African Children ≤ 59 Months of Age
By Country and Age Group

Country and Date of Survey		Age in Months				
		6-11	12-23	24-35	36-47	48-59
Swaziland	1983	6.1%	17.3%	16.2%	20.8%	20.6%
Cameroon	1978	9.4%	20.0%	23.4%	27.4%	26.8%
Egypt	1978	10.2%	26.2%	26.5%	22.6%	16.3%
Sierra Leone	1978	14.2%	22.6%	27.3%	28.1%	30.5%
Togo	1977	6.5%	15.0%	18.6%	24.4%	23.9%
Liberia	1976	12.5%	22.3%	21.1%	20.5%	24.7%
Lesotho	1977	11.6%	24.1%	28.6%	26.5%	27.3%

NOTE: All surveys conducted by CDC or UCLA. Percentages are based on representative sample only. Adapted from table prepared by Food Policy and Nutrition Division, FAO, UN.
Stunting is defined as <90% of the reference median height-for-age.

Table 4.85

Prevalence of Wasting*
Among African Children ≤ 59 Months of Age
By Country and Age Group
(Percentage of Children in Each Category)

Country and Date of Survey		Age in Months				
		6-11	12-23	24-35	36-47	48-59
Swaziland	1983	1.4%	0.6%	0.0%	0.2%	0.1%
Cameroon	1973	1.4%	1.4%	1.1%	0.9%	0.5%
Egypt	1978	1.5%	1.2%	0.3%	0.2%	0.2%
Sierra Leone	1978	4.8%	5.6%	2.2%	1.3%	0.3%
Togo	1977	3.2%	4.5%	1.8%	0.8%	0.5%
Liberia	1976	1.9%	2.4%	0.7%	0.4%	1.1%
Lesotho	1977**	5.3%	3.4%	4.1%	2.7%	1.5%

NOTE: All surveys were conducted by CDC or UCLA. Percentages are based on representative sample only. Adapted from table prepared by Food Policy and Nutrition Division, FAO, UN.

* Wasting is defined as <80% of the reference median weight-for-height.

**Wasting is defined as <85% of the reference median weight-for-height for Lesotho.

APPENDIX 4.1

PROCEDURES FOR ANTHROPOMETRIC MEASUREMENTS

Since physical growth is one of the best indicators of the nutritional status of children, its careful measurement is useful for adequate assessment of their nutritional status. Total body length or height and weight are the measurements most frequently carried out to provide useful information on growth. In practice, however, the accuracy and precision of these measurements are often unsatisfactory. Small differences between groups are immensely important, but this significance may be obscured if the measurements have not been made with sufficient accuracy or precision.

The following equipment and procedures were used in the Swaziland survey.

A. Equipment

1. Measuring Board

   A combination height/length board that has been custom-made with metric scale to 0.1 cm.

2. Scale

   A portable, hanging 25 kg scale with 0.1 kg divisions and pants for suspending the child from the scale.

B. Procedures

The measurements were done in the following order:

1. Weight (survey children $\geq$3 months old.)
2. Length/height (survey children $\geq$3 months old.)

1. Weight

   a. The scale was suspended from a pole held by two assistants.

   b. The child was undressed by the parent or guardian.

   c. The parent held the child; the measurer reached his or her arms through the leg holes of the scale pants and drew the legs of the child through the leg holes. He then attached the scale pants to the scale.

   d. While the child was suspended from the pole, the scale was read to the nearest 0.1 kg. When the pointer tip was at or beyond the midway point of a 0.1 kg graduation, weight recorded as the next higher 0.1 kg, the reading was made after the child was reasonably still and the needle was stationary.

   e. The measurer then recorded the weight clearly in the appropriate blocks on the questionnaire.

   f. The child was then removed from the scale pants and reclothed.

2. Length or Height

   For children <2 years of age, supine length was measured.

   For children ≥2 years of age, standing height was measured.

   a. Length measurements

      (1) The measuring board was laid horizontally on the ground or on a table.

      (2) With the help of at least one assistant,* the barefoot baby was placed on the board with its head against the fixed end of the board.

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* Assistants are necessary--a child's strength and mobility cannot be overstated.

(3) An assistant held the baby's head in the Frankfort plane** and applied gentle traction to bring the top of the head into contact with the fixed end of the measuring board.

(4) The measurer held the child's knees together and fully extended the legs.*** The measurer used one hand to insure that the child's feet were perpendicular to the board and brought the movable footboard to rest firmly against the child's heels.

(5) The measurer read the value of the length to the nearest 0.1 cm. When the measurement of a child's length fell at or above the midway point of a 0.1 cm graduation, the child's length was rounded off to the higher 0.1 cm.

(6) The measurer then recorded the length clearly in the appropriate blocks on the questionnaire.

b. Height measurement

(1) The measuring board was placed in a vertical position.

(2) With the help of at least one assistant, the child was positioned barefoot on the horizontal platform with his or her feet together.

** The Frankfort plane is a plane perpendicular to the body and constructed in profile by an imaginary line between the lowest point on the margin of the orbit of the eye and the highest point on the opening of the ear. (As much as 2 cm variation in height or length can be produced by flexing or extending the head out of the Frankfort plane.)

*** Children, especially infants, have a tendency to extend their feet while lying or standing. Accurate height or length depends on a measurement from the heel.

(3) The assistant insured that the child stood flatfooted with the knees fully extended. The shoulders and buttocks were in line with the heels and touched the vertical surface of the measuring board.

(4) The movable headboard was then brought to rest firmly on the crown of the child's head. The head was held in the Frankfort plane.

(5) As in a.5 except substitute "height" for "length."

(6) As in a.6 except substitute "height" for "length."

APPENDIX 4.2

COMPARISON OF THE SPECIAL GROUP POPULATION WITH THE NCHS REFERENCE POPULATION

A total of 182 children were weighed and measured from the special group enumeration areas (the method for selecting these areas is presented in chapter 2 in the survey design section: special group sample.) Figures A4.1 and A4.2 show the distribution of the special group population compared with that of the NCHS reference population. Compared to the NCHS reference population, the special group population is shorter overall, but not thinner. Whereas about 2.2% of the NCHS reference population would be expected to fall -2 S.D. below the median, about 15.4% of the special group population is below -2 S.D. for height-for-age and 0.5%, for weight-for-height.

The high percentage of children stunted in the special group raises the question of whether or not the special group is truly an elite population living under ideal environmental conditions. That the special group may not represent a uniformly privileged population is suggested by the mothers' educational levels: 21.4% of mothers had not achieved a Form 1 educational level.

Previous studies from other African populations suggest that the influence of the environment (e.g., nutrition and infectious diseases) is of much greater importance than race or genetic factors in growth of preschool children (Graitcer 1981, Alnwick 1980, Habicht 1974). That the growth potential of Swazi children living under ideal environmental conditions is

similar to that of the NCHS population is supported by the growth patterns of Swazi children whose fathers had at least some college education, 5.7% of whom were below -2.00 S.D. below the median.

References for Appendix 4.2

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APPENDIX 4.3

PRECISION ESTIMATES: NUTRITIONAL STATUS

Swaziland National Nutrition Status Survey, 1983

Rural Sample

An explanation of statistical terms used in the tables in this Appendix can be found in Chapter 2, page 2.12.

A4.3 Table 1
Swaziland Rural Precision
Percentage Low Height-for-Age

Characteristic	Number	Prevalence (%)	Standard Error	90% Confidence	Design Effect
Total	4133	30.314	1.163	1.913	2.645
Zone					
Highveld	1108	29.987	2.624	4.316	3.633
Middleveld	1603	31.675	1.619	2.663	1.941
Lowveld	1226	28.057	1.946	3.201	2.300
Lubombo	196	34.855	5.630	9.261	2.736
Tenure					
Non-Rural Development Areas	1248	34.047	2.185	3.594	2.652
Minimum Rural Development Areas	659	31.113	2.154	3.543	1.427
Maximum Rural Development Areas	1294	30.950	1.897	3.121	2.179
Company Towns	374	21.001	2.520	4.145	1.431
Administrative Towns	96	24.996	5.480	9.014	1.538
Individual Tenure Farms	462	28.640	4.691	7.717	4.974
District					
Hhohho	1054	31.505	2.358	3.878	2.715
Lubombo	982	30.113	2.183	3.592	2.224
Manzini	1034	27.630	2.344	3.856	2.841
Shiselweni	1063	31.969	2.347	3.861	2.693
Vehicle Ownership					
Owns Vehicle	666	21.284	2.089	3.437	1.735
Does Not Own Vehicle	3454	32.090	1.214	1.997	2.337
Maximun Homestead Education					
None/Adult	205	44.343	4.293	7.062	1.531
Grade 1-2	120	40.416	5.086	8.367	1.289
Standard 1-5	1525	33.316	1.686	2.773	1.951
Forms 1-6	2007	27.435	1.368	2.250	1.886
College/University	269	17.730	2.538	4.175	1.188
Vegetable Garden					
Has Vegetable Garden	1578	27.230	1.848	3.039	2.718
No Vegetable Garden	2505	32.426	1.109	1.825	1.406
Vegetable Garden Unknown	50	26.541	6.478	10.656	1.076

A4.3 Table 2
Swaziland Rural Precision
Percentage Low Height-for-Age

Characteristic	Number	Prevalence (%)	Standard Error	90% Confidence	Design Effect
Total	4133	30.314	1.163	1.913	2.645
Grew Maize					
For Homestead Use Only	3131	32.750	1.311	2.156	2.443
For Mostly Homestead Use	220	31.710	3.004	4.941	0.917
For Cash Crop	115	15.689	2.633	4.332	0.603
Income					
Agriculture/Self-Employed	1152	33.887	2.055	3.380	2.171
Agricultural/Employed	118	30.763	3.715	6.112	0.765
Salaried, Government	514	23.646	2.208	3.631	1.387
Salaried, Non-Gov't Swaziland	1234	30.578	1.964	3.231	2.243
Salaried, Non-Gov't Non-Swaziland	427	29.642	2.389	3.929	1.168
Self-Employment	260	27.150	2.968	4.882	1.158
Combination	304	30.629	3.006	4.945	1.293
Other/Unknown	124	32.123	4.436	7.297	1.119
Defecation Site					
Open/Bush	3018	34.496	1.252	2.060	2.094
Flush Toilet	325	15.215	2.060	3.389	1.070
Concrete Latrine	219	16.523	2.956	4.863	1.388
Wooden Latrine	522	24.100	2.308	3.797	1.520
Other/Unknown	49	23.435	7.197	1.839	1.414
Water Source					
Public Tap	720	26.312	2.340	3.849	2.034
Private Tap	279	15.792	1.661	2.732	0.579
Dam/Pond	184	28.857	5.031	8.277	2.269
Well/Bore Hole	136	30.639	4.886	8.038	1.528
Protected Spring	247	31.399	4.233	6.963	2.054
Unprotected Spring	825	33.031	2.425	3.989	2.193
River/Stream	1681	33.761	1.544	2.540	1.792
Other/Unknown	61	22.572	5.495	9.040	1.054
Children Under 5 Years of Age					
1 Child	803	26.659	1.784	2.935	1.307
2 Children	1404	29.427	1.543	2.538	1.609
3 Children	829	31.910	1.991	3.276	1.513
4 Children	402	37.189	2.836	4.666	1.385
5 or More Children	691	30.908	2.394	3.939	1.855

A4.3 Table 3
Swaziland Rural Precision
Percentage Low Height-for-Age

Characteristic	Number	Prevalence (%)	Standard Error	90% Confidence	Design Effect
Total	4133	30.314	1.163	1.913	2.645
Homestead Membership, Mother					
Member, Resident ≥50%	3444	29.946	1.201	1.976	2.368
Member, Resident <50%	137	25.399	4.293	7.062	1.332
Not Homestead Member	539	34.132	2.404	3.955	1.386
Total Homestead Members	3594	29.747	1.191	1.959	2.440
Employment of Mother					
Unemployed	2693	31.518	1.324	2.177	2.186
Employed Inside Home	464	26.608	2.112	3.475	1.060
Employed Outside Home	415	21.791	2.425	3.989	1.432
Total Homestead Members	3594	29.747	1.191	1.959	2.440
Education of Mother					
None	853	35.282	1.959	3.222	1.433
Adult	153	35.224	4.516	7.429	1.368
Grade 1- Standard 5	1705	30.327	1.524	2.507	1.875
Forms 1-6	740	21.924	1.672	2.750	1.208
College/University	72	7.935	3.436	5.653	1.164
Unknown	71	43.017	5.793	9.530	0.972
Total Homestead Members	3594	29.747	1.191	1.959	2.440
Mother's Age					
<20 Years Old	286	27.063	3.062	5.037	1.358
20-24 Years Old	1060	28.803	1.762	2.898	1.604
25-29 Years Old	873	29.842	1.741	2.864	1.264
30-34 Years Old	618	27.905	2.051	3.374	1.293
35-39 Years Old	417	32.825	2.694	4.432	1.373
>39 Years Old	319	32.374	2.969	4.884	1.284
Live Birth Order for Child					
1	479	25.256	2.278	3.748	1.317
2-3	1383	28.872	1.516	2.493	1.547
4-5	835	32.889	2.190	3.602	1.814
6-7	566	29.424	2.138	3.518	1.246
8+	300	32.970	2.757	4.535	1.032
Unknown	570	33.776	2.293	3.772	1.340
Children Died Past 5 Years					
None	2222	28.013	1.317	2.166	1.910
One Child	795	30.870	1.989	3.272	1.474
Two Children	332	34.449	3.031	4.986	1.351
Three or More Children	231	36.138	3.995	6.571	1.597
Unknown Number of Children	553	33.983	2.338	3.846	1.347

A4.3 Table 4
Swaziland Rural Precision
Percentage Low Height-for-Age

Characteristic	Number	Prevalence (%)	Standard Error	90% Confidence	Design Effect
Education of Father					
(Total Homestead Members)	2507	29.651	1.412	2.322	2.395
None	648	36.172	2.631	4.327	1.942
Adult	210	37.770	3.481	5.727	1.083
Grade 1- Standard 5	925	29.312	1.962	3.228	1.719
Forms 1-6	510	22.132	2.620	4.310	2.031
College/University	79	5.870	2.151	3.538	0.661
Unknown	135	29.676	4.413	7.259	1.260
Number of Wives					
Husband Has 1 Wife	2078	29.490	1.403	2.308	1.968
Husband Has 2 Wives	605	32.749	2.068	3.401	1.174
Husband Has 3 Wives	184	35.571	5.080	8.357	2.072
Husband Has ≥4 Wives	83	41.205	6.244	10.272	1.336
Occupation of Father					
(Total Homestead Members	2507	29.651	1.412	2.322	2.395
Salaried, Government	444	25.757	2.696	4.435	1.687
Salaried, Non-Government Swaziland	957	27.723	2.054	3.380	2.016
Businessman/Shopkeeper	23	29.565	7.763	12.771	0.666
Unemployed	272	30.220	2.644	4.350	0.902
Agricultural	224	36.425	3.774	6.208	1.378
Seller or Hawker	65	39.174	6.923	11.388	1.307
Other/Unknown	522	32.559	2.563	4.216	1.562
Travel Time to Clinic					
<30 Minutes to Clinic	865	20.175	1.937	3.187	2.016
30-59 Minutes to Clinic	1309	31.099	1.898	3.121	2.200
1-2 Hours to Clinic	1142	34.193	1.659	2.729	1.397
More Than 2 Hours to Clinic	789	34.277	2.333	3.838	1.907
History of Clinic Attendance	3202	28.839	1.180	1.941	2.173
Clinic Card, 1983 Visit	1264	26.484	1.603	2.636	1.667
CLinic Card, No 1983 Visit	689	31.082	1.993	3.278	1.277
No Clinic Card	1249	30.067	1.446	2.379	1.242
History of No Attendance	839	35.608	2.104	3.461	1.620
Unknown	92	34.441	5.469	8.996	1.219

A4.3 Table 5
Swaziland Rural Precision
Percentage Low Weight-for-Age

Characteristic	Number	Prevalence (%)	Standard Error	90% Confidence	Design Effect
History of Attendance	3202	8.816	0.540	0.887	1.159
Clinic Card, 1983 Visit	1264	9.011	0.896	1.475	1.239
Clinic Card, No 1983 Visit	689	9.362	1.108	1.823	0.998
No Clinic Card	1249	8.307	0.846	1.392	1.174
History of No Attendance	839	13.275	1.457	2.396	1.547
Unknown	92	12.258	3.734	6.142	1.192

CHAPTER 5: FEEDING PRACTICES OF INFANTS AND CHILDREN

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CHAPTER 5:

FEEDING PRACTICES OF INFANTS AND CHILDREN

INTRODUCTION

Infant-feeding practices are an important determinant of infant and child health, especially in developing countries. Studying infant-feeding practices is complex, since many factors combine to determine a society's general method of infant feeding--e.g., environmental characteristics, economic conditions, and cultural influences. Infant feeding can be divided into three overlapping stages: (1) a period of exclusive breast (or bottle) feeding, (2) a transitional period in which specially prepared foods are introduced in addition to breast milk, and (3) a modified adult period, which begins after 1 year of age when the infant is able to eat modified family foods (American Academy of Pediatrics, 1980).

There is concern over declining breastfeeding rates in developing countries and over lack of adequate national data on use of milk formulae and patterns of supplementation (Notzon, 1984). Breastfeeding is beneficial to infants, not only because it provides nutritionally adequate food, but also because it provides factors such as maternal antibodies that increase resistance to certain diseases. In addition, if infants are exclusively breastfed, their risk of acquiring infection through contaminated liquid or solid foods is reduced. For these reasons, exclusive breastfeeding is considered to be the preferred method for feeding healthy babies for the first 4-6 months of life, provided their growth rate remains satisfactory (American Academy of Pediatrics, 1978; Underwood, 1982).

There is no advantage and, depending on local circumstances (e.g., availability of high-quality breast milk substitutes and availability of sterilizing techniques, clean water, and refrigeration), there may be disadvantages to the infant in terms of growth, morbidity, and mortality from introducing complementary liquid or solid foods to breastfed infants before 3 months of age. Complementary food should be viewed as "the additional food needed to complete the energy and other nutrient needs of a growing infant when these needs are no longer met by exclusive breast feeding" (Underwood, 1982). Breast milk continues to be a major source of infant food in the second half of infancy for breastfed infants, although complementary foods should provide an increasing proportion of nutrients during this time. In general, breast milk alone cannot be expected to support normal growth from 6 to 12 months of age (Seward, 1984).

Important issues to study in the area of infant feeding are, therefore, not only how many mothers initiate breastfeeding, but also (1) how long mothers breastfeed exclusively; (2) at what age do they wean their children from the breast; and (3) what are the patterns of use of nonhuman milks, including formulae, and the patterns of supplementation with semisolid and solid foods.

This chapter examines infant-feeding practices in rural and peri-urban Swaziland, focusing on initiation and duration of breastfeeding, the timing of introduction of artificial milks and solid foods, and the types of milks and foods that are used.

METHODS

Information on infant feeding was obtained from the biological mothers for 75.6% of children in the rural sample (n=4698) and 74.5% of children in the peri-urban sample (n=772) or, in the mother's absence, from the primary caretaker.

Questions on breastfeeding included whether each child surveyed was ever breastfed and, if not, the reason for not initiating breastfeeding; whether the child was currently breastfeeding and, if not, the reasons for weaning and the age at weaning. Mothers were also asked whether each child had received any formula or milk other than breast milk and, if so, the kind of milk the child usually received at first and the age at introduction; and whether the child had received semisolid/solid foods (excluding milk, water and juices) and the age at introduction for these foods.

The analyses in this chapter primarily involve current feeding status. We assumed that children who had been introduced to other milks and semisolid/solid food would still be receiving them. Children whose current eastfeeding status was coded as unknown (5.7% of rural sample, n=274; 8.7% of peri-urban sample, n=67) were excluded from all analyses based on current breastfeeding status. Information on infant feeding based on 24-hour dietary recall was obtained in a subsample of 1 in every 5 children and is included in Appendix 5.1.

Initiation of breastfeeding was studied by analyzing the proportion of children who ever breastfed. The following variables were examined for associations with initiation of breastfeeding: sex and live birth order of child, maternal age at delivery, and educational status. Duration of breastfeeding was studied by analyzing only data on current breastfeeding

status rather than retrospectively collected information (i.e., age that children stopped breastfeeding for those children who were weaned at the time of the survey). Current-status data are generally considered more reliable than retrospective data because the latter have potential problems with recall and also overreporting of certain preferred durations, usually multiples of 6 months (Ferry, 1981).

Duration of breastfeeding was examined by analyzing prevalence of breast-feeding by age strata (<6 months, 6-11 months, 12-17 months, and 18-23 months) and by calculating mean duration of breastfeeding. A number of methods have been used to calculate mean duration of breastfeeding. Because of previously mentioned problems with recall and overreporting of certain durations, methods for calculating duration have been developed based on current breastfeeding-status data. The prevalence/incidence estimate of mean duration based on current breastfeeding status was developed by Mosley et al. (Mosley, 1982) and has been found to be comparable, at least at the national level, to mean durations calculated from the current status life tables (Ferry, 1983). The mean duration of breastfeeding by the prevalence method is computed by dividing the number of children currently breastfeeding by the number of births in the past 24 months and multiplying by 24. For the purpose of those analyses it was calculated as follows:

$$\text{mean duration} = \frac{\text{children currently breastfed 1-24 months of age}}{\text{living children 1-24 months of age}} \times 24$$

The number of living children was used in this calculation rather than the number of all births. If the denominator had included children who had died, the mean duration of breastfeeding would have been lower, but since birth order, maternal work status, resident status, and pregnancy status were not

ascertained for children who had died, tabulations of mean duration with these variables were restricted to surviving children.

The following variables were examined for associations with duration-of-breastfeeding measures (prevalence by age and mean duration): sex of child, live-birth order of child, maternal education, pregnancy status, work status, resident status, and age. Whether the mother was a member of the homestead affected ascertainment of all these variables apart from sex of child. Among the children aged 0 through 59 months, 566 rural and 77 peri-urban mothers were not current members of the homestead or living in the dwelling, and therefore information was not available on these variables. For the age group 0 through 23 months, information on these variables was not available for 83 rural and 10 peri-urban children.

A comparison of breastfeeding practices in Swaziland and other African countries was done for initiation and measures of duration of breastfeeding.

RESULTS

Initiation of Breastfeeding

Initiation of breastfeeding is common in Swaziland. In the rural sample, 94.4% of all children surveyed had ever breastfed. The most common reasons given for not initiating breastfeeding were that the child was well but refused the breast (27.8%) or the mother was ill (23.9%) (Table 5.1).

In the peri-urban sample, 92.1% of children had been breastfed. For those who had never been breastfed, the most common reasons for not initiating breastfeeding were the same as for the rural sample, i.e., the child was well but refused the breast (35.0%) or the mother was ill (26.7%) (Table 5.1).

There was no trend towards declining rates of initiation of breastfeeding when breastfeeding initiation rates were examined by 12-month birth cohort. In fact, in both rural and peri-urban children the highest rates of initiation (96.3% and 94.8%) were in the cohort of children born in the 12 months before the survey, and the lowest rates of initiation (93.0% rural, 87.7% peri-urban) were among the cohort of children born 4-5 years before the survey.

Sex and live-birth order of the child were not associated with differences in the proportions of infants who were ever breastfed in rural or peri-urban samples. In the rural sample, there was a negative association between initiation of breastfeeding and mother's education. Among mothers with no education or adult education, 97.8% initiated breastfeeding compared with 95.7% of mothers whose education was at the level of grade 1 through standard 5, and 92.6% whose education was at the level of forms 1-6 or a university education.

This negative association was not seen in the peri-urban sample. Mothers who were 25 to 34 years old at delivery had the lowest rate of initiation of breastfeeding both in the rural and peri-urban samples, but the effect was more marked in the peri-urban sample. Mothers who were <25 years old had rates similar to those for mothers ≥35 years old (Table 5.2).

Duration of Breastfeeding

Prevalence of Breastfeeding.

Age of Child. Figure 5.1 and Table 5.3 show proportions of children being breastfed at given age intervals. Breastfeeding durations are fairly long, with a high proportion of infants being breastfed in the first year in both the rural and peri-urban samples. This proportion dropped steadily during

the second year so that approximately one-fourth of infants were breastfeeding at ages 18 to 23 months, with a sharp decline after the age of 2 years.

Membership and Residence Status of Mother. Table 5.4 shows prevalences of breastfeeding by age of child and maternal membership and residence status for the rural sample. Very few mothers with infants <12 months old were not members of the homestead. In this age group, children of mothers who were residents <50% of the time had a lower prevalence of breastfeeding than those whose mothers were residents ≥50% of the time. For children between the ages of 1 and 2 years, there was a stronger association seen with maternal membership and prevalence of breastfeeding. Only 3.5% of children currently breastfeeding had mothers who were not members of the homestead compared with 21.4% whose mothers were members and residents <50% of the time and 46.5% whose mothers were residents ≥50% of the time. Numbers were too small in the peri-urban sample to permit tabulation.

Pregnancy Status of Mother. Table 5.5 shows the percentage of mothers who were pregnant, according to the age of their child, for the rural and peri-urban samples. Pregnancy was uncommon among mothers of infants aged 0 to 11 months. In the rural sample, among mothers of children aged 12 to 17 months, 10.2% were pregnant and 17.2% of mothers with children aged 18 to 23 months were pregnant. In the peri-urban sample, the highest proportion of mothers currently pregnant (13.8%) were mothers of the 24- to 35-month-old age group (Table 5.5).

Pregnancy was associated with lower prevalences of breastfeeding in both rural and peri-urban samples (Table 5.6). In the 12- to 17-month age group, rural children whose mothers were pregnant were only 34% as likely to be

breastfeeding as those whose mothers were not pregnant and less than 1% as likely in the 18- to 23-month-old age group.

Sex. In the rural sample, the proportions of children breastfeeding in each age group were similar for males and females (Table 5.7). In the peri-urban sample, higher proportions of males were breastfed in the 6- to 11-month and 12- to 17-month age groups (Table 5.7).

Live-Birth Order. In the rural sample for children ≥6 months of age, breastfeeding prevalence tended to increase with live-birth order of child (Table 5.8). This was not seen in the peri-urban sample; however, the numbers were small in each age stratum (Table 5.9).

Age of Mother. Tables 5.10 and 5.11 show prevalence of breastfeeding by maternal age. In the rural sample, except for infants aged <6 months, young mothers (<25 years old) had the lowest breastfeeding rates. Older mothers (≥35) had the highest rates for children <1 year of age, but this effect was not seen for older children. In the peri-urban sample, small numbers limited interpretation of the data; however, young mothers had the lowest prevalences of breastfeeding except in the 12- to 17-month age group.

Work Status of Mother. In the rural sample, most mothers surveyed were not working (75%); 13% worked at home and 12% worked away from home, although this varied by the age of the child. The proportions of children breastfed in all the 6-month age groupings were similar for mothers who did not work and mothers who worked at home. In all age groups, mothers who worked away from home breastfed their children less frequently than other mothers did (Table 5.12). Comparing the prevalences of breastfeeding for women who worked away from home and those who did not work and expressing these prevalences as a ratio yields prevalence ratios of 0.97 for children aged 0-5 months, and

0.82, 0.68, and 0.55 for the successive age groupings of children. In other words, mothers of infants <6 months old who worked away from home were 0.97 as likely to be breastfeeding as mothers who did not work, and mothers of children 18 to 23 months old who worked away from home were 0.55 as likely to be breastfeeding as those who did not work.

A higher percentage of women worked away from home in the peri-urban sample (35.8%) compared with the rural sample (14.9%). The proportions of children breastfeeding in each age group varied less with mother's work status in the peri-urban sample than in the rural sample. In the <6-month age group, 100% of mothers who worked away from home breastfed their infants compared with 91.5% of mothers who were not working. For infants and children ≥6 months of age, the mother's working away from home was associated with lower prevalences of breastfeeding (Table 5.13). Breastfeeding prevalence ratios for mothers who worked away from home compared with those who did not work were 0.83 in the 6- to 11-month age group, 0.84 in the 12- to 17-month age group and 0.90 in the 18- to 23-month age group.

Educational Status of Mother. There was a negative association between proportions of children breastfeeding and mother's education in each age group in the rural and peri-urban samples (Tables 5.14 and 5.15). In the rural sample, the effect was stronger among children in the second year of life. In the peri-urban sample, the effect was seen in the 6- to 11-month as well as the other age groups. In all age groups, mothers who had completed forms 1-6 or some level of university education were less likely to breastfeed their children than mothers who had completed some elementary grades.

Mean Duration of Breastfeeding. Table 5.16 shows mean duration of breastfeeding by selected variables for the rural and peri-urban samples.

Mean duration of breastfeeding was 14.8 months for rural children and 15.1 months for peri-urban children. In the peri-urban sample, the mean duration of breastfeeding was 1.3 months longer for male children than for female children. There was a negative association of mean duration of breastfeeding with education of mother in the rural sample. In the peri-urban sample, the number of mothers with no education or adult education was small (n=22), but mothers with the highest level of education had lower mean durations than mothers with a grade 1 to standard 5 level of education. Live-birth order had a positive association with mean duration in the rural sample and a negative association in the peri-urban sample. However, rural children with birth order >5 breastfed for only 1.0 month longer, on average, than firstborn children. In the peri-urban sample, firstborn children breastfed for 16.7 months compared with 14.3 months for children with birth order ≥5.

Mothers who worked away from home, who were not a member of the homestead, or who were present <50% of the time were associated with lower mean durations of breastfeeding in the rural sample but not in the peri-urban one. Mothers who were ≥35 had lower mean durations of breastfeeding than younger mothers by an average of 1-2 months in the rural and peri-urban samples.

Reasons for Weaning. The reasons given for weaning children in the rural and peri-urban samples are shown in Table 5.17. The most common reason for weaning children from the breast was that the child had reached weaning age. Other reasons given were that the child refused the breast, the child or mother was ill, the mother was pregnant, or the mother worked.

Introduction of Nonhuman Milks and Semisolid/Solid Foods

Tables 5.18 and 5.19 show method of infant feeding by age groups for the rural and peri-urban samples. In the rural sample, 27.9% of infants <6 months

old were breastfeeding exclusively and 33.5% were receiving breast milk plus other milks. Only 1.2% were exclusively bottle feeding; 5.5% had had solids introduced. Of infants 6 to 11 months old, 1.8% were still exclusively breastfeeding; 1.5% were receiving breast plus other milks, and 0.6% were receiving bottle milk only. In other words, 4% of children aged 6 to 11 months were not receiving solid foods. A small percentage of children 12 to 17 months old were still exclusively breastfeeding (0.6%) (Table 5.18).

In the peri-urban sample among infants <6 months old, 22.3% were exclusively breastfeeding, 37.2% were breast- and bottle feeding, and 34.0% were receiving breast and bottle milk plus solid foods. There were 1.1% exclusively bottlefed infants and 4.1% were fed bottle milk plus solids (Table 5.19).

Use of Nonhuman Milks. These milks tend to be introduced early in Swaziland. Among infants 0-6 months old in the rural sample, 26.9% of those <1 month old had been introduced to nonhuman milks, as were 58.0% of those aged 1 month, 70.2% of those aged 2 months, and 88.4% of those who were 5 months old (Table 5.20). The median age for introducing these milks was, therefore, between 1 and 2 months of age. Introduction of artificial milks was earlier in the peri-urban sample: 69.1% of infants 0-2 months old, and 97% of all infants aged 3 to 5 months (Table 5.21). Formulae were the most common nonhuman milk first introduced to rural and peri-urban infants. In the rural sample, powdered milks were introduced as an infant's first artificial milk almost as often as formulae. Fresh animal milks were the first nonhuman milk introduced to 12.9% of rural infants and to 2.7% of peri-urban infants (Table 5.22).

Introduction of Semisolid/Solid Foods. Information on whether a child had been given semisolid or solid foods was examined for children <12 months of age (Table 5.23). Among infants <3 months of age, 14.0% of those in the rural sample and 16.2% of those in the peri-urban sample had been introduced to solids. Among infants 6 to 11 months of age, 4.1% of rural infants had not been introduced to solids and 1.1% of peri-urban infants had not been introduced to solids.

Comparison of Swaziland Data With Data From Other African Surveys

Initiation of Breastfeeding. World Fertility Surveys have been done in Kenya, Lesotho, Senegal, and Sudan. The percentage of children ever breastfed according to these surveys ranged from 96% to 98%. A family health survey in Sine-Saloum reported initiation-of-breastfeeding rates of 98% (USAID/Dakar, 1984). Therefore, the rate for initiation of breastfeeding in Swaziland is comparable to, though slightly lower than, rates in these other African countries (Table 5.24).

Duration of Breastfeeding. Compared with data from other surveys done in Africa with the assistance of CDC or University of California at Los Angeles (UCLA), the proportion of children currently breastfeeding was lower in Swaziland, especially after 12 months of age (Figure 5.2). Mean duration of breastfeeding calculated from the Swaziland survey using the 24-month incidence/prevalence procedure was compared with mean durations from a Sine-Saloum survey and World Fertility Surveys (based on interviews with mothers). Mean durations of breastfeeding in Swaziland were lower than in Sine-Saloum and in other African countries surveyed in World Fertility Surveys (Table 5.24).

DISCUSSION

With concern over declining rates of breastfeeding and early introduction of other milks and solid foods in developing countries and with the paucity of national data on these issues, the importance of studying factors that affect breastfeeding and related infant-feeding practices is being increasingly recognized. The sample of children in this survey was of appropriate size and design to provide a reliable measure of infant-feeding practices at the national level for the rural Swazi population. Since the peri-urban sample was not representative of all peri-urban areas in Swaziland, the data analyzed do not necessarily represent the total peri-urban population; however, unless peri-urban areas are thought to differ considerably, the findings can reasonably be generalized to other economically similar peri-urban areas.

Cross-sectional surveys such as this cannot be used to study causality but are useful for identifying groups at high risk for certain adverse infant-feeding practices. In-depth studies are then needed to examine these findings and their implications more thoroughly. For this report, examination of factors associated with initiation and duration of breastfeeding was done with bivariate analyses, and statistical testing was not done on possible associations between dependent and independent variables. Some variables examined, e.g., maternal age and child's live-birth order, are highly correlated. Multivariate analyses would enable the independent effect of these and other important factors, such as length of the birth interval and pregnancy status of the mother, to be determined, but this was beyond the scope of this report.

In general, pregnancy status of the mother is an important variable to take into account when examining breastfeeding practices, because breastfeeding and fertility are highly dependent on each other. In this study, pregnant women were far less likely to be breastfeeding than those who were not. On a national scale, especially in countries where contraceptive use is low, breastfeeding is a very important determinant of the interval between births (Bongaarts, 1980).

Although the rate for initiation of breastfeeding was high in both the rural and peri-urban samples of Swaziland (94.4% and 92.1% respectively), breastfeeding was not prolonged, compared with its duration in other countries surveyed in Africa and very early initiation of nonhuman milks and solids was common.

Fresh animal milks and powdered milks without vitamin supplementation are not recommended breast milk substitutes for the first 6 months of life (American Academy of Pediatrics, 1978), yet these are the first nonhuman milks introduced to half the children <2 years old in the rural sample. Powdered milk is the first nonhuman milk introduced to a third of peri-urban infants. Use of fresh animal milk is relatively uncommon. Formulae are used more commonly in peri-urban areas, perhaps because they are more readily available. The risk of introducing other milks or semisolid foods to infants <3 months old differs according to the area of residence, socioeconomic level, etc. The risk is greatest in environmental conditions where clean water is not available or sterilization of bottles is not possible.

Late introduction of solid foods is also disadvantageous to the infant. Continued normal growth on breast milk exclusively has not been described on a community or population basis for infants in the second half of infancy

(Seward, 1984); therefore, appropriate use of semisolid and solid foods is necessary in this "transitional" period (American Academy of Pediatrics, 1980, Underwood, 1982). Four percent of rural infants aged 6 to 11 months were not receiving these foods. This group is therefore at high risk for poor growth.

Rural and peri-urban samples differed in the variables found to be associated with differences in measures of initiation or duration of breastfeeding. With the high rates of initiation of breastfeeding, it was not surprising that few of the variables examined were associated with large differences in initiation of breastfeeding. In the rural sample, maternal education showed a negative association with initiation of breastfeeding. This association has been described in numerous other countries (Forman, 1984). In contrast, this effect was not seen in the peri-urban sample where the most educated mothers (forms 1-6 or university education) had the highest rate of initiation of breastfeeding.

Examining initiation of breastfeeding by yearly birth cohort showed no consistent pattern for declining rates in more recent years, suggesting that breastfeeding initiation rates did not decline significantly during the 5 years preceding the survey. In fact, they may have increased, although the findings of the highest initiation rates among children <12 months of age, and the lowest rates among children 4-5 years old may be due to poorer recall among mothers of older children.

Factors found to be associated with lower mean durations of breastfeeding (or lower prevalences of breastfeeding among children >6 months old) in Swaziland have been consistently described in the majority of studies in developing countries (Forman, 1984). These factors are higher maternal education (as an indicator of higher socioeconomic status), working away from

home (rural sample only), and lower birth order of child (rural sample only). Notable exceptions were urban residence (rural and peri-urban infants had very similar mean durations of breastfeeding) and lower maternal age. In the rural and peri-urban samples of the Swaziland survey, the oldest group of mothers (>35 years) had the lowest breastfeeding durations. Not surprisingly, duration of breastfeeding was markedly affected by the mother's absence from the homestead.

The reason for the lack of association between urban residence and duration of breastfeeding is unclear. Peri-urban populations have migrated fairly recently from rural areas and may still retain their rural patterns of infant feeding. Also, the peri-urban population in Swaziland, with its population of 600,000, may be relatively rural in nature compared with that in other countries. Peri-urban women may have different work patterns which may account for the lack of association between duration of breastfeeding and whether the mother worked away from the home in the peri-urban sample. Perhaps peri-urban women work in areas closer to their residences or perhaps they take their infants with them to work.

Some of the factors associated with lower durations of breastfeeding are potentially amenable to change whereas others are not. As discussed by Forman, high socioeconomic status is an indicator of exposure to Westernization and social change. This factor is not amenable to intervention nor would one necessarily want to intervene. However, infants could be brought to the mother's workplace where day nurseries and feeding breaks could be established. These procedures could alleviate the problem of shortened duration of breastfeeding among women who work away from home (Forman, 1984).

A high percentage of mothers (12% overall) were not members of the homestead. It would be advantageous to both the mother and child if they lived in the same homestead since duration of breastfeeding was markedly affected by the mother's absence. The socioeconomic, cultural, and other factors contributing to this need to be explored.

A relationship between birth order and duration of breastfeeding has been consistently found in other studies in developing countries (Forman, 1984; Ferry, 1983). A difference of 3-6 months in mean duration of breastfeeding between parities 1-2 and 7+ is evident in most World Fertility Surveys (Ferry, 1983). However, mean duration of breastfeeding differed by only 1.0 month (from live-birth order 1, to 5+) in rural Swaziland. The opposite trend was apparent in the peri-urban sample, with a decrease of 2-4 months in mean duration of breastfeeding (between live-birth 1, to 5+). The reason for this is unclear. The differences in breastfeeding by birth order may be due to a pattern over time, to a maternal cohort effect (different patterns of breastfeeding which depend on the mother's age) or to differences in the length of the birth interval (Notzon, 1984).

Although the rate for initiation of breastfeeding is comparable to (although slightly lower than) the rate in other African countries surveyed, duration of breastfeeding was much lower in Swaziland. Mean durations of breastfeeding for surviving children would be longer than those for all births, since mortality terminates breastfeeding.

There were also methodologic differences between the surveys. Different biases are present depending on whether the survey is based on a sample of mothers or children, which do not make calculations of mean duration of breastfeeding exactly comparable. In the "child-based" Swaziland survey,

among the sample of children aged 0 to 59 months, approximately 12% of mothers were not members of the household. These women would not have been interviewed in a "mother-based" survey. However, it is unlikely that all of the difference in mean duration is due to methodological variations between the surveys. These surveys were also conducted at different times spanning 6 years, and breastfeeding may have declined in some or all of these countries over this time period.

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Table 5.1

Reasons For Never Initiating Breastfeeding
(of Children ≤59 Months of Age)
Swaziland National Nutrition Status Survey, 1983

Reason	Rural (N=246)	Peri-Urban (N=60)
Child Well/Refused	27.8%	35.0%
Mother Ill	23.9%	26.7%
No Milk	14.8%	10.0%
Child Ill	11.7%	6.7%
Mother at School	4.0%	1.7%
Mother Works	3.4%	1.7%
Medical Advice	3.2%	5.0%
Bottle Preferred	2.7%	6.7%
Other/Unknown	8.5%	6.7%
Total	99.9%	100.2%

NOTE: Percentages are weighted on the basis of population proportions; actual number surveyed is given in parenthesis.

Table 5.2

Initiation of Breastfeeding
By Child's Sex, Mother's Education, Live-Birth Order, and
Mother's Age at Delivery
Swaziland National Nutrition Status Survey, 1983

	Initiation of Breastfeeding			
	Rural		Peri-Urban	
	Percent	Number	Percent	Number
Child's Sex				
Male	94.3	(2324)	93.0	(398)
Female	95.3	(2353)	91.4	(373)
Mother's Education				
None/Adult	97.8	(1145)	92.6	(54)
Grade 1-Standard 5	95.7	(1942)	92.5	(214)
Forms 1-6/University	92.6	(953)	93.3	(405)
Unknown	94.1	(83)	77.3	(22)+
Live-Birth Order				
1	95.4	(604)	92.4	(144)
2-4	95.6	(2134)	93.0	(374)
5+	95.5	(1353)	91.1	(169)
Mother's Age at Delivery				
<25	96.2	(2170)	94.4	(408)
25-34	94.5	(1413)	88.9	(225)
35+	95.7	(519)	93.4	(61)

NOTE: Percentages are weighted on the basis of population proportions; actual number surveyed is given in parenthesis.
Table excludes 643 children whose mothers were not members of the homestead. Therefore, mother's education, age at delivery, and live-birth order of child were not ascertained.
Unknowns are excluded because the number of unknowns is <50.
+A number <50 is considered statistically unreliable.

Table 5.3

Prevalence of Breastfeeding
By Age of Child
Swaziland National Nutrition Status Survey, 1983

Age in Months	Rural		Peri-Urban	
	Percent	Number	Percent	Number
<3	97.9	(257)	100.0	(63)
3-5	91.2	(234)	83.9	(31)+
6-8	87.4	(246)	77.4	(53)
9-11	81.3	(230)	70.6	(34)+
12-17	58.5	(522)	58.6	(70)
18-23	23.0	(424)	30.1	(73)
24-35	2.0	(930)	4.7	(129)
36-47	0.4	(881)	0.7	(146)
48-59	0.1	(700)	-	(106)

NOTE: Percentages are weighted on the basis of population proportions; actual number surveyed is given in parenthesis.

+A number <50 is considered statistically unreliable. Percentages are not provided for any number ≤20.

Table 5.4

Prevalence of Breastfeeding
By Child's Age and Mother's Membership and Resident Status of Homestead
Swaziland National Nutrition Status Survey, 1983
(Rural Sample Only)

Age in Months	Not Member		Member, Resident <50%		Member, Resident ≥50%	
	Percent	Number	Percent	Number	Percent	Number
<12	--	(14)+	81.8	(20)+	90.9	(931)
12-23	3.5	(69)	21.4	(27)+	46.5	(848)

NOTE: Percentages are weighted on the basis of population proportions; actual number surveyed is given in parenthesis.

+A number <50 is considered statistically unreliable.
Percentages are not provided for any number ≤20.

Table 5.5

Percentage of Mothers Pregnant
By Age of Child
Swaziland National Nutrition Status Survey, 1983

Age in Months	Rural		Peri-Urban	
	Percent	Number	Percent	Number
<6	0.8	(495)	0.0	(100)
6-11	1.8	(476)	1.1	(90)
12-17	10.2	(505)	9.9	(71)
18-23	17.2	(399)	8.3	(72)
24-35	13.2	(811)	13.8	(123)

NOTE: Percentages are weighted on the basis of population proportions; actual number surveyed is given in parenthesis.
Unknowns are excluded because the number of unknowns is <50.
Table excludes 241 children whose mothers were not members of the homestead; therefore, their pregnancy status was not ascertained.

Table 5.6

Prevalence of Breastfeeding
By Residence Location, Mother's Pregnancy Status,
And Age of Child
Swaziland National Nutrition Status Survey, 1983

Age in Months	Rural				Peri-Urban			
	Mother Pregnant		Mother Not Pregnant		Mother Pregnant		Mother Not Pregnant	
	Percent	Number	Percent	Number	Percent	Number	Percent	Number
<6	-	(4)+	95.2	(476)	--	(0)+	94.6	(93)
6-11	--	(7)+	86.8	(453)	--	(1)+	77.4	(84)
12-17	22.4	(45)	66.6	(436)	--	(6)+	68.3	(60)
18-23	1.7	(63)	28.8	(322)	--	(5)+	33.9	(62)

NOTE: Percentages are weighted on the basis of population proportions; actual number surveyed is given in parenthesis.
Table excludes 93 children whose mothers were not members of the homestead; therefore, their pregnancy status was not ascertained.
Unknowns are excluded because the number of unknowns is <50.

+A number <50 is considered statistically unreliable.
Percentages are not provided for any number ≤20.

Table 5.7

Prevalence of Breastfeeding
By Residence Location and By Age and Sex of Infant
Swaziland National Nutrition Status Survey, 1983

Age in Months	Rural				Peri-Urban			
	Male		Female		Male		Female	
	Percent	Number	Percent	Number	Percent	Number	Percent	Number
<6	94.6	(249)	94.8	(242)	92.3	(52)	97.6	(42)+
6-11	83.0	(235)	85.9	(241)	82.5	(40)+	68.1	(47)+
12-17	60.0	(271)	57.0	(251)	69.2	(39)+	45.2	(31)+
18-23	24.2	(214)	21.7	(210)	28.6	(42)+	32.3	(31)+

NOTE: Percentages are weighted on the basis of population proportions; actual number surveyed is given in parenthesis.

+A number <50 is considered statistically unreliable.
Percentages are not provided for any number ≤20.

Table 5.8

Prevalence of Breastfeeding
By Live Birth Order and by Age of Infant
Swaziland National Nutrition Status Survey, 1983
(Rural Sample Only)

	Live Birth Order					
	1		2-4		5+	
Age in Months	Percent	Number	Percent	Number	Percent	Number
<6	93.6	(109)	95.4	(228)	95.9	(146)
6-11	80.6	(115)	85.8	(227)	92.1	(122)
12-17	56.2	(99)	61.8	(252)	68.8	(130)
18-23	12.6	(69)	25.9	(196)	28.6	(122)

NOTE: Percentages are weighted on the basis of population proportions; actual number surveyed is given in parenthesis.
Table excludes 83 children whose mothers were not members of the homestead; therefore, the order of their live births was not ascertained.
Unknowns are excluded because the number of unknowns is <50.

Table 5.9

Prevalence of Breastfeeding
By Live-Birth Order and by Age of Infant
Swaziland National Nutrition Status Survey, 1983
(Peri-Urban Sample Only)

	Live-Birth Order					
	1		2-4		5+	
Age in Months	Percent	Number	Percent	Number	Percent	Number
<6	100.0	(28)+	92.3	(52)	--	(11)+
6-11	66.7	(30)+	83.7	(43)+	--	(11)+
12-17	--	(20)+	51.6	(31)+	--	(15)+
18-23	--	(13)+	27.8	(36)+	--	(20)+

NOTE: Percentages are weighted on the basis of population proportions; actual number surveyed is given in parenthesis.
Table excludes 10 children whose mothers were not members of the homestead; therefore, the order of their live births was not ascertained.
Unknowns are excluded because the number of unknowns is <50.

+A number <50 is considered statistically unreliable.
Percentages are not provided for any number ≤20.

Table 5.10

Prevalence of Breastfeeding
By Maternal Age and by Age of Child
Swaziland National Nutrition Status Survey, 1983
(Rural Sample Only)

Age in Months	Maternal Age <25 Percent	Maternal Age <25 Number	Maternal Age 25-34 Percent	Maternal Age 25-34 Number	Maternal Age 35+ Percent	Maternal Age 35+ Number
<6	94.8	(250)	95.1	(185)	97.0	(53)
6-11	82.6	(239)	88.2	(160)	95.6	(62)
12-17	57.8	(223)	67.0	(182)	66.3	(83)
18-23	17.9	(153)	31.6	(152)	22.1	(81)

NOTE: Percentages are weighted on the basis of population proportions; actual number surveyed is given in parenthesis.
Table excludes 83 children whose mothers were not members of the homestead; therefore, their maternal age was not ascertained.
Unknowns are excluded because the number of unknowns is <50.

Table 5.11

Prevalence of Breastfeeding
By Maternal Age by Age of Child
Swaziland National Nutrition Status Survey 1983
(Peri-Urban Sample Only)

Age in Months	Maternal Age <25 Percent	<25 Number	25-34 Percent	25-34 Number	35+ Percent	35+ Number
<6	94.4	(54)	97.0	(33)+	--	(7)+
6-11	71.2	(52)	80.8	(26)+	--	(7)+
12-17	62.5	(32)+	61.5	(26)+	--	(8)+
18-23	20.7	(29)+	46.4	(28)+	--	(12)+

NOTE: Percentages are weighted on the basis of population proportions; actual number surveyed is given in parenthesis.
Table excludes 10 children whose mothers were not members of the homestead; therefore, their maternal age was not ascertained.
Unknowns are excluded because the number of unknowns is <50.

+A number <50 is considered statistically unreliable.
Percentages are not provided for any number ≤20.

Table 5.12

Prevalence of Breastfeeding
By Mother's Work Status and by Age of Child
Swaziland National Nutrition Status Survey, 1983
(Rural Sample Only)

Age in Months	Mother's Work Status					
	Not Working		Works at Home		Works Away From Home	
	Percent	Number	Percent	Number	Percent	Number
<6	94.8	(392)	97.3	(60)	91.5	(36)+
6-11	85.6	(376)	91.7	(50)	70.3	(45)+
12-17	60.7	(383)	66.4	(63)	41.0	(68)
18-23	23.9	(312)	24.5	(49)	13.1	(58)

NOTE: Percentages are weighted on the basis of population proportions; actual number surveyed is given in parenthesis.
Table excludes 83 children whose mothers were not members of the homestead; therefore, their work status was not ascertained.
Unknowns are excluded because the number of unknowns is <50.

+A number <50 is considered statistically unreliable.

Table 5.13

Prevalence of Breastfeeding
By Mother's Work Status and by Age of Child
Swaziland National Nutrition Status Survey, 1983
(Peri-Urban Sample Only)

Age in Months	Mother's Work Status					
	Not Working		Works at Home		Works Away From Home	
	Percent	Number	Percent	Number	Percent	Number
<6	91.5	(47)+	--	(14)+	100.0	(33)+
6-11	79.1	(43)+	--	(13)+	65.5	(7)+
12-17	59.5	(41)+	--	(5)+	50.0	(19)+
18-23	27.8	(36)+	--	(8)+	25.0	(24)+

NOTE: Percentages are weighted on the basis of population proportions; actual number surveyed is given in parenthesis.
Table excludes 10 children whose mothers were not members of the homestead; therefore, their work status was not ascertained.
Unknowns are excluded because the number of unknowns is <50.

+A number <50 is considered statistically unreliable.
Percentages are not provided for any number ≤20.

Table 5.14

Prevalence of Breastfeeding
By Education of Mother and by Age of Child
Swaziland National Nutrition Status Survey, 1983
(Rural Sample Only)

Age in Months	Education of Mother: None/Adult %	None/Adult Number	Grades 1-2/Standards 1-5 %	Grades 1-2/Standards 1-5 Number	Forms 1-6/University %	Forms 1-6/University Number
<6	97.6	(129)	96.5	(226)	90.1	(124)
6-11	87.3	(121)	88.4	(221)	80.7	(111)
12-17	71.7	(146)	60.5	(222)	55.5	(115)
18-23	35.9	(104)	24.8	(188)	9.5	(86)

NOTE: Percentages are weighted on the basis of population proportions; actual number surveyed is given in parenthesis.
Table excludes 83 children whose mothers were not members of the homestead; therefore, their educational level was not ascertained.
Unknowns are excluded because the number of unknowns is <50.

Table 5.15

Prevalence of Breastfeeding
By Education of Mother and by Age of Child
Swaziland National Nutrition Status Survey, 1983
(Peri-Urban Sample Only)

Age in Months	Education of Mother: None/Adult		Grades 1-2/Standards 1-5		Forms 1-6/University	
	Percent	Number	Percent	Number	Percent	Number
<6	--	(1)+	96.8	(31)+	93.1	(58)
6-11	--	(8)+	91.3	(23)+	65.4	(52)
12-17	--	(6)+	79.2	(24)+	54.3	(35)+
18-23	--	(5)+	40.0	(25)+	29.7	(37)+

NOTE: Percentages are weighted on the basis of population proportions; actual number surveyed is given in parenthesis.
Table excludes 10 children whose mothers were not members of the homestead; therefore, their educational level was not ascertained.
Unknowns are excluded because the number of unknowns is <50.

+A number <50 is considered statistically unreliable.
Percentages are not provided for any number ≤20.

Table 5.16

Mean Duration of Breastfeeding--Prevalence Method
By Selected Variables
Swaziland National Nutrition Status Survey, 1983

	Rural		Peri-Urban	
	Mean Duration		Mean Duration	
	Months	Number	(Months)	Number
	15.9	(1913)	16.1	(324)
Sex				
Male	16.0	(969)	16.6	(173)
Female	15.9	(944)	15.4	(151)
Education of Mother*				
None/Adult	17.8	(500)	14.4	(20)+
Grade 1-Standard 5	16.7	(857)	18.6	(103)
Forms 1-6/University	15.2	(436)	15.6	(182)
Live-Birth Order*				
1	16.0	(392)	17.7	(91)
2-4	16.4	(903)	16.3	(162)
5+	17.3	(520)	15.6	(57)
Mother's Work Status				
Does Not Work/Works at Home	16.5	(1685)	16.8	(208)
Works Away	11.8	(207)	15.0	(112)
Mother's Resident Status				
Not Member	1.1	(83)	—	(10)+
Member <50% of Time	11.4	(47)	—	(5)+
Member ≥50% of Time	16.7	(1779)	16.6	(309)
Mother's Age*				
<25	16.4	(865)	16.4	(167)
25-34	17.1	(679)	17.4	(113)
35+	15.8	(279)	14.8	(34)+

NOTE: Percentages are weighted on the basis of population proportions; actual number surveyed is given in parenthesis.
Unknowns are excluded because the number of unknowns is <50.

*Excludes 141 children whose mothers were not members of the homestead.

+A number <50 is considered statistically unreliable.
Percentages are not provided for any number ≤20.

Table 5.17

Reason for Weaning
(Children <59 Months of Age)
Swaziland National Nutrition Status Survey, 1983

Reason	Rural (N=3134) Percent	Peri-Urban (N=481) Percent
Weaning Age	64.4	46.2
Child Refused	6.7	16.2
Child Ill	4.9	5.7
Mother Ill	4.2	5.1
Mother Pregnant	6.3	5.7
Mother Works	3.7	5.7
Other	9.9	15.2

NOTE: Percentages are weighted on the basis of population proportions; actual number surveyed is given in parenthesis.

Table 5.18

Method of Infant Feeding
By Age of Child
Swaziland National Nutrition Status Survey, 1983
(Rural Sample Only)

Age in Months	BF+ Only	BF & Bottle*	BF & Solids	BF & Bottle & Solids	Bottle Only	Bottle & Solids	Solid Only	Number
<6	27.9%	33.5%	5.5%	27.7%	1.2%	4.1%	-	(490)
6-11	1.8%	1.5%	18.3%	62.8%	0.6%	14.0%	1.0%	(474)
12-17	0.6%	0.3%	17.5%	40.3%	0.0%	36.0%	5.2%	(521)
18-23	0.0%	0.0%	7.3%	15.6%	0.2%	65.3%	11.6%	(419)
24-35	0.1%	0.0%	0.7%	1.4%	0.3%	79.5%	18.1%	(912)
Total	5.2%	6.1%	8.6%	25.6%	0.4%	45.3%	8.7%	(2816)

NOTE: Percentages are weighted on the basis of population proportions; actual number surveyed is given in parenthesis.

+(BF): Breastfeeding

*(Bottle): Feeding with nonhuman milk.

Table 5.19

Method of Infant Feeding
By Age of Child
Swaziland National Nutrition Status Survey, 1983
(Peri-Urban Sample Only)

Age in Months	BF+ Only	BF & Bottle*	BF & Solids	BF & Bottle & Solids	Bottle Only	Bottle & Solids	Solid Only	Number
<6	22.3%	37.2%	1.1%	34.0%	1.1%	4.1%	-	(94)
6-11	0.0%	1.1%	13.8%	59.8%	0.0%	24.1%	1.1	(87)
12-17	0.0%	0.0%	11.6%	46.4%	0.0%	40.6%	1.4	(69)
18-23	0.0%	1.4%	9.7%	19.4%	0.0%	65.3%	4.2	(72)
24-35	0.0%	0.0%	2.3%	2.3%	0.0%	82.8%	12.5	(128)
Total	4.7%	8.2%	6.9%	29.6%	0.2%	45.8%	4.7	(450)

NOTE: Percentages are weighted on the basis of population proportions; actual number surveyed is given in parenthesis.

+(BF): Breastfeeding

*(Bottle): Feeding with nonhuman milk.

Table 5.20

Percentage of Children <6 Months of Age Fed Nonhuman Milk
Swaziland National Nutrition Status Survey, 1983
(Rural Sample Only)

Age in Months	Percent	Number
0	26.9	(87)
1	58.0	(85)
2	70.2	(94)
3	79.0	(74)
4	82.8	(82)
5	88.3	(87)

NOTE: Percentages are weighted on the basis of population proportions; actual number surveyed is given in parenthesis.

Table 5.21

Percentage of Children <6 Months of Age Fed Nonhuman Milk
Swaziland National Nutrition Status Survey, 1983
(Peri-Urban Sample Only)

Age in Months	Percent	Number
<3	69.1	(47)+
3-5	97.0	(32)+

NOTE: Percentages are weighted on the basis of population proportions; actual number surveyed is given in parenthesis.

+A number <50 is considered statistically unreliable.

Table 5.22

Type of Nonhuman Milk Introduced First
To Children <24 Months of Age
Swaziland National Nutrition Status Survey, 1983

	Rural (N=1535)	Peri-Urban (N=298)
Fresh Animal Milk	12.9%	2.7%
Formula	44.8%	61.7%
Powdered Milk	40.9%	34.9%
Other/Unknown	1.3%	0.7%

NOTE: Percentages are weighted on the basis of population proportions; actual number surveyed is given in parenthesis.

Table 5.23

Percentage of Children <12 Months of Age
Fed Semisolid/Solid Foods
Swaziland National Nutrition Status Survey, 1983

Age in Months	Rural		Peri-Urban	
	Percent	Number	Percent	Number
<3	14.0	(265)	16.2	(68)
3-5	64.2	(242)	87.9	(33)+
6-11	95.9	(495)	98.9	(92)

NOTE: Percentages are weighted on the basis of population proportions; actual number surveyed is given in parenthesis.
+A number <50 is considered statistically unreliable.

Table 5.24

Percentage of Children Ever Breastfed and
Mean Duration of Breastfeeding in
Selected African Countries
Swaziland National Nutrition Status Survey, 1983

Country & Year of Survey	Percentage of Children Ever Breastfed	Mean Duration (Months) Prevalence Method Based on 24 Months
Swaziland NNS, 1983	95	14.8+
Rural population		13.7*
Sine-Saloum FHS, 1982	98	23.6+
Rural population		21.9*
Kenya WFS, 1977	98	15.9*
Lesotho WFS, 1977	96	19.5*
Senegal WFS, 1978	98	18.6*
Sudan WFS, 1979 (North)	98	16.8*

NOTE: FHS = Family Health Survey.
WFS = World Fertility survey.
NNS = National Nutrition survey.

+Living children only.

*All children.

Figure 5.1

PERCENT OF CHILDREN BREASTFED: SWAZILAND BY AGE OF CHILD AND UNIVERSE

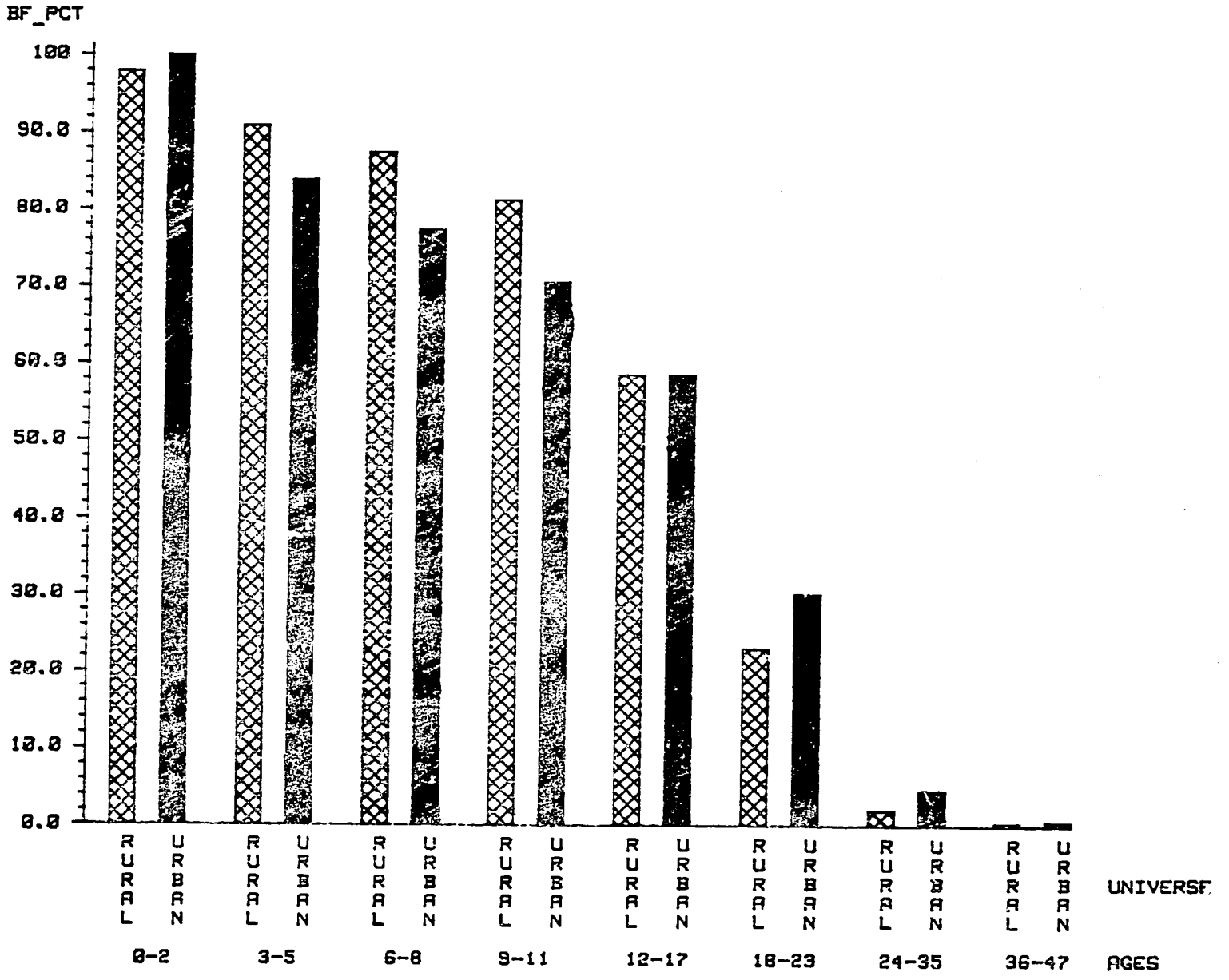
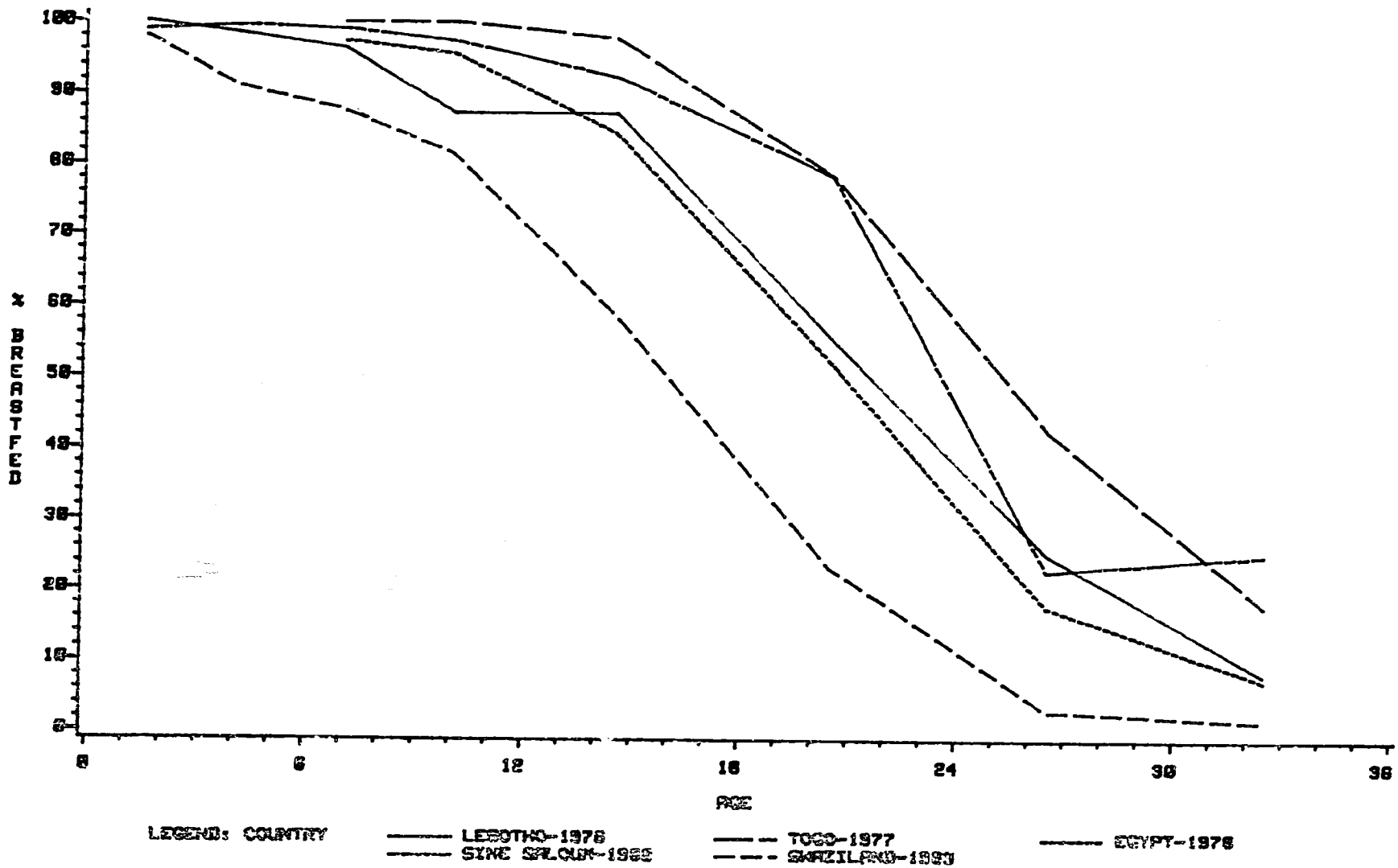


Figure 5.2

PREVALENCE OF BREASTFEEDING BY AGE OF CHILD AMONG RURAL CHILDREN IN FIVE AFRICAN COUNTRIES



Appendix 5.1

24-Hour Dietary Recall

INTRODUCTION

The dietary intake data were collected by using a simplified dietary methodology developed by a panel convened by the Committee on International Program of the U.S. Academy of Sciences. The methodology used is designed to obtain qualitative data on a specific age group for the preceding 24 hours.

The basic issues to be addressed by the dietary intake data are:

1. Milks consumed by infants/toddlers as a supplement or substitute for breast milk.
2. Foods consumed by infants and toddlers during the weaning period.
3. Comparison of foods consumed by the infant/toddler with the family's food consumption.

METHODS

Information on dietary practices and attitudes was collected on the subsample questionnaire. This questionnaire was administered to the mothers or caretakers of survey children <3 years of age and only in every fifth enumeration area in the rural sample only. (Enumeration areas are listed in Chapter 2, Appendix 2.3.)

Dietary intake data were collected by using a 24-hour dietary recall for both the survey child and the child's family (form 5) (Chapter 2, Appendix 2.1). Interviewers asked the respondent what the child and the child's family ate "yesterday." After recording the food items volunteered by the respondent on the questionnaire, the interviewer asked the respondent about consumption of foods by category noted on the questionnaire. A glossary of Swazi foods is provided in Appendix 5.2.

RESULTS

Response Rate

Of the 588 children eligible for the rural subsample, an interview was obtained for 96.1% (565). Mothers were the informants for 76.5% of these interviews.

Consumption by Toddlers of Milks and Milk Products

The most commonly consumed milks for children 0-35 months of age were breast milk (42.9%), powdered milk (23.6%), fresh milk from an animal (20.3%), and infant formula (11.1%). Children rarely consumed condensed milk (0.6%), dried skim milk (2.8%), or filled/non-dairy "milks" (0.2%) (Table A5.1). Breast milk was the most commonly consumed milk until 18-23 months of age, when powdered and fresh milk became more frequently consumed. Milk products (sour milk (emasi), yogurt, cheese) were consumed by 16.1% of the children.

Weaning Foods

The most commonly consumed weaning foods were the traditional weaning foods: soft porridge (indengane) and sour porridge (incwancwa) (49.3%), followed by commercial cereals (7.8%), inembe (1.9%), and commercial baby foods (0.2%). Traditional weaning foods were consumed by 3.9% of children <3 months old, 32.7% of children 3-5 months old, and 62.0% of children at 6-11 months (Table A5.2). After 11 months, 50.8% to 58.2% of children consumed traditional weaning foods. Commercial cereals were consumed by 7.8% of children at <3 months, 31.4% at 3-5 months, and 18.5% at 6-11 months. After 11 months, the percentage consuming cereal decreased sharply ranging from 0.6% to 3.9%. Thus, commercial cereal was consumed more commonly than traditional weaning foods at <3 months, about the same at 3-5 months, and less frequently after 6 months.

Family and Child Consumption of Foods

Milks and Milk Products. Because milks were grouped differently, consumption of milks by families and children cannot be directly compared. Information was available on the families of 554 children, of which 11.2% had consumed sour milk (emasi), yogurt, or cheese; 19.1%, fresh milks; and 3.8%, other milks.

Starchy Foods. Mealie meal, rice and mealie rice, and samp (all staples) were the foods most commonly consumed by both the child (68.0%) and family (96.4%) (Table A5.3). The next most commonly consumed starchy foods were breads (33.8% of children and 50.4% of adults) and potatoes (8.0% of children and 8.8% of adults). Other starchy foods were consumed much less commonly.

Although foods from the mealie meal category are acceptable as foods for young children, the percentage of children consuming foods from this category approached but did not ever reach family consumption levels. At 6-11 months, consumption of mealie meal was 55.0% for children, compared with 95.8% for families. The level of consumption among children aged 18-23 months, approached that for the family (94.0% versus 98.5% respectively). A similar pattern was observed for breads, with the level of consumption among children reaching that for adults only at 24-35 months.

Protein Foods.

Meats. Red meat (beef, mutton, goat, and bush meat) were the protein food meats most commonly consumed by the child (24.4%) and family (25.3%) (Table A5.4). Tinned or fresh fish was the meat next most commonly consumed by the child (7.5%) and family (9.6%); chicken was the third most commonly consumed (5.3% of children and 7.9% of adults). Pork and viscera were rarely consumed by either the child or the family.

The percentage of children consuming red meats increased with the child's age, with the consumption level for children above that of the family by age 12-17 months (35.6% versus 30.2% respectively).

Eggs. Eggs were consumed by 11.0% of children, compared with 8.8% of families. The percentage of children consuming eggs was slightly higher than the percentage for families by age 6-11 months and in the higher age categories.

Legumes/Ground Nuts. Legumes (beans, peas, cowpeas, jugo beans) were consumed by 8.6% of children and 12.0% of families. The percentage of children consuming legumes was below the level of family consumption until the children reached age 24-35 months. Ground nuts/peanut butter were consumed by 5.1% of children overall and 6.7% of families overall. The percentage of children aged 6-11 months and older eating ground nuts/peanut butter was about the same as the percentage for families.

Vegetables. The most commonly consumed vegetables were onions, garlic, green peppers, tomatoes (the percentage for the child was 29.9%, for the family, 37.6%); ligusha, imbuya, chuchuza (child, 28.2%; family, 43.3%), cabbages (child, 16.7%; family, 27.7%), and spinach/other dark leafy vegetables (child, 9.5%; family, 14.6%) (Table A5.5). The level of consumption for children was within 4.0% of the level of consumption for the family by the time the children were aged 12-17 months for the onions, garlic, green pepper, and tomatoes, and spinach categories; by 18-23 months for the ligusha, imbuya, and chuchuza category; and by 24-35 months for cabbages.

Fruits. The most commonly consumed fruits were citrus: oranges, grapefruit, and lemons (child, 8.2%; family, 6.6%) (Table A5.6). The level of consumption for children aged 6-11 months was higher than the level for

families (16.5% and 5.3% respectively). Bananas were consumed by 2.2% of children and 1.6% of families. Bananas were introduced at age <3 months in the small number of families eating bananas (child, 2.0%; family, 1.9%). Mangoes, peaches, guava, and apricots were consumed by 1.6% of children and 4.2% of families. The level of consumption for children aged 18-23 months reached the level for families. Other fruits were consumed by less than 3.0% of families and children.

Oils and Sugars. Oil was commonly consumed by children and families. Cooking oil and margarine were consumed by 30.8% of children and 46.0% of families (Table A5.7). Sugar and sugar products were consumed by 48.7% of children and 65.8% of families. The level of sugar consumption among children did not match the level for families until the children reached age 24-35 months. Sugar was introduced early, with 7.8% of children receiving sugar at <3 months of age.

Beverages (Non-Milk). The non-milk beverages most commonly consumed by children and their families were tea and coffee (child, 34.5%; family, 53.1%) (Table A5.8). The next most common was emahewu, consumed by 16.5% of children and 26.9% of families. Interestingly, homemade beer (tjwala) was consumed by 11.6% of families (0.6% of children). Other beverages were consumed by less than 5.0% of the children and families.

DISCUSSION

As with all 24-hour dietary recall data, the data collected are useful for describing the dietary pattern of a population group, but not for an individual's pattern. What the individual ate yesterday may or may not reflect his or her regular eating pattern. Thus, the data cannot be related to the anthropometric or socioeconomic characteristics of an individual.

Because the data collected were qualitative rather than quantitative, the information collected cannot be converted to nutrient terms for comparison with norms. The season in which these data were collected was the traditional hungry season when crops stores were low and certain wild vegetables unavailable, so the dietary patterns described here may reflect patterns in other seasons.

Infant feeding can be divided into three overlapping periods: the nursing period during which breast milk alone provides the sole source of nutrients, the transitional period during which specially prepared weaning foods are introduced, and a modified adult period when the child receives most of the foods from the family table (American Academy of Pediatrics, 1980).

During the first 4-6 months, when breast milk alone will support adequate growth, exclusive breastfeeding is the preferred method of infant feeding for most infants. The diet of some infants was supplemented too soon with milks other than breast milk (powdered, fresh milk, and formula), weaning foods (traditional and commercial cereals), and sugars. The use of powdered and fresh milks as a sole source of nutrients for infants may be problematic because of the need for vitamin/iron supplementation.

After the first 4-6 months, supplementation is necessary to maintain normal growth in most infants. The infant enters the weaning and modified adult periods. At age 6-12 months, Swazi infants continued to receive breast milk, other milks, weaning foods, and, in addition, began receiving other foods eaten by the family. For some foods, the difference between the level of consumption for the child as opposed to that for the family decreased as the child grew older.

For children aged 12 months and older, levels of food consumption began to approach those of the family for most foods. Differences in the percentage of children and families consuming foods must be interpreted in view of the child's age. Reasons for discrepancies cannot be answered by the data collected. Certain foods are difficult for a toddler to eat and must be specially prepared or not offered. Other foods may be considered against usual practice or traditionally taboo, and may not be offered. In addition, toddlers may not accept all foods offered to them. The small number of family members consuming a food item within each age group make statistical comparisons difficult for some food items.

There was no evidence that either meats or eggs were consumed less often by children than by families. Protein foods such as meats, eggs, and legumes have traditionally been considered taboo for children for the first 12-24 months. Legumes were consumed less commonly by children at 12-17 and 18-23 months. Legumes are traditionally thought to cause constipation or diarrhea.

Dark green, leafy vegetables and cabbages are traditionally thought to cause diarrhea in young children. Native vegetables (liqusha, etc.), cabbages, and spinach all were consumed by children 12-17 months old only somewhat less often than by families (35.6% versus 41.0%, 15.8% versus 24.8%, and 12.5% versus 15.2% respectively). However, among children 18-23 months old, cabbage was the only vegetable of these three kinds consumed less often by children than by families (21.2% versus 27.3%). Cabbage is usually served as relish and therefore spiced, mainly with curry. This may be the reason it is the least likely of these vegetables to be consumed by children in this age category. Whether these differences at 12-17 months of age represent food withholding because of food taboos or just statistical variation cannot be

determined. No common food taboos exist for yellow vegetables; levels of consumption among children approximated levels of family consumption.

Several other foods, none of which are traditionally regarded as taboo, were consumed less often by children than by families: mealie meal (rice, mealie rice, samp), certain fruits, oils and fats, and sugars. Traditional weaning foods containing mealie meal may be substituted for other mealie meal products eaten by older family members. Certain fruits, such as those from the mango, peach, guava, apricot category, may be offered less often to younger children because of difficulty in preparation. Reasons for the lower rates of consumption of oils and fats and sugars are unclear. One possible explanation is that children in younger age categories are barred from consumption of stews (which are usually oily and spicy).

REFERENCES

American Academy of Pediatrics, Committee on Nutrition. On the feeding of supplemental foods to infants. Pediatrics 1980;65:1178-81.

A5.1 Table 1

Consumption of Milks and Milk Products by Age of Child
Swaziland National Nutrition Status Survey, 1983
(Rural Sample Only)

	Age in Months						
	< 3	3 - 5	6 - 11	12 - 17	18 - 23	24-35	Total
Milks							
Breast	100.0% (51)	82.7% (52)	76.3% (93)	53.9% (104)	17.9% (67)	1.6% (183)	42.9% (550)
Powdered milk: Nespray,* Everyday,* Klim*	13.7% (51)	40.4% (52)	41.8% (91)	29.8% (104)	23.9% (67)	8.8% (182)	23.6% (547)
Fresh milk: cow, goat, sheep	3.9% (51)	5.8% (52)	22.0% (91)	22.1% (104)	25.4% (67)	25.1% (183)	20.3% (548)
Infant formula: Pellargon,*NAN,* Lactogen,* Baby Milk,* Plus,*SMA, S26*	37.3% (51)	34.6% (52)	11.0% (91)	6.7% (104)	4.5% (67)	2.2% (183)	11.1% (549)
Sweetened milk, condensed, or evaporated	— (51)	— (52)	— (91)	1.0% (104)	1.5% (67)	0.6% (183)	0.6% (549)
Dried skim milk	— (51)	— (52)	— (90)	1.9% (103)	1.5% (67)	6.6% (182)	2.8% (545)
Filled milks: Sungold Blend,* Make-o-Milk,* Blend of Milk*	— (51)	— (52)	1.1% (90)	— (104)	— (67)	— (183)	0.2% (547)
Other milk	— (51)	— (52)	— (91)	— (104)	1.5% (67)	0.6% (183)	0.4% (548)
Milk Products							
Sour milk (emasi) yogurt, cheese	— (51)	3.8% (52)	5.5% (91)	21.2% (104)	20.9% (67)	24.6% (183)	16.1% (548)

NOTE: Actual number surveyed is given in parenthesis.
*Use of trade name s for identification purposes only and does not imply the endorsement of the Department of Health and Human Services or any of its agencies.

A5.1 Table 2

Consumption of Weaning Foods
By Age of Child
Swaziland National Nutrition Status Survey, 1983
(Rural Sample Only)

	Age in Months													
	< 3		3 - 5		6 - 11		12 - 17		18 - 23		24-35		Total	
Soft porridge (indengane) Sour porridge (incwancwa)	3.9%	(51)	32.7%	(52)	62.0%	(92)	58.2%	(103)	50.8%	(67)	54.6%	(183)	49.3%	(548)
Inembe	—	(51)	3.9%	(52)	3.4%	(89)	1.0%	(102)	—	(66)	2.2%	(182)	1.9%	(542)
Commercial cereal	7.8%	(51)	31.4%	(51)	18.5%	(92)	3.9%	(104)	1.5%	(67)	0.6%	(183)	7.9%	(548)
Commercial baby food	—	(51)	1.9%	(52)	—	(91)	—	(103)	—	(67)	—	(183)	0.2%	(547)

NOTE: Actual number surveyed is given in parenthesis.

A5.1 Table 3

Consumption of Starchy Foods by Children and Their Families
By Age of Child
Swaziland National Nutrition Status Survey, 1983
(Rural Sample Only)

		Age in Months						
		< 3	3 - 5	6 - 11	12 - 17	18 - 23	24-35	Total
Mealie meal, rice, mealie rice, samp	Child	— (51)	17.3% (52)	55.0% (91)	80.4% (102)	94.0% (67)	91.3% (184)	68.0% (547)
	Family	98.1% (52)	90.6% (53)	95.8% (96)	96.2% (106)	98.5% (67)	97.3% (184)	96.4% (558)
Bread, brown/white maize bread, wheat	Child	— (51)	3.9% (52)	17.6% (91)	37.3% (102)	43.9% (66)	54.1% (183)	33.8% (545)
	Family	48.1% (52)	47.2% (53)	51.0% (96)	51.9% (106)	53.7% (67)	49.5% (182)	50.4% (556)
Irish potato	Child	2.0% (51)	3.9% (52)	4.4% (91)	9.1% (99)	10.6% (66)	11.0% (182)	8.0% (541)
	Family	9.6% (52)	5.7% (53)	5.3% (95)	11.3% (106)	11.9% (67)	8.7% (183)	8.8% (556)
Green maize, imbhasha, tinkhobe	Child	— (51)	— (52)	1.1% (91)	3.0% (101)	1.5% (66)	5.0% (182)	2.6% (543)
	Family	1.9% (52)	7.6% (53)	5.3% (95)	4.7% (106)	1.5% (67)	8.2% (182)	5.6% (555)
Cakes, biscuits	Child	— (51)	— (52)	3.3% (91)	2.9% (104)	3.0% (67)	3.3% (183)	2.6% (548)
	Family	— (52)	5.7% (53)	8.4% (95)	1.9% (105)	1.5% (66)	3.8% (183)	3.8% (554)
Pasta, macaroni, spaghetti, custard	Child	— (51)	2.0% (51)	1.1% (91)	— (104)	4.6% (66)	— (180)	0.9% (543)
	Family	— (52)	1.9% (52)	2.2% (93)	0.9% (106)	3.0% (66)	— (180)	1.1% (549)
Cassava, emathapha ematabhane	Child	— (51)	— (51)	— (91)	2.9% (104)	— (65)	— (180)	0.6% (542)
	Family	— (52)	3.9% (52)	1.1% (95)	0.9% (106)	— (66)	— (181)	0.7% (552)
Sorghum	Child	— (51)	— (52)	— (90)	— (101)	— (67)	1.7% (181)	0.6% (542)
	Family	3.9% (52)	1.9% (53)	2.1% (95)	— (106)	— (67)	— (183)	0.9% (556)

NOTE: Actual number surveyed is given in parenthesis.

A5.1 Table 4

Consumption of Protein Foods by Children and Their Families
By Age of Child
Swaziland National Nutrition Status Survey, 1983
(Rural Sample Only)

		Age in Months						
		< 3	3 - 5	6 - 11	12 - 17	18 - 23	24-35	Total
Meat: Beef, mutton, goat, bush	Child	— (51)	7.7% (52)	20.9% (91)	35.6% (104)	28.4% (67)	30.0% (183)	24.4% (548)
	Family	15.4% (52)	25.0% (52)	29.5% (95)	30.2% (106)	19.7% (66)	25.1% (183)	25.3% (554)
Fish, fresh & tinned	Child	— (51)	— (52)	4.4% (91)	12.5% (104)	11.9% (67)	8.7% (183)	7.5% (548)
	Family	5.8% (52)	7.7% (52)	10.5% (95)	11.3% (106)	10.6% (66)	9.3% (183)	9.6% (554)
Poultry/ chicken	Child	— (51)	1.9% (52)	3.3% (91)	4.8% (104)	13.4% (67)	6.0% (183)	5.3% (548)
	Family	1.9% (52)	9.6% (52)	9.5% (95)	7.6% (106)	13.6% (66)	6.6% (183)	7.9% (554)
Tripe, intestines	Child	— (51)	— (52)	1.1% (91)	— (104)	— (67)	1.1% (183)	0.6% (548)
	Family	3.9% (52)	3.9% (52)	3.2% (95)	1.0% (104)	— (66)	2.2% (183)	2.2% (552)
Liver, spleen, kidney	Child	— (51)	— (52)	— (91)	1.0% (104)	— (67)	0.6% (182)	0.4% (547)
	Family	— (52)	3.9% (52)	2.1% (95)	0.9% (106)	— (66)	1.1% (183)	1.3% (554)
Pork	Child	— (51)	— (51)	— (91)	— (104)	— (66)	1.1% (183)	0.4% (546)
	Family	1.9% (52)	— (52)	— (95)	— (106)	— (66)	— (183)	0.2% (554)
Other meats	Child	— (51)	— (52)	3.3% (91)	4.8% (104)	3.0% (67)	4.4% (183)	3.3% (548)
	Family	3.8% (52)	4.0% (50)	— (94)	7.6% (105)	9.1% (66)	5.0% (181)	4.9% (548)
Eggs	Child	— (51)	7.7% (52)	18.7% (91)	9.6% (104)	10.5% (67)	12.2% (181)	11.0% (546)
	Family	1.9% (52)	7.8% (51)	12.8% (94)	4.8% (105)	9.2% (65)	11.1% (181)	8.8% (548)
Legumes: beans, peas, cowpeas, jugo beans	Child	— (51)	— (52)	8.8% (91)	3.9% (104)	11.9% (67)	14.8% (183)	8.6% (548)
	Family	11.5% (52)	20.0% 50)	12.8% (94)	7.6% (105)	15.2% (66)	11.1% (181)	12.0% (548)
Ground nuts, peanut butter	Child	— (51)	— (52)	5.5% (91)	6.7% (104)	6.0% (67)	6.6% (183)	5.1% (548)
	Family	3.9% (52)	9.8% (51)	7.5% (94)	5.7% (105)	7.6% (66)	6.6% (181)	6.7% (549)

NOTE: Actual number surveyed is given in parenthesis.

A5.1 Table 5

Consumption of Vegetables by Children and Their Families
By Age of Child
Swaziland National Nutrition Status Survey, 1983
(Rural Sample Only)

		Age in Months						
		< 3	3 - 5	6 - 11	12 - 17	18 - 23	24-35	Total
Onions, garlic, green peppers, tomatoes	Child	— (51)	3.6% (52)	23.1% (91)	41.4% (104)	40.3% (67)	38.8% (183)	29.9% (548)
	Family	36.5% (52)	41.2% (51)	34.0% (94)	38.1% (105)	34.8% (66)	39.4% (180)	37.6% (548)
Liqusha, imbuya, chuchuza, etc.	Child	— (51)	— (52)	24.2% (91)	35.6% (104)	41.8% (67)	37.0% (184)	28.2% (549)
	Family	50.0% (52)	30.0% (50)	49.5% (95)	41.0% (105)	37.9% (66)	45.0% (182)	43.3% (550)
Cabbages	Child	— (51)	3.9% (51)	13.3% (90)	15.8% (101)	21.2% (66)	25.4% (181)	16.7% (540)
	Family	26.9% (52)	42.9% (49)	28.4% (95)	24.8% (105)	27.3% (66)	25.4% (181)	27.7% (548)
Spinach (other dark green, leafy vegetables)	Child	— (51)	1.9% (52)	6.7% (90)	12.5% (104)	9.0% (67)	14.3% (182)	9.5% (546)
	Family	11.5% (52)	20.0% (50)	12.8% (94)	15.2% (105)	9.1% (66)	16.7% (180)	14.6% (547)
Pumpkin (litsanga), sweet potato, butternut, green squash, beet root	Child	— (51)	— (51)	4.5% (89)	3.0% (101)	6.0% (67)	5.5% (181)	3.9% (540)
	Family	1.9% (52)	2.0% (50)	8.5% (94)	2.9% (105)	4.6% (66)	2.8% (180)	3.8% (547)
Carrots, melons (lijoti), other deep yellow vegetables)	Child	— (51)	— (52)	1.1% (89)	1.0% (104)	3.0% (67)	1.6% (183)	1.3% (546)
	Family	3.8% (52)	4.0% (50)	2.1% (94)	3.8% (105)	3.0% (66)	2.2% (180)	2.9% (547)
Pumpkin, beet, and carrot tops	Child	— (51)	— (52)	— (90)	1.9% (104)	1.5% (67)	1.1% (183)	0.9% (547)
	Family	1.9% (52)	4.0% (50)	2.1% (94)	1.9% (105)	— (66)	1.7% (180)	1.8% (547)
Green beans, other vegetables)	Child	— (51)	1.9% (52)	1.1% (91)	1.9% (104)	— (67)	— (183)	0.7% (548)
	Family	— (52)	2.0% (50)	2.1% (94)	1.0% (104)	— (66)	1.1% (181)	1.1% (547)

NOTE: Actual number surveyed is given in parenthesis.

A5.1 Table 6

Consumption of Fruits by Children and Their Families
By Age of Child
Swaziland National Nutrition Status Survey, 1983
(Rural Sample Only)

		Age in Months						
		< 3	3 - 5	6 - 11	12 - 17	18 - 23	24-35	Total
Citrus: oranges, grapefruit, lemons	Child	— (51)	7.7% (52)	16.5% (91)	7.7% (104)	10.5% (67)	6.0% (183)	8.2% (548
	Family	5.8% (52)	16.0% (50)	5.3% (94)	4.8% (105)	7.7% (65)	5.5% (181)	6.6% (547
Bananas	Child	2.0% (51)	3.9% (52)	6.6% (91)	2.9% (104)	— (67)	— (183)	2.2% (548
	Family	1.9% (52)	7.7% (52)	3.2% (95)	— (105)	— (66)	0.6% (181)	1.6% (551
Wild fruit, emantulwa, emagungumence, tincozi	Child	— (51)	— (52)	1.1% (91)	1.0% (103)	— (66)	4.9% (184)	2.0% (547
	Family	3.9% (52)	4.0% (50)	1.1% (94)	1.0% (104)	— (66)	2.8% (180)	2.0% (546
Mangoes, peaches, guava, apricots	Child	— (51)	— (52)	— (91)	1.9% (104)	3.0% (67)	2.7% (183)	1.6% (548
	Family	1.9% (52)	4.0% (50)	6.4% (94)	3.8% (105)	3.0% (66)	4.4% (180)	4.2% (547
Avocados	Child	— (51)	1.9% (52)	2.2% (90)	— (103)	3.0% (66)	1.6% (183)	1.5% (545
	Family	1.9% (52)	5.8% (52)	4.2% (95)	— (106)	3.0% (66)	2.8% (181)	2.7% (552
Apples, pears, grapes, lychee, pineapples	Child	— (51)	— (52)	— (91)	1.9% (104)	— (67)	1.1% (183)	0.7% (548
	Family	— (52)	6.0% (50)	3.2% (94)	1.9% (105)	— (66)	0.6% (180)	1.7% (547

NOTE: Actual number surveyed is given in parenthesis.

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A5.1 Table 7

Consumption of Oils and Sugars by Children and Their Families
By Age of Child
Swaziland National Nutrition Status Survey, 1983
(Rural Sample Only)

		Age in Months						
		< 3	3 - 5	6 - 11	12 - 17	18 - 23	24-35	Total
Oils								
Cooking oil, margarine	Child	— (51)	3.9% (52)	25.8% (89)	37.5% (104)	41.8% (67)	41.8% (182)	30.8% (545)
	Family	44.2% (52)	51.9% (52)	41.7% (96)	50.9% (105)	47.0% (66)	44.0% (182)	46.0% (554)
Butter, lard holsum, drippings, animal fat	Child	— (51)	5.8% (52)	7.8% (90)	15.4% (104)	13.6% (66)	22.5% (178)	13.9% (541)
	Family	21.2% (52)	26.9% (52)	20.0% (95)	19.1% (105)	10.6% (66)	24.6% (183)	21.0% (553)
Sugars								
Sugar: white sugar, sugar cane, jams	Child	7.8% (51)	23.5% (51)	38.9% (90)	51.0% (104)	55.2% (67)	68.5% (181)	48.7% (544)
	Family	67.3% (52)	73.1% (52)	62.1% (95)	62.3% (106)	66.7% (66)	67.0% (182)	65.8% (553)

NOTE: Actual number surveyed is given in parenthesis.

A5.7 Table 8

Consumption of Beverages by Children and Their Families
By Age of Child
Swaziland National Nutrition Status Survey, 1983
(Rural Sample Only)

		Age in Months						
		< 3	3 - 5	6 - 11	12 - 17	18 - 23	24-35	Total
Tea, Coffee	Child	— (51)	3.9% (52)	18.0% (89)	43.3% (104)	40.3% (67)	53.9% (182)	34.5% (545)
	Family	55.8% (52)	48.1% (52)	53.1% (96)	58.5% (106)	50.0% (66)	51.6% (182)	53.1% (554)
Emahewu	Child	— (51)	1.9% (52)	7.9% (89)	20.2% (104)	18.2% (66)	26.6% (184)	16.5% (546)
	Family	29.4% (51)	32.7% (52)	25.3% (95)	27.4 (106)	15.2% (66)	29.5% (183)	26.9% (553)
Squash drinks	Child	— (51)	1.9% (52)	4.4% (90)	2.9% (104)	4.5% (67)	2.2% (181)	2.7% (545)
	Family	1.9% (52)	— (52)	6.3% (95)	4.7% (106)	3.1% (65)	3.3% (182)	3.6% (552)
Pure fruit juices	Child	2.0% (51)	3.9% (52)	3.3% (91)	5.8% (104)	1.5% (67)	0.6% (183)	2.6% (548)
	Family	— (52)	1.9% (52)	1.1% (95)	1.9% (106)	— (66)	0.6% (182)	0.9% (553)
Carbonated drinks, sugar water	Child	— (51)	3.9% (52)	2.2% (90)	1.9% (103)	3.0% (67)	1.7% (181)	2.0% (544)
	Family	1.9% (52)	11.5% (52)	2.1% (95)	3.8% (105)	6.1% (66)	5.0% (181)	4.7% (551)
Powdered fruit drinks	Child	— (51)	1.9% (52)	1.1% (91)	1.9% (104)	1.5% (67)	1.6% (183)	1.5% (548)
	Family	3.9% (52)	1.9% (52)	2.1% (95)	0.9% (106)	1.5% (66)	1.1% (182)	1.6% (553)
Cocoa, Milo,* hot chocolate	Child	— (51)	— (52)	1.1% (91)	1.0% (104)	1.5% (67)	0.6% (183)	0.7% (548)
	Family	— (52)	— (52)	— (95)	— (106)	1.5% (66)	— (182)	0.2% (553)
Homemade beer (tjwala)	Child	— (51)	— (52)	1.1% (90)	1.0% (104)	— (66)	0.6% (181)	0.6% (544)
	Family	15.4% (52)	11.5% (52)	13.8% (94)	9.4% (106)	9.1% (66)	11.5% (182)	11.6% (552)

NOTE: Actual number surveyed is given in parenthesis.

*Use of trade names is for identification purposes only and does not imply the endorsement of the Department of Health and Human Services or any of its agencies.

Appendix 5.2

Glossary of Swazi Food

Weaning Foods:

Soft porridge	Semisolid breakfast food (cereal) made out of finely milled maize (corn) and water (mainly eaten as a breakfast food and used as a weaning food).
Sour porridge	Same as soft porridge but made out of fermented maize meal.
Inembe	Cereal made from maize starch (mostly used as a baby or weaning food).

Milks and Milk Products:

Sour milk	Coagulated cultured milk with or without whey.

Carbohydrates:

ematabhane	Edible starchy tubers. Much smaller than the ordinary potato but of the same family.
emathapha	Edible starchy tuberous root of the yam family.
Green maize	Fresh corn (usually used for fresh corn on the cob).
Imbhasha	Toasted, semidry maize grains, usually toasted with ground nuts and eaten as a snack.
Irish potato	Ordinary or white potato.
Mealie meal	Corn meal.
Mealie rice	Coarsely ground maize.
Samp	Granulated maize.
Tinkhobe	Boiled dry maize grains.

Vegetables:

Chuchuza	Green leafy vetetable from the blackjack plant.
Imbuya	Green leafy vegetable of the amasanthus plant family.
Ligusha	Green leafy vegetable of the chorchodicus plant family.

Fruit:

Emagungumence	Mulberries.
Emantulwa	Wild fruit.
Tincozi	Wild fruit (belong to the berry family).

Drinks

Emahewu	Fermented maize meal drink.
Tjwala	Home brewed beer, commonly brewed from sorghum and less commonly from pineapple or pawpaw. In season, a brew from a murula fruit (emaganu) is popular.

APPENDIX 5.3

PRECISION ESTIMATES: FEEDING PRACTICES OF INFANTS AND CHILDREN

Swaziland National Nutrition Status Survey, 1983

Rural Sample

An explanation of statistical terms used in the tables in this Appendix can be found in Chapter 2, page 2.12.

A5.3 Table 1
Swaziland Rural Precision
Percentage Breastfeeding by Age of Child

Months of Age	Number	Prevalence (%)	Standard Error	90% Confidence	Design Effect
<3	257	97.865	0.875	1.440	0.942
3-5	234	91.204	1.743	2.867	0.886
6-8	246	87.441	2.178	3.582	1.062
9-11	230	81.290	2.877	4.732	1.252
12-17	522	58.491	2.241	3.687	1.080
18-23	424	22.984	2.436	4.007	1.421
24-35	930	2.000	0.444	0.731	0.936
36-47	881	0.428	0.211	0.347	0.919
48-59	700	0.142	0.141	0.233	0.986

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A5.3 Table 2
Swaziland Rural Precision
Percentage Breastfeeding by Age of Child and Other Characteristics

Characteristic	Months of Age	Number	Prevalence (%)	Standard Error	90% Confidence	Design Effect
Live Birth Order For Child:						
1	<6	109	93.575	2.344	3.856	0.996
1	6-11	115	80.633	3.981	6.549	1.167
1	12-17	99	56.197	5.461	8.984	1.199
1	18-23	69	12.605	4.665	7.674	1.363
2-4	<6	228	95.368	1.403	2.308	1.016
2-4	6-11	227	85.791	2.117	3.482	0.834
2-4	12-17	252	61.793	3.186	5.240	1.083
2-4	18-23	196	25.856	3.937	6.476	1.585
5+	<6	146	95.923	1.607	2.643	0.964
5+	6-11	122	92.102	2.488	4.093	1.038
5+	12-17	130	68.766	4.313	7.095	1.126
5+	18-23	122	28.617	3.939	6.479	0.926
Mother Less Than 25 Years Old	<6	250	94.825	1.475	2.426	1.108
	6-11	239	82.644	2.699	4.440	1.214
	12-17	223	57.827	3.537	5.818	1.144
	18-23	153	17.914	3.218	5.293	1.077
Mother 25-34 Years Old	<6	185	95.100	1.539	2.531	0.940
	6-11	160	88.156	2.519	4.143	0.972
	12-17	182	67.047	3.732	6.139	1.147
	18-23	152	31.635	4.626	7.610	1.504
Mother 35 Years or More Old	<6	53	96.963	2.117	3.483	0.807
	6-11	62	95.562	2.570	4.228	0.966
	12-17	83	66.299	5.704	9.383	1.209
	18-23	81	22.101	5.323	8.756	1.333

A5.3 Table 3
Swaziland Rural Precision
Percentage Breastfeeding by Age of Child and Other Characteristics

Characteristic	Months of Age	Number	Prevalence (%)	Standard Error	90% Confidence	Design Effect
Mother Does Not Work	<6	392	94.797	1.108	1.822	0.975
	6-11	376	85.567	1.856	3.053	1.049
	12-17	383	60.656	2.632	4.329	1.111
	18-23	312	23.939	2.975	4.893	1.516
Mother Works at Home	<6	60	97.327	1.854	3.051	0.793
	6-11	50	91.707	3.617	5.950	0.860
	12-17	63	66.445	5.167	8.499	0.754
	18-23	49	24.453	6.550	10.775	1.138
Mother Works Outside Home	<6	36	91.514	4.257	7.003	0.840
	6-11	45	70.345	6.866	11.295	1.017
	12-17	68	41.022	6.580	10.824	1.217
	18-23	58	13.130	4.516	7.429	1.037
Education of Mother None/Adult	<6	129	97.633	1.336	2.198	0.997
	6-11	121	87.318	3.904	6.422	1.665
	12-17	146	71.728	4.176	6.870	1.256
	18-23	104	35.856	5.466	8.991	1.351
Grade 1 - Standard 5	<6	226	96.461	1.297	2.133	1.113
	6-11	221	88.428	2.103	3.460	0.956
	12-17	222	60.482	3.564	5.863	1.180
	18-23	188	24.781	2.828	4.651	0.806
Formal 1 or Higher	<6	124	90.091	2.500	4.112	0.868
	6-11	111	80.660	3.655	6.013	0.951
	12-17	115	55.478	4.984	8.199	1.157
	18-23	86	9.530	3.570	5.873	1.271

A5.3 Table 4
Swaziland Rural Precision
Percentage Formula Feeding by Age of Child

Months of Age	Number	Prevalence (%)	Standard Error	90% Confidence	Design Effect
	508	67.464	2.627	4.321	1.597
<1	86	27.172	5.286	8.695	1.214
1	85	57.991	5.988	9.851	1.251
2	94	70.182	4.626	7.609	0.961
3	74	78.963	4.907	8.073	1.073
4	82	82.832	4.660	7.666	1.252
5	87	88.328	3.617	5.951	1.104

CHAPTER 6: DIARRHEA

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CHAPTER 6: DIARRHEA

INTRODUCTION

Diarrheal diseases are important causes of morbidity in Swaziland. Of 5,566 hospital patients admitted in 1982 for infectious diseases, 59.7% were diagnosed with gastroenteritis which also accounted for 10.6% of all "under age five" outpatient visits in the country (Government of Swaziland, 1983). Diarrheal illness is particularly devastating for children. Of the 225 hospital deaths of children 0-4 years of age reported in 1981, 38.2% were associated with gastroenteritis. Also in that year, diarrheal diseases in children >5 years of age ranked as the fourth most frequent (9%) diagnosis for outpatients of all ages (after respiratory diseases, 19%; infectious and parasitic diseases, 11%; and other digestive system diseases, 10%) (Kingdom of Swaziland, 1983).

Health education for preventing diarrheal diseases has been conducted in rural Swaziland since 1981 under a national rural waterborne disease-control project, and there is growing awareness of diarrheal disease as a serious health problem among rural populations.

Both prepackaged oral rehydration salts (ORS) and home-prepared salt and sugar solutions are effective and inexpensive means of treating or preventing dehydration due to diarrhea (Pierce, 1977). ORS are not produced in Swaziland, but are supplied by the United Nations International Children's Emergency Fund (UNICEF). In 1982, 300,000 packets of ORS were supplied to health services, or about 2.6 packets for every Swazi >5 years of age. Use of prepackaged ORS as the primary treatment for dehydration due to diarrheal disease has been accepted in the larger hospitals in Swaziland, and use of ORS is taught in all nursing and allied health schools.

Studies of diarrheal illness in the 1983 Swaziland national nutrition status survey focused on its prevalence in young children because of the high incidence of diarrhea in this age group and because of the serious implications of diarrhea as a cause of nutritional deficiencies, morbidity, and mortality. This chapter reports on the prevalence of diarrhea among survey children, with a review of associations between diarrhea and selected socioeconomic and demographic characteristics. In addition, there is a discussion of the treatment used by those with diarrheal illness.

METHODS

During the survey, mothers or other reliable homestead informants were asked if their preschool children had a recent history of diarrhea. Specifically, the informants were asked, "In the past 14 days has this child had diarrhea (umsheko)?" Although the survey methodology did not define diarrhea in terms of a minimum number of loose or watery stools per day or a minimum number of days of illness, interviewers did ascertain when possible, the average number of stools per day and the number of days the diarrhea lasted. Informants reporting children as having had diarrhea within the previous 2 weeks were asked, "About how many watery stools [did the child pass] per day?", "How many days did the diarrhea last?", and "How many days ago did the diarrhea stop?"

To distinguish children with more sustained diarrhea from the overall group with any diarrheal illness (umsheko), a definition for "sustained diarrhea" was constructed: three or more loose or watery stools per day for 2 or more consecutive days. Unless otherwise stated, the discussion of diarrheal illness in this report uses the more broad Swazi definition

(umsheko). However, analysis using the definition for sustained diarrhea is included as appropriate for comparison.

For each child who reportedly had diarrhea in the previous 14 days, the informant was asked, "What treatment did this child receive?" The objective was to document the extent to which oral rehydration treatment, such as ORS or home prepared salt and sugar solutions, was being used. To verify the treatment used, survey workers carried packets of ORS to use as visual aids.

Home-prepared solution was defined as a specially prepared solution of salt and/or sugar dissolved in water. Although the correct method of preparing the solution has been taught by local health personnel throughout the country, data on its use may be subject to some inaccuracy because survey workers did not verify how it was actually prepared or used.

RESULTS

Diarrheal-illness information was obtained on 4,698 rural and 772 peri-urban children. Mothers provided information for 72.6% of the rural and 72.9% of the peri-urban children. When the mother was not available, another reliable adult homestead member supplied the information. No diarrheal-illness information was available for 1.8% of the rural and 1.7% of the peri-urban survey children.

Prevalence of Diarrhea

Of the children on whom diarrheal-illness information was obtained, 16.4% of the rural and 14.5% of the peri-urban sample were reported to have had diarrhea (umsheko) sometime during the previous 2 weeks (Table 6.1). Diarrhea (umsheko) on the day of interview (i.e., the point prevalence) was reported in 5.2% of children in the rural areas and in 5.4% of children in the

peri-urban sample. Differences in prevalence between rural and peri-urban areas were not statistically significant.

Three or four watery stools per day was the most common frequency reported in both rural (36.0%) and peri-urban (39.3%) samples (Table 6.2). Most episodes of diarrhea lasted two to seven days (Table 6.3). The prevalence of sustained diarrhea among children whose frequency and duration of diarrhea was known was 5.4% in the rural and 5.2% in the peri-urban samples. A number of children were excluded from these prevalence estimates of sustained diarrhea either because they had an unknown number of stools (36.7% rural, 27.7% peri-urban), an unknown duration of illness (8.7% rural, 2.9% peri-urban) or because the duration of their illness was not ascertained because they had diarrhea on the day of interview (34.1% rural, 38.9% peri-urban).

District, Zone, and Land Tenure

Within the four rural districts, the highest prevalences of diarrhea were found in Lubombo (22.4%) and Shiselweni (18.1%); the lowest prevalences were found in Manzini (10.9%) and Hhohho (13.7%). The rural Lowveld had a substantially higher prevalence of diarrhea (22.6%) than the Highveld (14.0%), Middleveld (13.3%), or Lubombo districts (16.6%) (Table 6.4). The higher prevalences in Lubombo and Shiselweni may reflect the relatively larger proportion of Lowveld land within these rural districts.

By land tenure, the prevalence of diarrhea ranged from a high of 20.7% in the minimum rural development areas (RDA's) and 20.0% in the administrative land areas to a low of 12.7% for the maximum RDA's.

With the exception of administrative towns, the areas with the highest prevalence of diarrhea (umsheko) were the areas with the highest rates of sustained diarrhea. However, differences in the prevalence of sustained

diarrhea between districts, zones and tenure areas should be viewed with caution; because of the overall low rates, these differences were within about 4% for all areas.

Age of the Surveyed Children

The highest prevalences of diarrhea occurred among children between 3 and 35 months of age in both the rural (Table 6.5) and peri-urban (Table 6.6) areas. The prevalence of diarrhea peaked in the 6- to 11-month age group in both rural and peri-urban areas. Among rural children with diarrhea, those aged 18-23 months had the highest (6.6) mean number of days with diarrhea (Table 6.5). Among peri-urban children, age-specific differences were less reliable because of the small number of children in each age group (Table 6.6). There were no consistent differences in the daily number of loose or watery stools by age of the child (Tables 6.5 and 6.6).

Data on the average number of stools per day must be interpreted with caution since informants were unable to estimate the average number of stools for 36.7% of afflicted rural children (Table 6.7). Older children, who are more likely to have been toilet trained, were more likely to have an undetermined number of stools.

Linear Growth Status and Diarrhea

Both diarrheal illness data and height measurements were available for 4,111 children. Quantitative illness histories were provided for 3,812 of those. Overall, slightly more than 30% of the children were more than 2 standard deviations below the reference median in height-for-age and were classified as stunted for their ages. Among infants under 1 year of age, the prevalences of both umsheko and sustained diarrhea tended to be lower for children who were stunted (Table 6.8) although the number of children on which

these percentages was based was small. In all age groups over 11 months of age, diarrhea (both umsheko and sustained) was more prevalent among children who were stunted for their ages. The prevalence of both kinds of diarrhea among stunted children generally increased with age through 36-47 months.

Homestead and Household Size

In the rural sample, there was a trend toward an increased prevalence of diarrhea among children of all age groups living in smaller homesteads (Tables 6.9 and 6.10). In contrast, in peri-urban areas the larger homesteads reported a slightly higher prevalence of illness.

In both rural and peri-urban samples, the smaller households within homesteads had a higher prevalence of reported diarrhea among their children (Table 6.11). This increased rate of diarrhea in smaller households occurred generally among children of all age groups in the rural sample (Table 6.12). The peri-urban sample was too small to permit disaggregation by both household size and age group.

Education of Parents

Information about the parents' education was not always available. For rural and peri-urban children, the educational level was unknown for about 14% of mothers and over 40% of fathers. Because so few data were available, there was no analysis of possible associations between diarrhea and fathers' education.

Of those with known maternal educational levels, rural sample children of mothers with less education tended to have slightly higher reported rates of diarrhea (Table 6.13). The highest prevalence of illness occurred among children whose mothers had either no formal or only adult education (19.1%).

The lowest prevalence of illness in the rural sample occurred among children of mothers who had either form 1-6 or university level educations (13.6%).

In the peri-urban sample no consistent association was found between reported diarrhea and mother's education.

Infant Feeding and Diarrhea

To analyze associations between infant-feeding practices and diarrhea, we focused on infants less than 1 year old. There were 947 rural children under 1 year of age for whom both diet and diarrhea status histories were available. Data from peri-urban children were not analyzed because of small numbers. The three diet categories considered were "exclusive breastfeeding," "partial breastfeeding with formula and/or solids," and "weaned from breast milk."

The youngest children, those aged birth-2 months, who were exclusively breastfed had the lowest overall prevalence of any diarrhea (4.0%) (Table 6.14). Children in this age group who were breastfed but also receiving formula and/or solids had a substantially higher prevalence of diarrheal illness (13.6%). The number of infants completely weaned from the breast in this youngest age group was too small (N=6) for reliable comparison. At age 3-5 months, comparison between feeding regimens also was difficult because there were so few exclusively breastfed infants (N=24) (Table 6.14). At age 6-11 months, the rates of diarrhea were about the same for both those partially breastfed (31.9%) or weaned from breast milk (30.8%). Overall, diarrhea tended to occur more frequently as the children got older, regardless of their feeding practice.

Source of Drinking Water

Over 40% of rural children usually obtained their drinking water from a river or stream. In the peri-urban areas, over 62% of children usually obtained their drinking water from a public tap. Associations of diarrhea prevalence with usual drinking-water source were variable and unclear (Table 6.15).

Presence of a Working Refrigerator

In rural areas, less than 6% of children had access to a working refrigerator; in peri-urban areas, about 18% of children were from homesteads having one. A working refrigerator in the homestead was not consistently associated with rates of diarrhea for the rural or peri-urban areas (Table 6.16). Rural children whose homesteads had a refrigerator had a slightly lower rate of diarrhea (12.1%) than those without (16.5%). In contrast, peri-urban children with access to a refrigerator had a slightly higher prevalence of diarrhea (18.7%) than those without (13.4%).

Use of Sanitary Facilities

Homestead informants were asked, "Where do children from this homestead usually go to defecate?" Except for those classified as "other" or "unknown," or where the numbers were too small to be reliable, the prevalence of recent diarrhea varied little by the kind of sanitary facilities usually used by children in either rural or peri-urban areas (Table 6.17).

Among the children whose use of sanitary facilities were known, the prevalence of diarrhea in rural areas ranged from 15.9% for those using a wooden latrine to 17.0% for those using a concrete latrine. In peri-urban areas, children using the open bush for defecation had the highest prevalence

of diarrhea (16.6%), while those using a wooden latrine had the lowest prevalences (12.1%).

Treatment of Diarrhea

ORS had been received by 27.4% of the rural and 12.5% of the peri-urban children with reported diarrhea (Table 6.18). An additional 13% of children were reported to have been treated with a homemade salt and sugar solution in both rural and peri-urban samples. Clinic or chemist's medications were used to treat diarrhea considerably more often in the peri-urban sample (41.9%) than in the rural sample (27.1%), possibly because chemists and clinics are more accessible to those living in or around towns. An approximately equal proportion of the reported diarrhea cases were given no treatment at all in the rural (17.0%) and peri-urban (17.9%) sample. Traditional Swazi home remedies or imbhita, a medicine given by native herbalists, were reportedly little used in either rural (5.4%) or peri-urban (3.6%) samples.

Among districts in the rural sample, ORS were used most frequently among children with diarrhea in Lubombo (34.6%), where diarrhea prevalences were highest, and least in Hhohho (18.3%) (Table 6.19). In contrast, use of homemade salt and sugar solution was reported most often in Hhohho (18.9%) and least in Lubombo (8.3%).

Among the agroecological zones, ORS were used most often in the Lowveld (35.9%), which had the highest prevalence of diarrhea, and least in the Highveld (18.3%). Some form of home prepared salt and sugar solutions were reportedly used most often in the Highveld (16.3%) and Middleveld (15.9%) and least in the Lowveld (10.3%) and Lubombo (4.8%).

In terms of land tenure, ORS were used most often in the minimum RDA (35.6%) and non-RDA (34.4%) and least often in the individual tenure farms

(ITF's) (13.6%); some kind of homemade salt and sugar solutions were reported used most often in the maximum RDA (21.3%) and least often in the company towns (7.5%).

DISCUSSION

The reliability of the prevalence rates for diarrhea depend on the accuracy of reporting by the mother or caretaker over the 2-week period prior to the interview. Although mothers are likely to be aware of serious illness in their children, they may be less likely to know about or recall minor illnesses, particularly in older children. The mother or caretaker's perception of umsheko determined whether or not the illness was reported. Because reports of diarrhea were not independently validated, the prevalence rates should be interpreted in view of the above limitations.

One problem in attempting to establish rates for severe cases of diarrhea is informant memory. Informants for 36.7% of afflicted rural children did not know or could not remember the average frequency of watery stools per day and in 8.7% of the cases they could not remember the number of days the diarrhea lasted. The problem of informant memory has implications for other diarrheal studies that impose specific criteria for methodological definitions of diarrheal illness. Significant numbers of cases otherwise meeting the "sustained diarrhea" criteria may have been excluded because informants did not know or could not remember the quantitative details of children's illnesses.

In Swaziland, morbidity and mortality from diarrheal diseases may be expected to be higher during the summer months from December to February. Since the survey data collection took place in the spring and summer months,

between September and January, one would expect to find relatively low prevalences of diarrhea. Thus, a conservative estimate would be that on any given day at least 5% of Swazi children less than 5 years of age are affected by diarrhea.

The observed age patterns of children afflicted with diarrhea in Swaziland are similar to those found in other developing countries (Brink, 1983; Graitcer, 1980). The reduced prevalence in the youngest age group might be explained at least in part by the maternal antibody protection and reduced exposure to infection that accompany breastfeeding (World Health Organization, 1980). Conversely, older children might have built up resistance to pathogens causing diarrheal illness from previous exposures. Diarrhea among older children may be underreported since adults (who report diarrhea) are less likely to observe and note diarrhea among children who are toilet trained.

The lack of clear and consistent associations between diarrhea and sanitary facilities, source of drinking water, and the availability of a working refrigerator may indicate that children in Swaziland have frequent exposures to diarrheal pathogens in their environment, rather than a single most important source. Shortage of water may also be an important factor associated with diarrhea. Although the survey workers did not obtain quantitative information on water availability.

Diarrhea occurred more frequently among stunted Swazi children who were over 12 months of age. This phenomenon has also been noted in Brazil (Guerrant, 1983) where a prospective study found that the number of diarrhea episodes in children was associated with significantly lower gains in height. However, other cross-sectional studies (Stetler, 1981; Graitcer, 1981) did not find consistent associations between diarrhea and short stature, possibly

because the effects of frequent diarrhea attacks on stature would manifest over a period of time. Whether the increase in diarrhea occurs because the children are chronically undernourished and hence more prone to infection, whether more frequent illness has caused chronic undernutrition or whether chronic undernutrition and frequent diarrhea are separate outcomes of poverty cannot be determined by a cross-sectional survey.

Diarrhea was reported least frequently (4.0%) among exclusively breastfed infants who were less than 3 months of age. Infants in this age group who received formula and/or solids had more than three times the risk (13.6%) of diarrhea. Breastfeeding has been demonstrated to protect against diarrhea in numerous studies in the developing world (Jason, 1984). Introduction of other foods could cause an increase in diarrhea rates through loss of protective factors contained in breastmilk or through an increase in the likelihood of exposure to contaminated foods.

The reported use of ORS (27.4%) among rural children with diarrhea (16.4%) is consistent with the number of prepared packets (300,000) reported to have been distributed in the country in 1982 (Kingdom of Swaziland, 1983). About 5,400 Swazi children (.164 x .274 x 120,000 children) would be estimated to have received one or more packets of ORS in any two-week period. At this rate of consumption, about 140,000 (5,392 children x 26 weeks) children would have received one or more packets of ORS during the year. This relatively common use of ORS in Swaziland is in positive contrast, for example, to the level of use (1.9%) reported in the Sine-Saloum (Senegal) Family Health Survey conducted in 1982 (USAID/Dakar, 1984).

Generally, the rural districts and zones with the highest prevalence of diarrheal illness were also those with the most frequent reported use of ORS.

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Table 6.1

Characteristics of Diarrhea* Among Children
0-59 Months of Age
Swaziland National Nutrition Status Survey, 1983

	Total Number of Children	Percent With Any Diarrhea ("Umsheko")	Percent With Sustained Diarrhea**	Point Prevalence of Diarrhea***	Mean Number of Days with Diarrhea (N)****		Mean Number of Stools Per Day (N)*****	
Rural	(4698)	16.4	5.4	5.2	5.6	(476)	3.9	(478)
Peri-Urban	(772)	14.5	5.2	5.4	5.4	(68)	3.7	(81)

NOTE: Percentages are weighted on the basis of population proportions; actual number surveyed is given in parenthesis.

* A reported history of diarrhea in the previous 14 days.
** Three or more loose or watery stools per 2 or more consecutive days. Includes only those children for whom diarrhea frequency and duration were known.
*** Includes only those children who had diarrhea on the day of interview.
**** Includes only those children whose diarrhea had stopped by the day of interview and for whom the number of days with diarrhea was known.
***** Includes only those children whose average number of loose or watery stools is known.

Table 6.2

Percentage of Children with Diarrhea* (Umsheko)
By Frequency of Watery Stools
For Children 0-59 Months of Age
Swaziland National Nutrition Status Survey, 1983

"About How Many Watery Stools Per Day?"	Rural Percent	Peri-Urban Percent
1	1.4	1.8
2	8.8	11.6
3	18.2	23.2
4	17.8	16.1
5	6.8	12.5
6	5.8	3.6
7	2.3	2.7
8+	2.2	0.9
Unknown	36.7	27.7
Total (Number)	100.0 (755)	100.0 (112)

NOTE: Percentages are weighted on the basis of population proportions; actual number surveyed is given in parenthesis.

* A reported history of diarrhea in the previous 14 days.

Table 6.3

Percentage of Children with Diarrhea* (Umsheko)
for Children 0-59 Months of Age
By Number of Days with Symptoms of Diarrhea
Swaziland National Nutrition Status Survey, 1983

Number of Days with Diarrhea	Rural Percent		Peri-Urban Percent	
<2	6.0		4.3	
2-3	28.4		22.9	
4-7	45.2		58.6	
8-14	9.7		11.4	
15+	2.0		-	
Unknown	8.7		2.9	
Total (Number)	100.0	(518)	100.0	(70)

NOTE: Percentages are weighted on the basis of population proportions; actual number surveyed is given in parenthesis.
Table excludes 237 rural and 42 peri-urban cases where the diarrhea had not yet stopped on the day of interview.

* A reported history of diarrhea in the previous 14 days.

Table 6.4

Percentage of Children with Diarrhea*
By Residence, District, Agroecological Zone and Land Tenure
For Children 0-59 Months of Age
Swaziland National Nutrition Status Survey, 1983

	Percent with Any Diarrhea (Umsheko)	Total Number of Children	Percent with Sustained Diarrhea**	Total Number of Children
Residence				
Rural	16.4	4698	5.4	(4461)
Peri-Urban	14.5	772	5.2	(730)
District (Rural)				
Hhohho	13.7	1204	4.4	(1159)
Lubombo	22.4	1123	6.9	(1035)
Manzini	10.9	1156	4.1	(1114)
Shiselweni	18.1	1215	6.3	(1153)
Ecological Zone (Rural)				
Highveld	14.0	1259	5.3	(1212)
Middleveld	13.3	1811	4.5	(1737)
Lowveld	22.6	1402	6.7	(1300)
Lubombo	16.6	226	6.2	(212)
Land Tenure (Rural)				
Non-RDA***	15.9	1434	4.3	(1369)
Minimum RDA	20.7	754	6.7	(694)
Maximum RDA	12.7	1453	4.9	1401)
Company	19.7	428	7.8	(407)
Administrative	20.0	103	6.3	(98)
ITF****	17.6	526	5.4	(492)

NOTE: Percentages are weighted on the basis of population proportions; actual number surveyed is given in parenthesis.

* A reported history of diarrhea in the previous 14 days.
** Three or more loose or watery stools per day for 2 or more consecutive days. Excludes children with unknown numbers of stools or unknown duration of symptoms, and those who had diarrhea on the day of interview.
*** RDA=Rural Development Area
**** ITF=Individual Tenant Farm

Table 6.5

Characteristics of Diarrhea*
By Age of Child
Swaziland National Nutrition Status Survey, 1983
(Rural Sample Only)

Age in Months	Total Number of Children	Percent With Any Diarrhea ("Umsheko")	Percent With Sustained Diarrhea**	Point Prevalence of Diarrhea***	Mean Number of Days with Diarrhea (N)****	Mean Number of Stools Per Day (N)*****
<3	266	9.1	4.0	2.6	4.4 (17)	3.8 (16)
3-5	243	22.3	12.3	4.4	5.8 (37)	4.4 (33)
6-11	497	32.1	10.4	11.6	5.6 (97)	3.8 (105)
12-17	556	27.5	9.3	9.6	5.6 (96)	4.1 (104)
18-23	458	24.0	7.4	8.2	6.6 (66)	4.1 (68)
24-35	990	14.9	4.7	4.8	5.1 (82)	4.1 (79)
36-47	936	8.4	2.6	2.2	5.8 (52)	3.6 (48)
48-59	752	5.4	1.5	1.2	5.2 (29)	3.2 (25)
Total	4698	16.4	5.4	5.2	5.6 (476)	3.9 (478)

NOTE: Percentages are weighted on the basis of population proportions; actual number surveyed is given in parenthesis.

* A reported history of diarrhea in the previous 14 days.

** Three or more loose or watery stools per 2 or more consecutive days. Includes only those children for whom diarrhea frequency and duration were known.

*** Includes only those children who had diarrhea on the day of interview.

**** Includes only those children whose diarrhea had stopped by the day of interview and for whom the number of days with diarrhea was known.

***** Includes only those children whose average number of loose or watery stools is known.

Table 6.6

Characteristics of Diarrhea*
By Age of Child
Swaziland National Nutrition Status Survey, 1983
(Peri-Urban Sample Only)

Age in Months	Total Number of Children	Percent With Any Diarrhea ("Umsheko")	Percent With Sustained Diarrhea**	Point Prevalence of Diarrhea***	Mean Number of Days with Diarrhea (N)****		Mean Number of Stools Per Day (N)*****	
<3	(68)	8.8	3.1	4.4	5.5	(2)	3.4	(5)
3-5	(33)	21.2	3.4	12.1	6.0	(3)	3.8	(6)
6-11	(92)	29.3	14.5	9.8	5.1	(17)	3.9	(20)
12-17	(78)	20.5	5.8	11.5	6.9	(7)	4.1	(11)
18-23	(82)	15.9	3.9	6.1	6.4	(8)	4.0	(8)
24-35	(137)	18.2	8.4	4.4	4.9	(19)	3.4	(19)
36-47	(160)	8.1	2.6	3.1	5.3	(8)	3.2	(10)
48-59	(122)	4.1	0.8	0.8	4.3	(4)	4.5	(2)
Total	(772)	14.5	5.2	5.4	5.4	(68)	3.7	(81)

NOTE: Percentages are weighted on the basis of population proportions; actual number surveyed is given in parenthesis.

* A reported history of diarrhea in the previous 14 days.

** Three or more loose or watery stools per 2 or more consecutive days. Includes only those children for whom diarrhea frequency and duration were known.

*** Includes only those children who had diarrhea on the day of interview.

**** Includes only those children whose diarrhea had stopped by the day of interview and for whom the number of days with diarrhea was known.

***** Includes only those children whose average number of loose or watery stools is known.

Table 6.7

Percentage of Children with Diarrhea* (Umsheko)
Having Unknown Number of Loose or Watery Stools Per Day
By Age of Child
Swaziland National Nutrition Status Survey, 1983
(Rural Sample Only)

Age in Months	Percent	Number Reported With Diarrhea
<18	33.4	(389)
18-59	39.9	(366)
Total	36.6	(755)

NOTE: Percentages are weighted on the basis of population proportions; actual number surveyed is given in parenthesis.

* A reported history of diarrhea in the previous 14 days.*

Table 6.8

Percentage of Children with Diarrhea*
by Height-For-Age Status
For Children 3-59 Months of Age
Swaziland National Nutrition Status Survey, 1983
(Rural Sample Only)

Age and Growth Status	Any Diarrhea (Umsheko) (Total Number)	Percent	Prevalence Ratio****	Sustained Diarrhea** (Total Number)	Percent	Prevalence Ratio****
3-5 Stunted***	(29)+	16.4	.65	(29)+	7.2	.48
Normal	(188)	25.3		(177)	15.0	
6-11 Stunted	(78)	32.5	.96	(69)	8.2	.69
Normal	(380)	34.0		(336)	11.9	
12-17 Stunted	(158)	34.9	1.30	(139)	9.8	.96
Normal	(351)	26.9		(320)	10.3	
18-23 Stunted	(175)	30.5	1.42	(158)	10.0	1.66
Normal	(241)	21.5		(223)	6.0	
24-35 Stunted	(279)	19.4	1.42	(262)	6.1	1.30
Normal	(649)	13.7		(621)	4.7	
36-47 Stunted	(308)	12.3	1.91	(299)	5.5	5.44
Normal	(580)	6.4		(569)	1.0	
48-59 Stunted	(244)	7.7	1.67	(240)	2.8	2.89
Normal	(473)	4.6		(467)	1.0	
Total	(4133)	17.4		(3909)	5.8	

NOTE: Percentages are weighted on the basis of population proportions; actual number surveyed is given in parenthesis.

* A reported history of diarrhea in the previous 14 days.

** Three or more loose or watery stools per 2 or more consecutive days. Includes only those children for whom diarrhea frequency and duration were known.

*** Stunted is defined as <2 standard deviations below reference mean in height-for-age. Includes only those children who had diarrhea on the day of interview.

**** Prevalence of diarrhea in stunted children compared to prevalence of diarrhea in "normal" children in same age group.

+A number <50 is considered statistically unreliable. Percentages are not provided for any number ≤20.

Table 6.9

Percentage of Children with Diarrhea* (Umsheko)
By Homestead Size
For Children 0-59 Months of Age
Swaziland National Nutrition Status Survey, 1983

Number of Persons in Homestead	Rural		Peri-Urban	
	Percent with Diarrhea	Total Number of Children	Percent with Diarrhea	Total Number of Children
<5	24.0	(281)	12.6	(103)
5-9	16.6	(1830)	13.2	(318)
10-14	15.6	(1329)	15.8	(190)
15+	14.7	(1258)	16.8	(161)
Total	16.4	(4698)	14.5	(772)

NOTE: Percentages are weighted on the basis of population proportions; actual number surveyed is given in parenthesis.

* A reported history of diarrhea in the previous 14 days.

Table 6.10

Percentage of Children with Diarrhea* (Umsheko)
By Size of Homestead and Age of Child
Swaziland National Nutrition Status Survey, 1983
(Rural Sample Only)

Number of Persons in Homestead	Age of Children in Months				Total Number
	0-11 (N)	12-17 (N)	18-23 (N)	24-59 (N)	
<5	31.7 (61)	31.3 (43)	33.6 (34)	15.7 (143)	(281)
5-9	21.4 (378)	29.1 (213)	24.9 (168)	11.2 (1071)	(1830)
10-14	24.8 (304)	27.2 (141)	21.7 (130)	8.6 (754)	(1329)
15+	23.4 (263)	24.0 (159)	22.1 (126)	8.2 (710)	(1258)
Total	23.7 (1006)	27.5 (556)	24.0 (458)	10.0 (2678)	16.4(4698)

NOTE: Percentages are weighted on the basis of population proportions; actual number surveyed is given in parenthesis.

* A reported history of diarrhea in the previous 14 days.

Table 6.11

Percentage of Children with Diarrhea* (Umsheko)
By Household Size
For Children 0-59 Months of Age
Swaziland National Nutrition Status Survey, 1983

Number of Persons in Household	Rural		Peri-Urban	
	Percent with Diarrhea	Total Number of Children	Percent with Diarrhea	Total Number of Children
<5	21.8	(513)	19.7	(198)
5-9	16.5	(2291)	12.8	(375)
10-14	14.9	(1272)	14.4	(146)
15+	14.0	(622)	7.5	(53)
Total	16.4	(4698)	14.5	(772)

NOTE: Percentages are weighted on the basis of population proportions; actual number surveyed is given in parenthesis.

* A reported history of diarrhea in the previous 14 days.

Table 6.12

Percentage of Children with Diarrhea* (Umsheko)
By Size of Household and Age of Child
Swaziland National Nutrition Status Survey, 1983
(Rural Sample Only)

Number of Persons in Household	Age of Children in Months				Total Number
	0-11 (N)	12-17 (N)	18-23 (N)	24-59 (N)	
<5	30.7 (101)	34.9 (82)	25.2 (60)	13.2 (270)	(513)
5-9	21.4 (479)	28.7 (260)	26.9 (211)	10.8 (1341)	(2291)
10-14	25.1 (291)	20.8 (138)	19.9 (119)	8.8 (724)	(1272)
15+	23.0 (135)	26.9 (76)	20.4 (68)	6.4 (343)	(622)
Total	23.7 (1006)	27.5 (556)	24.0 (458)	10.0 (2678)	16.4 (4698)

NOTE: Percentages are weighted on the basis of population proportions; actual number surveyed is given in parenthesis.

* A reported history of diarrhea in the previous 14 days.

Table 6.13

Percentage of Children with Diarrhea* (Umsheko)
By Education of Mother
Swaziland National Nutrition Status Survey, 1983

	Rural		Peri-Urban	
Education of Mother	Percent with Diarrhea	Total Number of Children	Percent with Diarrhea	Total Number of Children
None or Adult Only	19.1	(1147)	14.8	(54)
Grade 1/Standard 5	16.8	(1948)	17.3	(214)
Form 1/University	13.6	(954)	14.8	(405)
Unknown**	14.3	(649)	7.1	(99)
Total	16.4	(4698)	14.5	(772)

NOTE: Percentages are weighted on the basis of population proportions; actual number surveyed is given in parenthesis.

* A reported history of diarrhea in the previous 14 days.

** The "unknown" category includes children of mothers who were not members of the survey homestead and therefore not available for inquiry.

Table 6.14

Percentage of Rural Infants with Diarrhea* (Umsheko)
By Feeding Status and Age of Child
Swaziland National Nutritional Status Survey, 1983

Age in Months	Percentage with Diarrhea (Total Number of Children)**			
	Breastfeeding Exclusively	Partial Breastfeeding With Formula and/or Solids	Weaned From Breast Milk	Total
0-2	4.0 (116)	13.6 (135)	- (6)+	9.1 (266)
3-5	22.1 (24)+	24.0 (189)	16.8 (21)+	22.3 (243)
6-11	- (9)+	31.9 (395)	30.8 (72)	32.1 (497)

NOTE: Percentages are weighted on the basis of population proportions; actual number surveyed is given in parenthesis.

* A reported history of diarrhea in the previous 14 days.

** Includes only those children with known feeding and diarrheal illness status histories.

+ A number <50 is considered statistically unreliable. Percentages are not provided for any number ≤20.

Table 6.15

Percentage of Children with Diarrhea* (Umsheko)
By Source of Drinking Water
For Children 0-59 Months of Age
Swaziland National Nutrition Status Survey, 1983

	Rural		Peri-Urban	
	Percent with Diarrhea	Total Number of Children	Percent with Diarrhea	Total Number of Children
River/stream	15.4	(1900)	10.6	(94)
Unprotected spring	14.7	(955)	18.4	(49)+
Protected spring	17.1	(277)	26.3	(38)+
Dam/pond	23.6	(213)	-	(1)+
Well/borehole	20.8	(162)	-	(11)+
Public tap	18.7	(821)	13.7	(482)
Private tap	15.2	(305)	16.1	(93)
Other/unknown	11.2	(65)	-	(4)+
Total	16.4	(4698)	14.5	(772)

NOTE: Percentages are weighted on the basis of population proportions; actual number surveyed is given in parenthesis.

* A reported history of diarrhea in the previous 14 days.

+ A number <50 is considered statistically unreliable. Percentages are not provided for any number ≤20.

Table 6.16

Percentage of Children with Diarrhea* (Umsheko)
By Homestead Possession of a Working Refrigerator
For Children 0-59 Months of Age
Swaziland National Nutrition Status Survey, 1983

Working Refrigerator	Rural		Peri-Urban	
	Percent with Diarrhea	Total Number of Children	Percent with Diarrhea	Total Number of Children
Yes	12.1	(271)	18.7	(139)
No	16.5	(4405)	13.4	(628)
Unknown	33.4	(22)+	-	(5)+
Total	16.4	(4698)	14.5	(772)

NOTE: Percentages are weighted on the basis of population proportions; actual number surveyed is given in parenthesis.

* A reported history of diarrhea in the previous 14 days.

+ A number <50 is considered statistically unreliable. Percentages are not provided for any number ≤20.

Table 6.17

Percentage of Children With Diarrhea* (Umsheko)
By Homestead Sanitary Facilities
Swaziland National Nutrition Status Survey, 1983

Homestead Sanitary Facilities	Rural		Peri-Urban	
	Percent with Diarrhea	Total Number of Children	Percent with Diarrhea	Total Number of Children
Open/bush	16.4	(3421)	16.6	(205)
Latrine (wooden)	15.9	(585)	12.1	(314)
Latrine (concrete)	17.0	(262)	13.0	(169)
Flush toilet	16.5	(369)	16.1	(31)+
Other/unknown	17.7	(61)	24.5	(53)
Total	16.4	(4698)	14.5	(772)

NOTE: Percentages are weighted on the basis of population proportions; actua ıumber surveyed is given in parenthesis.

* A reported history of diarrhea in the previous 14 days.

+ A number <50 is considered statistically unreliable.

Table 6.18

Treatment Given to Children with Reported Diarrhea* (Umsheko)
For Children 0-59 Months of Age
Swaziland National Nutrition Status Survey, 1983

	Rural Percent (N=755)	Peri-Urban Percent (N=112)
No treatment	17.0	17.9
Oral rehydration salts (ORS) (Pre-packaged)	27.4	12.5
Salt/sugar solutions (Home-prepared)	13.2	13.4
Intravenous therapy	1.6	-
Imbhita (herbal medicine)	5.4	3.6
Home remedies (traditional)	1.1	-
Chemists' medicines	13.4	8.0
Non-specific (clinic) medicines	13.7	33.9
Combination treatment	0.6	1.8
Other/unknown	6.4	8.9
Total	100.0	100.0

NOTE: Percentages are weighted on the basis of population proportions; actual number surveyed is given in parenthesis.

* A reported history of diarrhea in the previous 14 days.

Table 6.19

Percentage Using Oral Rehydration Salts (ORS) or
Salt and Sugar Solutions as Treatment for Children with Reported Diarrhea*
By Rural District, Ecological Zone, and Land Tenure
Swaziland National Nutrition Status Survey, 1983

	Percent Using ORS	Percent Using Salt and/or Sugar Solutions	Number with Diarrhea
Residence			
Rural	27.4	13.2	(755)
Peri-urban	12.5	13.4	(112)
District (Rural)			
Hhohho	18.3	18.9	(157)
Lubombo	34.6	8.3	(246)
Manzini	23.0	14.3	(134)
Shiselweni	27.7	14.5	(218)
Ecological Zone (Rural)			
Highveld	18.3	16.3	(177)
Middleveld	24.8	15.9	(243)
Lowveld	35.9	10.3	(297)
Lubombo	21.8	4.8	(38)+
Land Tenure (Rural)			
Non-RDA**	34.4	9.6	(223)
Minimum RDA	35.6	13.1	(155)
Maximum RDA	18.3	21.3	(187)
Company	29.2	7.5	(83)
Administrative	-	-	(19)+
ITF***	13.6	13.4	(88)

NOTE: Percentages are weighted on the basis of population proportions; actual number surveyed is given in parenthesis.
Sugar and salt solutions were homemade: data on their use should be regarded with caution because survey workers did not verify how such solutions were prepared or used.

+ A number <50 is considered statistically unreliable.
Percentages are not provided for any number ≤20.

* A reported history of diarrhea in the previous 14 days.

** RDA=Rural Development Area

*** ITF=Individual Tenure Farm

APPENDIX 6.1

PRECISION ESTIMATES: DIARRHEA

Swaziland National Nutrition Status Survey, 1983

Rural Sample

An explanation of statistical terms used in the tables in this Appendix can be found in Chapter 2, page 2.12.

A6.1 Table 1

Swaziland Rural Precision
Percentage of Children with Diarrhe
By Subdivision of Country

Subdivision of Country	Number	Prevalence (%)	Standard Error	90% Confidence	Design Effect
Any Diarrhea					
Total	4698	16.366	0.837	1.377	2.405
Hhohho District	1204	13.738	1.422	2.339	2.055
Lubombo District	1123	22.379	1.696	2.790	1.859
Manzini District	1156	10.928	1.181	1.943	1.658
Shiselweni Dustrict	1215	18.065	1.413	2.324	1.639
Sustained Diarrhea					
Total	4461	5.433	0.435	0.716	1.646
Hhohho District	1159	4.371	0.828	1.362	1.902
Lubombo District	1035	6.909	1.136	1.869	2.077
Manzini DIstrict	1114	4.060	0.586	0.963	0.981
Shiselweni District	1153	6.348	0.741	1.218	1.064
Any Diarrhea, by Zone					
Highveld	1259	14.008	1.284	2.112	1.723
Middleveld	1811	13.346	1.025	1.687	1.646
Lowveld	1402	22.610	1.738	2.859	2.421
Lubombo	226	16.566	2.562	4.215	1.073
Sustained Diarrhea, by Zone					
Highveld	1212	5.284	0.836	1.376	1.694
Middleveld	1737	4.531	0.604	0.994	1.466
Lowveld	1300	6.666	0.950	1.563	1.886
Lubombo	212	6.210	0.852	1.402	0.264
Any Diarrhea, by Tenure					
Non-RDA	1434	15.942	1.717	2.824	3.154
Minimum RDA	754	20.709	2.068	3.402	1.964
Maximun RDA	1453	12.662	1.014	1.668	1.350
Company	428	19.737	3.088	5.081	2.577
Administrative	103	20.026	3.411	5.612	0.748
Individual Tenure Farm	526	17.645	2.027	3.334	1.487
Sustained Diarrhea					
Non-RDA	1369	4.285	0.595	0.979	1.183
Minimum RDA	694	6.707	1.237	2.035	1.698
Maximum RDA	1401	4.944	0.646	1.063	1.245
Company	407	7.801	2.106	3.464	2.509
Administrative	98	6.343	0.482	0.793	0.038
Individual Tenure Farm	492	5.424	1.117	1.837	1.196

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A6.1 Table 2

Swaziland Rural Precision
Percentage of Children with Any Diarrhea and Unknown Number of Stools
By Age of Child

Months of Age	Number	Prevalence (%)	Standard Error	90% Confidence	Design Effect
TOTAL	755	36.575	2.544	4.184	2.106
<18	389	33.413	3.227	5.308	1.820
18-59	366	39.866	3.229	5.312	1.592

A6.1 Table 3

Swaziland Rural Precision
Percentage of Children with Any Diarrhea
By Age of CHild and Stunting Status

Stunting	Months of Age	Number	Prevalence (%)	Standard Error	90% Confidence	Design Effect
Stunted	Total	1271	19.683	1.360	2.237	1.487
Not Stunted	Total	2862	16.477	0.970	1.596	1.958
Stunted	3-5	29	16.378	6.972	11.469	1.029
Not Stunted	3-5	188	25.299	3.754	6.175	1.402
Stunted	6-11	78	32.519	5.594	9.203	1.112
Not Stunted	6-11	380	33.970	3.129	5.147	1.658
Stunted	12-17	158	34.929	4.650	7.649	1.503
Not Stunted	12-17	351	26.916	2.463	4.052	1.082
Stunted	18-23	175	30.452	3.628	5.968	1.088
Not Stunted	18-23	241	21.505	2.906	4.780	1.206
Stunted	24-35	279	19.428	2.564	4.218	1.172
Not Stunted	24-35	649	13.659	1.713	2.818	1.615
Stunted	36-47	308	12.260	1.969	3.239	1.110
Not Stunted	36-47	580	6.434	0.958	1.575	0.884
Stunted	48-59	244	7.733	1.704	2.804	0.993
Not Stunted	48-59	473	4.610	0.929	1.529	0.929

A6.1 Table 4

Swaziland Rural Precision
Percentage of Children with Sustained Diarrhea
By Age of Child and Stunting Status

Stunting	Months of Age	Number	Prevalence (%)	Standard Error	90% Confidence	Design Effect
Stunted	Total	1196	6.386	0.725	1.193	1.053
Not Stunted	Total	2713	5.594	0.572	0.940	1.678
Stunted	3-5	29	7.169	4.948	8.140	1.067
Not Stunted	3-5	177	14.974	3.438	5.655	1.643
Stunted	6-11	69	8.229	3.223	5.301	0.949
Not Stunted	6-11	336	11.871	2.181	3.588	1.528
Stunted	12-17	139	9.847	2.385	3.923	0.890
Not Stunted	12-17	320	10.254	1.670	2.747	0.969
Stunted	18-23	158	10.043	2.232	3.672	0.871
Not Stunted	18-23	223	6.037	1.766	2.905	1.226
Stunted	24-35	262	6.053	1.558	2.562	1.118
Not Stunted	24-35	621	4.664	0.997	1.640	1.389
Stunted	36-47	299	5.481	1.522	2.503	1.336
Not Stunted	36-47	569	1.008	0.408	0.672	0.951
Stunted	48-59	240	2.780	1.030	1.695	0.943
Not Stunted	48-59	467	0.961	0.425	0.699	0.886

A6.1 Table 5

Swaziland Rural Precision
Percentage of Children with Any Diarrhea
By Homestead Size and Education of Mother

Classification	Number	Prevalence (%)	Standard Error	90% Confidence	Design Effect
Persons in Homestead					
Total	4698	16.366	0.837	1.377	2.405
<5	281	24.038	3.205	5.272	1.580
5-9	1830	16.648	1.019	1.676	1.370
10-14	1329	15.560	1.065	1.752	1.148
15+	1258	14.744	1.300	2.138	1.691
Education of Mother					
None or Adult	1147	19.123	1.616	2.658	1.937
Grade 1 - Standard 5	1948	16.827	1.044	1.717	1.517
Form 1 - University	954	13.616	1.187	1.952	1.142
Unknown	649	14.290	1.614	2.655	1.380

A6.1 Table 6

Swaziland Rural Precision
Percentage of Children with Any Diarrhea
By Feeding Status and Age of Child

	Months of Age	Number	Prevalence (%)	Standard Error	90% Confidence	Design Effect
Total Persons in Homestead	Total	4698	16.366	0.837	1.377	2.405
	<12	1006	23.688	1.562	2.570	1.358
	12-17	556	27.491	2.420	3.981	1.633
	18-23	458	23.972	2.305	3.791	1.335
	24-59	2678	9.996	0.702	1.154	1.466
<5 Persons in Homestead	Total	281	24.038	3.205	5.272	1.580
	<12	61	31.741	6.565	10.799	1.213
	12-17	43	31.336	8.388	13.798	1.406
	18-23	34	33.638	10.311	16.962	1.619
	24-59	143	15.676	3.167	5.209	1.085
5-9 Persons in Homestead	Total	1830	16.648	1.019	1.676	1.370
	<12	378	21.446	2.222	3.656	1.108
	12-17	213	29.135	3.390	5.577	1.186
	18-23	168	24.934	3.457	5.687	1.073
	24-59	1071	11.205	0.988	1.625	1.050
10-14 Persons in Homestead	Total	1329	15.560	1.065	1.752	1.148
	<12	304	24.834	2.500	4.113	1.018
	12-17	141	27.230	4.454	7.326	1.411
	18-23	130	21.724	3.730	6.136	1.064
	24-59	754	8.572	1.220	2.007	1.432
15+ Persons in Homestead	Total	1258	14.744	1.300	2.138	1.691
	<12	263	23.444	3.208	5.277	1.508
	12-17	159	24.016	3.588	5.902	1.122
	18-23	126	22.055	3.446	5.669	0.870
	24-59	710	8.243	1.144	1.882	1.228

A6.1 Table 7

Swaziland Rural Precision
Percentage of Children with Any Diarrhea
By Feeding Status and Age of Child

Feeding Status	Months of Age	Number	Prevalence (%)	Standard Error	90% Confidence	Design Effect
Total	<3	266	9.129	1.986	3.267	1.265
Breast Only	<3	116	4.024	2.076	3.415	1.295
Mixed	<3	135	13.575	3.057	5.030	1.076
Weaned	<3	6	17.658	16.008	26.334	1.058
Total	3-5	243	22.283	3.220	5.296	1.455
Breast Only	3-5	24	22.089	8.942	14.709	1.115
Mixed	3-5	189	23.994	3.491	5.743	1.263
Weaned	3-5	21	16.824	7.950	13.078	0.949
Total	6-11	497	32.063	2.637	4.338	1.587
Breast Only	6-11	9	23.512	13.488	22.187	0.910
Mixed	6-11	395	31.909	2.916	4.796	1.545
Weaned	6-11	72	30.845	6.018	9.900	1.222

A6.1 Table 8

Swaziland Rural Precision
Percentage of Children with Specific Diarrhea Treatment
By Subdivision of Country

Characteristic	Subdivision of Country	Number	Prevalence (%)	Standard Error	90% Confidence	Design Effect
Oral Rehydration Salts:	District					
	Total	755	27.436	2.366	3.893	2.124
	Hhohho	157	18.287	3.795	6.243	1.513
	Lubombo	246	34.593	4.943	8.131	2.656
	Manzini	134	23.045	5.366	8.828	2.176
	Shiselweni	218	27.736	2.832	4.659	0.872
Oral Rehydration Salts:	Zone					
	Highveld	177	18.331	3.567	5.867	1.504
	Middleveld	243	24.791	3.414	5.617	1.519
	Lowveld	297	35.856	3.951	6.500	2.016
	Lubombo	38	21.781	12.103	19.910	3.267
Salt/Sugar Solution:	Tenure					
	Non-RDA	223	34.411	4.372	7.192	1.888
	Minimum RDA	155	35.571	4.982	8.196	1.679
	Maximum RDA	187	18.326	3.187	5.243	1.269
	Compaby Town	83	29.185	7.006	11.525	1.971
	Administrative	19	31.515	13.515	22.231	1.608
	ITF	88	13.560	5.160	8.489	1.999
Salt/Sugar Solution:	District					
	Total	755	13.222	1.629	2.680	1.746
	Hhohho	157	18.876	4.377	7.200	1.964
	Lubombo	246	8.319	2.259	3.717	1.646
	Manzini	134	14.340	3.175	5.222	1.099
	Shiselweni	218	14.525	3.184	5.237	1.780
Oral Rehydration Salts:	Zone					
	Highveld	177	16.307	3.826	6.293	1.898
	Middleveld	243	15.928	2.993	4.923	1.625
	Lowveld	297	10.340	2.269	3.733	1.650
	Lubombo	38	4.827	2.282	3.754	0.431
Salt/Sugar Solution	Tenure					
	Non-RDA	223	9.638	2.430	3.998	1.512
	Minimum RDA	155	13.057	3.330	5.477	1.514
	Maximum RDA	187	21.350	4.126	6.788	1.896
	Company Towns	83	7.533	3.373	5.549	1.356
	Administrative	19	5.941	3.977	6.542	0.538
	ITF	88	13.377	4.339	7.138	1.430

CHAPTER 7: IMMUNIZATIONS

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CHAPTER 7: IMMUNIZATIONS

INTRODUCTION

The Government of Swaziland began an Expanded Program of Immunization (EPI) in November 1980 with assistance from the Save the Children Fund and UNICEF. The goal of the government, as stated in the fourth national development plan, is to increase immunization coverage so that by 1987, 80% of all infants will be completely vaccinated by the age of 12 months. The vaccines offered in Swaziland and the target age for immunization adhere to the World Health Organization's recommendations. Initially, EPI included both fixed health facilities and mobile immunization teams, but the latter are now being phased out as more fixed health facilities are constructed.

EPI is one of the primary health care services in Swaziland for which there is no charge. However, to obtain a health card on which to record immunizations and other maternal and child health services provided to their children, families are required to pay the equivalent of $.50 in U.S. dollars.

The purpose of this chapter is to describe the immunization status of Swazi children and to identify those most at risk of not being immunized. Where possible, data are presented in such a way as to be comparable with data collected in previous Swaziland immunization coverage surveys.

METHODS

In the national nutrition status survey, mothers or other responsible homestead informants were asked to locate the immunization certificate (card) of children birth-23 months of age; verbal history alone was not accepted as evidence of immunization. Survey children without cards were thus classified as unimmunized.

Because children should have received a full series of immunizations by age 12 months, coverage by specific antigen was analyzed only for survey children aged 12-23 months. Survey children were considered fully immunized if the immunization card indicated that they had received one dose of BCG and measles vaccines and three doses of polio and DPT vaccines.

Information on the child's age at the time of immunization, the intervals between immunization, or physical evidence of vaccination such as BCG scars was not collected. In this report discussion of immunization card possession refers to children from birth-23 months of age (rural N=2,020, peri-urban N=353); discussion of immunization coverage refers to children 12-23 months of age (rural N=1,014, peri-urban N=160).

Information was collected regarding other variables such as whether the child had ever visited an MCH clinic, the distance in time traveled to the nearest health clinic, mothers' homestead membership and residence status, mothers' education, and other demographic characteristics. The association of these variables with certification and immunization status was examined and selected findings are presented below.

RESULTS

Possession of an Immunization Card

The percentage of children from birth-23 months with immunization cards was similar for the rural (56.4%) and peri-urban (54.1%) areas. By district, card possession in the rural sample was uniform, ranging from 54.5% for Manzini to 57.5% for Hhohho. By agroecological zone, the percentage of children with a card was less uniform, ranging from a low of 54.7% for the Lowveld to 65.2% for the Lubombo. By land tenure, the range of card possession was even more substantial, from a low of 49.3% in the individual tenure farms (ITF) to a high of 63.8% for the maximum development areas (RDA).

Fewer than one-quarter of rural infants <1 month of age had immunization cards (Table 7.1). About 44% of both rural and peri-urban children ages 1-2 months, had cards. The rate of card possession plateaued at about 60% for both rural and peri-urban children ages 3-5 months and older.

Other factors associated with immunization card possession included mothers' homestead membership and residence status, total number of children from birth through 59 months of age in the homestead, and distance to the nearest clinic. In rural areas 57.5% of the children of mothers who were resident members of the homestead (present ≥50% of the time) had cards, compared with 43.4% for children of nonmember mothers and 41.1% for those whose mothers were resident <50% of the time. In rural areas, 62.1% of children living <30 minutes from a clinic had cards, compared with 60.7% of those 30-59 minutes away, 54.1% of those 1-2 hours away, and 47.0% of those >2 hours from a clinic. Small numbers prevented examination of similar associations among peri-urban children. Total number of children <5 years of

age living in the homestead was not an important factor in card possession. Rural children from homesteads containing fewer than four children who were <5 years of age had cards in 57.5% of the cases vs 53.2% in homesteads with four or more children.

When survey mothers or informants could not produce an immunization card, they were asked, "Has this child had any vaccinations?" Nearly one-quarter of the rural (22.1%) and one-third of the peri-urban (32.3%) children ages birth through 23 months were reported to have had one or more unspecified immunizations even though they did not have a card (Table 7.2).

Completeness of Immunization

In the rural sample, 30.5% of children ages 12-23 months were completely immunized, 26.0% were partially immunized and 43.5% had had no recorded immunizations (Table 7.3). In peri-urban areas, 33.7% were fully immunized, 23.7% were partially immunized and 42.5% were completely unimmunized.

Rural Geographical Location and Land Tenure. In the rural sample districts, Manzini had the highest (35.4%) and Hhohho had the lowest (25.4%) rates of completely immunized children (Table 7.3). By agroecological zone, the percentage of children fully immunized ranged from a high of 33.0% in the Highveld to a low of 27.6% in the Middleveld. Completeness of immunization varied substantially by land tenure. Only 20.6% of individual tenure farms (ITF) and 25.3% of non-rural development area (RDA) children were fully immunized, compared with over 32% of the children in all other land tenure classifications.

Homestead Membership and Residence Status of Mothers. Mother's homestead residence was associated with immunization status coverage rates. In the

rural sample among children aged 12-23 months, 31.9% of those whose mothers were members and resident ≥50% of the time were fully immunized compared with 17.3% of children whose mothers were not members and 20.7% of those whose mothers were members but present <50% of the time (Table 7.4). Peri-urban data are not presented because the numbers were too small.

Number of Persons in the Household. Within the rural homesteads, homestead size was not associated with completeness of immunization (Table 7.5). In contrast, in the peri-urban sample, the percentage of children fully immunized dropped from 46.5% to 24.4% as the household size increased from <5 to >10 persons.

Number of Homestead Children Less Than 5 Years of Age. In the rural sample, 32.9% of children from homesteads with <4 children were full immunized, compared with 22.8% from homesteads with >4 children below age 5 years (Table 7.6). Data from the peri-urban sample are not presented because of small numbers.

Linear Growth and Immunization Status. Both immunization status and length measurements were available for 923 rural and 154 peri-urban children from 12-23 months of age. Children were classified as stunted if they were more than 2.00 standard deviations below the reference median in length-for-age. In the rural sample, 25.7% of the children classified as stunted were fully immunized vs 32.9% for those classified as not stunted (Table 7.7). In contrast, in the peri-urban areas there was no association between immunization status and length-for-age.

Travel Time to the Nearest Clinic. Survey children with a short travel time to a clinic were more likely to be fully immunized than with a longer

travel time. Almost 36% of the rural sample who lived less than half an hour from a clinic were fully immunized, compared with only about 24% of those living >2 hours away (Table 7.8).

Attendance at an MCH Clinic. About half of the rural (528/1014) (Table 7.9) children between 12 and 23 months of age had a history of at least one visit to an MCH clinic. Of rural children who had visited a clinic and were in possession of a growth chart (which are distributed at MCH clinics and are thus evidence of attendance), 47.0% were fully immunized compared with 15.9% of children who had not attended a clinic. Rural children with a reported clinic visit but wl e guardians could not locate an MCH growth chart had very low (9.6%) rates of complete immunization. Percentages for peri-urban children are not presented because the numbers are too small.

Education of Survey Parents. In both rural and peri-urban samples, educational levels were unknown for about 40% of the fathers and for about 10% of the mothers, often because one or the other parent was not a member of the survey homestead and thus not available for interview. Rural children with mothers (Table 7.10) having at least a grade 1 education were only slightly more likely to be fully immunized than those having parents with no education or only adult education. Similar findings were seen for the fathers but, because of the high percentage of unknowns, data are not presented. Peri-urban data are not reported because the numbers are too small.

Coverage by Specific Vaccines

A total of 1014 rural and 160 peri-urban children aged 12-23 months were included in the survey; 589 (58.8%) of the rural and 93 (58.1%) of the

peri-urban children possessed immunization cards. Children without cards are classified as without immunization.

Polio. Over half of the rural (53.1%) and peri-urban (54.4%) children aged 12-23 months had had 1 or more polio vaccinations (Table 7.11). About 40% of the rural and peri-urban children had received 3 or more polio vaccinations and were classified as fully immunized. By district, the percentage of children fully immunized against polio ranged from a high of 43.2% for Manzini to a low of 34.9% for Hhohho (Table 7.12). By agroecological zone, the levels of complete immunization ranged from a high of 42.3% in the Highveld to a low of 36.7% in the Lubombo (Table 7.13). By land tenure, the percentage of children fully immunized against polio varied more than by either district or zone. Levels of complete immunization for polio ranged from a high of 46.0% for company towns to a low of 31.2% for ITF area (Table 7.14).

DPT. By the time they reached ages 12-23 months, 52.4% of rural and 54.4% of peri-urban children had received one or more DPT immunizations; full immunization coverage (three or more immunizations) was achieved by 38.0% of the rural and 40.6% of peri-urban children (Table 7.11). The most complete DPT coverage by district was in Manzini (43.4%); Hhohho had the lowest percentage of fully immunized children (34.2%) (Table 7.12). By agroecological zone, the most complete DPT coverage was obtained in the Highveld (40.6%); the lowest percentage of coverage was in Lubombo and the Middleveld (both 36.7%) (Table 7.13). In terms of land tenure the highest complete DPT coverage was reported in the maximum RDA's (42.7%); the lowest percentage of children who were fully covered was in the ITF's (31.0%) (Table 7.15).

BCG. Among children aged 12-23 months, a higher percentage had been vaccinated with BCG than with any other vaccine--54.7% of rural and 56.3% of peri-urban children (Table 7.11). By district, the range of complete coverage was between a high of 56.9% for Shiselweni and a low of 52.5% for Hhohho (Table 7.12). The zone rate of complete BCG coverage varied little, from 56.2% for Lubombo to 54.9% for the Middleveld and Lowveld (Table 7.13). By land tenure, the highest percentage of full BCG coverage was reported for the maximum RDA's (60.4%); the lowest rate was from the small sample (N=22) taken from the administrative tenure areas (40.7%) (Table 7.14).

Measles. Among the survey children, 38.6% of the rural and 40.0% of the peri-urban samples had received measles immunizations (Table 7.11). By district, the coverage ranged from 39.4% for Lubombo to 36.5% in Hhohho (Table 7.12). By agroecological zone, the coverage varied from 41.7% for the Lubombo to 37.0% for the Middleveld (Table 7.13). By land tenure the measles coverage ranged from 44.8% for company towns and the Maximum RDA's to 23.1% for ITF's (Table 7.14).

DISCUSSION

Immunization coverage surveys in Swaziland underestimate coverage rates, since some children without cards or children whose cards could not be located were reported to have received some immunizations. In fact, about half the rural and about 70% of the peri-urban children without cards were reported to have had one or more immunizations.

Children who had histories of an MCH visit and who had growth charts were much more likely to be fully immunized (47.0%) than those with no reported MCH

visit (15.9%) or those who reported a visit but had no growth chart available (9.6%). The 15.9% who were fully immunized although they had no history of a MCH clinic visit may reflect activities of the mobile immunization teams. The low coverage rates among children with no available growth charts may be partially artificial; the immunization card and growth charts are probably stored together, and in cases of parental absence, other homestead informants might not be able to locate either document.

The government's EPI has conducted several immunization coverage surveys. However, there are important differences both in immunization status criteria and sampling techniques between the EPI surveys and the 1983 nutrition survey. For example, the EPI surveys generally include 22 to 30 systematically chosen clusters of seven children 12-23 months of age in each. In these surveys, a child is not classified as immunized unless the vaccines were given at the appropriate age and at the appropriate intervals. In contrast, the 1983 nutrition survey included an average of about 30 preschool children from each of 124 randomly selected enumeration areas. Children 12-23 months of age were considered immunized if their immunization cards indicated a specific antigen had been given, regardless of the child's age at administration or interval between doses. Generally, therefore, the EPI surveys would yield lower estimates of coverage than the nutrition survey. Although it seems logical to compare the results of the various surveys, the differences in methods make it necessary to view comparisons with caution.

REFERENCES

Galazka AM et al. Indications and contraindications for vaccines used in the expanded programme on immunization. Bulletin of the World Health Organization 1984;62(3):357-366.

Swaziland EPI Coverage Evaluation: 1982, unpublished Government report.

Swaziland EPI Coverage Evaluation: 1983, unpublished Government report.

Swaziland EPI coverage evaluation: 1984, unpublished Government report.

Table 7.1

Percentage of Children Possessing an Immunization Card
By Age, for Children 0-23 Months of Age
Swaziland National Nutrition Status Survey, 1983

Age in Months	Rural		Peri-Urban	
	Percent	Number	Percent	Number
<1	22.5	(87)	--	(13)+
1-2	43.9	(179)	43.6	(55)
3-5	59.6	(243)	57.6	(33)+
6-8	63.2	(255)	61.8	(55)
9-11	56.8	(242)	48.6	(37)+
12-23	58.8	(1014)	58.1	(160)
Total	56.4	(2020)	54.1	(353)

NOTE: Percentages are weighted on the basis of population proportions; actual number surveyed is given in parenthesis.

+ A number <50 is considered statistically unreliable. Percentages are not provided for any number ≤20.

Table 7.2

Vaccination Status
By Possession of an Immunization Card
For Children Birth-23 Months of Age
Swaziland National Nutrition Status Survey, 1983

	Immunization Card Located		Immunization Card Not Located						
			Some Immunization(s) Claimed		No Vaccinations Claimed		Immunization Status Unknown		Total
	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Number
Rural									
	56.4	(1127)	22.1	(457)	10.4	(211)	11.1	(225)	(2020)
Peri-Urban									
	54.1	(191)	32.3	(114)	9.1	(32)+	4.5	(16)+	(353)

NOTE: Percentages are weighted on the basis of population proportions; actual number surveyed is given in parenthesis.

+ A number <50 is considered statistically unreliable.

Table 7.3

Immunization Status
By Residence, District, Agroecological Zone and Land Tenure
For Children 12-23 Months of Age
Swaziland National Nutritional Status Survey, 1983
(Rural Sample Only)

	Percent Completely Immunized*	Percent Partially Immunized	Percent with No Vaccinations Recorded**	Number
Universe				
Rural	30.5	26.0	43.5	(1014)
Peri-Urban	33.7	23.7	42.5	(160)
District (Rural)				
Hhohho	25.4	28.5	46.1	(249)
Lubombo	30.8	26.8	42.4	(258)
Manzini	35.4	19.0	45.7	(236)
Shiselweni	30.5	29.0	40.5	(271)
Zone (Rural)				
Highveld	33.0	23.0	44.0	(274)
Middleveld	27.6	28.7	43.6	(380)
Lowveld	31.3	25.5	43.2	(307)
Lubombo	31.5	26.8	41.7	(53)
Land Tenure (Rural)				
Non-RDA	25.3	24.5	50.2	(284)
Minimum RDA§	32.7	27.6	39.7	(160)
Maximum RDA	35.0	26.7	38.3	(334)
Company	34.4	26.9	38.8	(97)
Administrative	35.2	8.6	56.1	(22)+
ITF¶	20.6	28.0	51.4	(117)

NOTE: Percentages are weighted on the basis of population proportions; actual number surveyed is given in parenthesis.

* Includes three polio, three DPT, one BCG and one measles vaccination.
** Includes children without immunization cards.
§ RDA=Rural Development Area.
¶ ITF=Individual Tenure Farm.

\+ A number <50 is considered statistically unreliable.
Percentages are not provided for any number ≤20.

Table 7.4

Immunization Status
By Mother's Homestead Membership and Residence Status
For Children 12-23 Months of Age
Swaziland National Nutrition Status Survey, 1983
(Rural Sample Only)

Mother's Status	Percent Completely Immunized*	Percent Partially Immunized	Percent with No Vaccinations Recorded**	Number
Not a Member of Homestead	17.3	25.2	57.6	(84)
Member (Present <50% of time)	20.7	28.6	50.6	(28)+
Member (Present ≥50% of time)	31.9	26.1	42.0	(898)
Membership Status Unknown	--	--	--	(4)+
Total	30.5	26.0	43.5	(1014)

NOTE: Percentages are weighted on the basis of population proportions; actual number surveyed is given in parenthesis.

* Includes three polio, three DPT, one BCG and one measles vaccination
** Includes children without immunization cards.

+ A number <50 is considered statistically unreliable.
Percentages are not provided for any number ≤20.

Table 7.5

Immunization Status
By Size of Households
For Children 12-23 Months of Age
Swaziland National Nutrition Status Survey, 1983

Number of Persons in Household	Percent Completely Immunized*	Percent Partially Immunized	Percent with No Vaccinations Recorded**	Number
Rural Sample				
<5	28.1	28.2	43.7	(142)
5-9	33.2	25.9	40.9	(471)
10+	28.0	25.2	46.7	(401)
Peri-Urban Sample				
<5	46.5	32.6	20.9	(43)+
5-9	31.6	19.7	48.7	(76)
10+	24.4	22.0	53.7	(41)+

NOTE: Percentages are weighted on the basis of population proportions; actual number surveyed is given in parenthesis.

* Includes three polio, three DPT, one BCG and one measles vaccination.
** Includes children without immunization cards.

+ A number <50 is considered statistically unreliable.

-3,60

Table 7.6

Immunization Status
By Number of Children <5 Years of Age in the Homesteads
For Children 12-23 Months of Age
Swaziland National Nutrition Status Survey, 1983
(Rural Sample Only)

Number of Children in Homestead	Percent Completely Immunized*	Percent Partially Immunized	Percent with No Vaccinations Recorded**	Number
1-3	32.9	25.4	41.7	(756)
4+	22.8	27.8	49.3	(258)
Total	30.5	26.0	43.5	(1014)

NOTE: Percentages are weighted on the basis of population proportions; actual number surveyed is given in parenthesis.

* Includes three polio, three DPT, one BCG and one measles vaccination

** Includes children without immunization cards.

Table 7.7

Immunization Status of Children
By Height-for-Age Status
For Children 12-23 Months of Age
Swaziland National Nutrition Status Survey, 1983
(Rural Sample Only)

Residence		Percent Completely Immunized*	Percent Partially Immunized	Percent with No Vaccinations Recorded**	Number
Rural Residence					
(345)	Stunted§	25.7	32.0	42.2	
(669)	Normal	32.9	22.9	44.2	
Peri-Urban Residence					
(45)+	Stunted	31.1	31.1	37.8	
(115)	Normal	34.8	20.9	44.3	

NOTE: Percentages are weighted on the basis of population proportions; actual number surveyed is given in parenthesis.

* Includes three polio, three DPT, one BCG and one measles vaccination.
** Includes children without immunization cards.
§ Stunted is defined as more than 2 standard deviations below the reference median.

+ A number <50 is considered statistically unreliable.

Table 7.8

Immunization Status
By Travel Time to a Clinic
For Children 12-23 Months of Age
Swaziland National Nutrition Status Survey, 1983
(Rural Sample Only)

Travel Time to Clinic	Percent Completely Immunized*	Percent Partially Immunized	Percent with No Vaccinations Recorded**	Number
Less than 30 minutes	35.8	28.4	35.9	(200)
30 - 59 minutes	32.7	23.0	44.3	(332)
1-2 hours	28.8	25.9	45.3	(279)
Greater than 2 hours	24.1	29.3	46.6	(192)
Unknown	--	--	--	(11)+
Total (1014)		30.5	26.0	43.5

NOTE: Percentages are weighted on the basis of population proportions; actual number surveyed is given in parenthesis.

* Includes three polio, three DPT, one BCG, and one measles vaccination.
** Includes children without immunization cards.

+ A number <50 is considered statistically unreliable.
Percentages are not provided for any number ≤20.

Table 7.9

Immunization Status
By History of a Maternal and Child Health (MCH) Clinic Visit
For Children 12-23 Months of Age
Swaziland National Nutrition Status Survey, 1983
(Rural Sample Only)

History of a Clinic Visit	Percent Completely Immunized*	Percent Partially Immunized	Percent with No Vaccinations Recorded**	Number
Has Visited Clinic (Chart Located)	47.0	37.2	15.9	(528)
Has Visited Clinic (Chart Not Located)	9.6	8.1	82.3	(285)
Has Not Visited MCH Clinic	15.9	22.4	61.8	(180)
MCH Clinic Visit Status Unknown	14.3	11.0	74.7	(21)+
Total	30.5	26.0	43.5	(1014)

NOTE: Percentages are weighted on the basis of population proportions; actual number surveyed is given in parenthesis.

* Includes three polio, three DPT, one BCG and one measles vaccination.
** Includes children without immunization cards.

+ A number <50 is considered statistically unreliable.

Table 7.10

Immunization Status
By Education of Mother
For Children 12-23 Months of Age
Swaziland National Nutrition Status Survey, 1983
(Rural Sample Only)

Education of Mother	Percent Completely Immunized*	Percent Partially Immunized	Percent with No Vaccinations Recorded**	Number
None/Adult	30.4	28.3	41.3	(255)
Grade 1 - Standard 5	32.8	25.9	41.3	(437)
Form 1 - University	32.3	23.9	43.8	(221)
Unknown§	16.4	25.1	58.5	(101)
Total	30.5	26.0	43.5	(1014)

NOTE: Percentages are weighted on the basis of population proportions; actual number surveyed is given in parenthesis.

* Includes three polio, three DPT, one BCG and one measles vaccination.
** Includes children without immunization cards.
§ Includes mothers whose educational status is unknown because they were not members of survey homesteads and therefore not available for inquiry.

Table 7.11

Specific Vaccine Coverage
By Residence
For Children 12-23 Months of Age
Swaziland National Nutrition Status Survey, 1983

	Rural (N=1014)		Peri-Urban (N=160)	
	Percent	Cumulative Number	Percent	Cumulative Number
Polio				
3+	39.5	39.5	40.0	40.0
2	7.4	46.9	6.3	46.3
1	6.2	53.1	8.1	54.4
0*	46.9	100.0	45.6	100.0
DPT				
3+	38.0	38.0	40.6	40.6
2	7.4	45.4	6.3	46.9
1	7.0	52.4	7.5	54.4
0*	47.7	100.0	45.6	100.0
BCG				
1+	54.7	54.7	56.3	56.3
0*	45.3	100.0	43.8	100.0
Measles				
1+	38.6	38.6	40.0	40.0
0*	61.4	100.0	60.0	100.0

NOTE: Percentages are weighted on the basis of population proportions; actual number surveyed is given in parenthesis.

* Children without vaccination cards or with unknown number of immunizations.

Table 7.12

Specific Vaccine Coverage
By District
For Children 12-23 Months of Age
Swaziland National Nutrition Status Survey, 1983
(Rural Sample Only)

	Hhohho (N = 249)		Lubombo (N = 258)		Manzini (N = 236)		Shiselweni (N=271)	
	Percent	Cumulative Percent	Percent	Cumulative Percent	Percent	Cumulative Percent	Percent	Cumulative Percent
Polio								
3+	34.9	34.9	39.6	39.6	43.2	43.2	40.4	40.4
2	11.7	46.6	8.0	47.6	3.8	47.0	6.2	46.6
1	4.5	51.1	6.2	53.8	3.5	50.5	10.0	56.6
0*	48.9	100.0	46.3	100.0	49.5	100.0	43.3	100.0
DPT								
3+	34.2	34.2	37.1	37.1	43.4	43.4	37.5	37.5
2	10.1	44.3	8.4	45.5	3.0	46.4	7.8	45.3
1	6.2	50.5	8.2	53.7	4.2	50.6	8.8	54.1
0*	49.5	100.0	46.3	100.0	49.4	100.0	45.9	100.0
BCG								
1+	52.5	52.5	55.4	55.4	53.5	53.5	56.9	56.9
0*	47.5	100.0	44.6	100.0	46.5	100.0	43.1	100.0
Measles								
1+	36.5	36.5	39.4	39.4	39.7	39.7	38.7	38.7
0*	63.5	100.0	60.6	100.0	60.3	100.0	61.3	100.0

NOTE: Percentages are weighted on the basis of population proportions; actual number surveyed is given in parenthesis.

* Children without vaccination cards or with unknown number of immunizations.

Table 7.13

Specific Vaccine Coverage
By Agroecological Zone
For Children 12-23 Months of Age
Swaziland National Nutrition Status Survey, 1983
(Rural Sample Only)

	Highveld (N=274)		Middleveld (N=380)		Lowveld (N=307)		Lubombo (N=53)	
	Percent	Cumulative Percent	Percent	Cumulative Percent	Percent	Cumulative Percent	Percent	Cumulative Percent
Polio								
3+	42.3	42.3	37.0	37.0	40.3	40.3	36.7	36.7
2	6.0	48.3	9.5	46.5	6.2	46.5	8.5	45.2
1	5.1	53.4	6.1	52.6	6.9	53.4	9.0	54.2
0*	46.5	100.0	47.5	100.0	46.6	100.0	45.7	100.0
DPT								
3+	40.6	40.6	36.7	36.7	37.1	37.4	36.7	36.7
2	7.3	47.9	8.1	44.8	6.5	43.9	8.5	45.2
1	5.2	53.1	6.4	51.2	9.4	53.3	7.4	52.6
0*	46.9	100.0	48.8	100.0	47.1	100.0	47.4	100.0
BCG								
1+	54.0	54.0	54.9	54.9	54.9	54.9	56.2	56.2
0*	46.0	100.0	45.1	100.0	45.1	100.0	43.8	100.0
Measles								
1+	38.3	38.3	37.0	37.0	40.2	40.2	41.7	41.7
0*	61.7	100.0	63.0	100.0	59.8	100.0	58.3	100.0

NOTE: Percentages are weighted on the basis of population proportions; actual number surveyed is given in parenthesis.

* Children without vaccination cards or with unknown number of immunizations.

Table 7.14
Specific Vaccine Coverage
By Land Tenure
For Children 12-23 Months of Age
Swaziland National Nutrition Status Survey, 1983
(Rural Sample Only)

	Non-RDA* (N=284)		Minimum RDA (N=160)		Maximum RDA (N=334)		Company (N=97)		Administrative (N=22)++		ITF** (N=117)	
	%	%§	%	%§	%	%§	%	%§	%	%§	%	%§
Polio												
3+	32.0	32.0	45.0	45.0	43.2	43.2	46.0	46.0	38.4	38.4	31.2	31.2
2	7.4	39.4	5.9	50.9	9.0	52.2	7.1	53.1	5.5	43.9	5.7	36.9
1	7.5	46.9	5.3	56.2	6.1	58.3	5.4	58.5	-	43.9	6.9	43.8
0¶	53.2	100.0	43.8	100.0	41.7	100.0	41.5	100.0	56.1	100.0	56.2	100.0
DPT												
3+	31.5	31.5	41.1	41.1	42.8	42.8	40.4	40.4	38.4	38.4	31.0	31.0
2	8.4	39.9	8.4	49.5	8.6	51.4	5.1	45.5	-	38.4	4.3	35.3
1	5.3	45.2	7.9	57.4	5.5	56.9	13.1	58.6	5.5	43.9	7.6	42.9
0¶	54.7	100.0	42.7	100.0	43.1	100.0	41.5	100.0	56.1	100.0	57.1	100.0
BCG												
1+	47.2	47.2	58.9	59.6	60.4	60.4	59.8	59.8	40.7	40.7	46.3	46.3
0¶	52.8	100.0	41.1	100.0	39.6	100.0	40.2	100.0	59.3	100.0	53.7	100.0
Measles												
1+	33.0	33.0	39.8	39.8	44.8	44.8	44.8	44.8	43.9	43.9	23.1	23.1
0¶	67.0	100.0	60.2	100.0	55.2	100.0	55.2	100.0	56.1	100.0	76.9	100.0

NOTE: Percentages are weighted on the basis of population proportions; actual number surveyed is given in parenthesis.

* RDA= Rural Development Area.
** ITF= Individual Tenant Farm.
++ A number <50 is statistically unreliable.
§ Cumulative percent.
¶ Children without vaccination cards or with unknown number of immunizations.

APPENDIX 7.1

Precision Estimates: Immunizations

Swaziland National Nutrition Status Survey, 1983

Rural Sample

An explanation of statistical terms used in the tables in this Appendix can be found in Chapter 2, page 2.12.

A7.1 Table 1
Swaziland Rural Precision
Percentage Distribution
By Immunization Status and Other Characteristics

Immunization Status With Other Characteristics	Number	Prevalence (%)	Standard Error	90% Confidence	Design Effect
Complete Immunization					
Total, Travel Time to Clinic	1014	30.484	1.812	2.981	1.571
<30 Minutes to Clinic	200	35.757	4.051	6.664	1.429
30-59 Minutes to Clinic	332	32.739	3.128	5.146	1.475
1-2 Hours to Clinic	279	28.792	3.702	6.090	1.865
>2 Hours to Clinic	192	24.150	3.800	6.251	1.514
Partial Immunization					
Total	1014	25.989	1.527	2.512	1.229
<30 Minutes to Clinic	200	28.359	3.901	6.417	1.498
30-59 Minutes to Clinic	332	22.983	2.396	3.941	1.077
1-2 Hours to Clinic	279	25.867	3.237	5.324	1.524
>2 Hours to Clinic	192	29.283	3.154	5.189	0.923
No Record of Immunization					
Total	1014	43.527	1.731	2.847	1.235
<30 Minutes to Clinic	200	35.884	3.394	5.583	1.001
30-59 Minutes to Clinic	332	44.279	3.393	5.582	1.550
1-2 Hours to Clinic	279	45.341	3.546	5.833	1.415
>2 Hours to Clinic	192	46.567	3.473	5.713	0.931
Complete Immunization					
Has Visited Clinic (Chart Located)	528	46.958	2.449	4.029	1.271
Has Visited Clinic (Chart Not Located)	285	9.649	2.313	3.805	1.749
Has Not Visited Clinic (Unknowns Omitted)	180	15.855	3.789	6.234	1.937
Partial Immunization					
Has Visited Clinic (Chart Located)	528	37.175	2.484	4.086	1.395
Has Visited Clinic (Chart Not Located)	285	8.075	1.672	2.751	1.074
Has Not Visited Clinic (Unknowns Omitted)	180	22.352	3.186	5.240	1.052
No Record of Immunization					
Has Visited Clinic (Chart Located)	528	15.867	1.574	2.590	0.980
Has Visited Clinic (Chart Not Located)	285	82.275	2.784	4.579	1.514
Has Not Visited Clinic (Unknowns Omitted)	180	61.793	4.306	7.083	1.413

A7.1 Table 2
Seaziland Rural Precision
Percentage Distribution
By Immunization Status and Other Characteristics

Immunization Status With Other Characteristics	Number	Prevalence (%)	Standard Error	90% Confidence	Design Effect
Complete Immunization					
Total	1014	30.484	1.812	2.981	1.571
Mother Not Member of Homestead	84	17.284	4.134	6.801	1.004
Mother Present <50% of Time	28	20.734	8.110	13.340	1.120
Mother Present ≥50% of Time	898	31.940	2.053	3.377	1.741
Partial Immunization					
Total	1014	25.989	1.527	2.512	1.229
Mother Not Member of Homestead	84	25.165	5.316	8.745	1.261
Mother Present <50% of Time	28	28.628	9.871	16.238	1.335
Mother Present ≥50% of Time	898	26.100	1.613	2.654	1.212
No Record of Immunization					
Total	1014	43.527	1.731	2.847	1.235
Mother Not Member of Homestead	84	57.551	6.078	9.999	1.270
Mother Present <50% of Time	28	50.637	10.408	17.121	1.213
Mother Present ≥50% of Time	898	41.961	1.892	3.112	1.320
Complete Immunization					
Total	1014	30.484	1.812	2.981	1.571
1-3 Children <5 Years of Age	756	32.862	2.197	3.614	1.654
4+ Children <5 Years of Age	258	22.829	2.515	4.137	0.926
Partial Immunization					
Total	1014	25.989	1.527	2.512	1.229
1-3 Children <5 Years of Age	756	25.414	1.806	2.971	1.301
4+ Children <5 Years of Age	258	27.839	3.061	5.036	1.204
No Record of Immunization					
Total	1014	43.527	1.731	2.847	1.235
1-3 Children <5 Years of Age	756	41.724	1.986	3.266	1.226
4+ Children <5 Years of Age	258	49.332	3.471	5.709	1.243
Complete Immunization					
Child Stunted	345	25.725	2.830	4.655	1.446
Child Not Stunted	669	32.906	2.135	3.512	1.381
Partial Immunization					
Child Stunted	345	32.031	2.792	4.593	1.235
Child Not Stunted	669	22.913	1.659	2.729	1.042
No Record of Immunization					
Child Stunted	345	42.244	2.773	4.562	1.088
Child Not Stunted	669	44.181	2.183	3.591	1.293

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CHAPTER 8: INFANT AND CHILD MORTALITY

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CHAPTER 8: INFANT AND CHILD MORTALITY

INTRODUCTION

Because infant mortality is a key indicator of the general health and nutritional status of children, mortality estimates for infancy and early childhood were derived from the data for the Swaziland survey. In this chapter, age-specific mortality rates are estimated for population subgroups and the reliability of results is discussed.

METHODS

All women aged 12-49 were asked about the number of live-born children they had had, the number surviving, and the number who died. (A live-born child was defined as one who cried at birth.) Additionally, women were asked to list the name, date of birth, and sex of children born within the 5 years preceding the survey. Date of death (or age at death) was obtained where applicable. If the woman was absent on the day of the interview and had given birth within the preceding 5 years, one follow-up visit was made to obtain the birth history.

Both direct and indirect mortality estimates were calculated using life-table methods. In life-table notation, the probability of dying before age 1 year is designated as 1q0. The probability of dying between 1 and 5 years is designated as 4q1, and between birth and 5 years as 5q0. The sample estimates presented here are unweighted. Direct estimates were calculated from the 5-year birth history. Indirect estimates were calculated on the

basis of proportion dead of children ever born. For these calculations, the Brass method using Trussell multipliers was used (Brass 1968, Trussell 1975). This method consists of converting proportions dead of children ever born (by age of the mother) to probabilities of dying, based on model life tables. As is standard in the Brass technique, only histories from women aged 20-34 were included in the indirect estimates.

RESULTS

Direct Estimates

Of women with live births in the 5 years preceding the survey, birth histories were obtained from 84.9% (2619/3085) in the rural sample and 83.3% (588/706) in the peri-urban sample. Reported deaths occurred largely in the first year of life (Table 8.1).

Direct estimates were made using BMDP procedure 1 L accesed by SAS. Both infant (1q0) and child mortality (4q1) estimates were lower than expected. Infant mortality estimates were .0577 (57.7 per 1000) for the rural sample and .0699 for the peri-urban sample (Table 8.2). Child mortality (4q1) estimates were .0280 for the rural sample and .0188 for the peri-urban sample. The ratio of infant mortality for males to females (1.4 for both rural and peri-urban samples) indicates probable underreporting of deaths of females, since one would expect only a small difference in deaths by sex (Table 8.2). Because of small numbers, data from the peri-urban sample will not be disaggregated further.

Estimates of infant mortality varied, but not consistently, by year of birth (Table 8.3). The highest rates were reported for the earliest year of birth included in the survey (1978).

Indirect Estimates

Of the women aged 20-34, birth histories were obtained from 85.0% (1790/2105) in the rural sample and 83.7% (430/574) in the peri-urban sample.

The indirect estimates for both infant and child mortality were about two times higher than the direct estimates (Tables 8.4, 8.5). For the rural sample, the indirect estimates of infant and child mortality rates were .113 and .073 respectively; for the peri-urban sample, rates were .094 and .054 respectively.

COMPARISON OF DATA FOR SWAZILAND WITH DATA FROM OTHER AFRICAN SURVEYS

When directly estimated mortality rates were compared, mortality rates for Swaziland were much lower than mortality rates for other African countries according to data from World Fertility Surveys (Table 8.7). Because these surveys were conducted 4-6 years before the Swaziland survey, mortality rates may have subsequently declined in some or all of these countries, but such a decline would be unlikely to explain the magnitude of these differences.

DISCUSSION

Problems with recalling past events in retrospective surveys such as this one are usual in developing countries. General recall problems include omissions of births and deaths, misreporting of dates for births and deaths, and misreporting of maternal age. There are several reasons why respondents may not provide complete information including problems with forgetting the deaths of young or absent children, reluctance to discuss dead children, and neglecting to count children who died very soon after birth as live births. Because of the high percentage of children living in homesteads where the

mother was not a member (12% in the rural sample and 10% in the peri-urban sample), problems with these mothers not reporting the deaths of children may be a particular problem in this survey.

Both the direct and indirect estimates of mortality should be interpreted with caution. The indirect estimates are based on only 62% of eligible women. Whether absent mothers could have been expected to report a higher or lower number of deaths cannot be determined with available data. The indirect method assumes constant mortality and fertility in the recent past. However, indirect estimates of infant mortality (.137) derived from 1976 census data for women aged 20-34 and the estimates based on this survey are consistent with a trend toward lower mortality (Central Statistics Office, 1979). However, because the methodology used to collect data and calculate estimates in this survey was different from that used to conduct a census, the rates cannot be directly compared. Because peri-urban and urban areas were excluded from the representative sample in the 1983 survey, an overall mortality rate for the country could not be calculated. Inclusion of urban Mbabane and Manzini and other peri-urban areas would probably lower the indirect estimates further.

On the basis of comparisons with estimates from other countries and internal consistency, the direct mortality estimates should be interpreted with caution. They are undoubtedly too low--much lower than those for other African countries. In addition, the high ratio of male deaths to female deaths would indicate that deaths among females are more often underreported. Although, in World Fertility Surveys, the reported infant mortality rate for males is, on the average, 16% higher than that for females, the ratio in this survey is even higher and probably indicates underreporting of deaths among females (Rutstein, 1983).

Direct and indirect estimates yield conflicting results for the rural and peri-urban samples. By direct estimation, infant mortality is higher in the peri-urban sample than in the rural sample; by indirect estimation, infant mortality is higher for the rural sample. Reasons for the conflicting findings are unclear. The indirect estimate of lower mortality in the peri-urban areas is more consistent with the relatively high socioeconomic and nutritional level of peri-urban children.

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Table 8.1

Age at Death of Children Who Were Born and Who Died
In the 5 Years Before Interview
Swaziland National Nutrition Status Survey, 1983

Age At Death In Months	Rural Sample		Peri-Urban Sample	
	Number	Percent	Number	Percent
<1	51	19.8	19	31.7
1	49	19.1	9	15.0
2	17	6.6	3	5.0
3	20	7.8	3	5.0
4	14	5.4	6	10.0
5	22	8.6	2	3.3
6	10	3.9	3	5.0
7	8	3.1	1	1.7
8	3	1.2	3	5.0
9	10	3.9	0	--
10	4	1.6	0	--
11	3	1.2	1	1.7
12-23	30	11.7	5	8.3
24-35	12	4.7	5	8.3
36-59	4	1.6	0	--
Total	257	100.0	60	100.0

Table 8.2

Direct-Estimate Probabilities of Dying
In Infancy and Early Childhood, By Sex
Swaziland National Nutrition Status Survey, 1983

	Probability of Dying			
	Before 1 Year of Age	Between 1 and 5 Years of Age	Before 5 Years of Age	
Rural Sample	1q0	4q1	5q0	(Number)
Male	.0661	.0234	.0880	(2019)
Female	.0471	.0304	.0761	(1966)
Total	.0577	.0280	.0841	(3990)*
Peri-Urban Sample				
Male	.0796	.0196	.0976	(416)
Female	.0572	.0089	.656	(380)
Total	.0699	.0188	.0874	(799)**

* Includes 5 children of unknown sex.
** Includes 3 children of unknown sex.

Table 8.3

Direct-Estimate Probabilities
Of Dying in Infancy, By Year of Birth
Swaziland National Nutrition Status Survey, 1983
(Rural Sample Only)

Year of Birth*	Probability of Dying Before 1 Year of Age 1q0	(Number)
1978	.0845	(71)
1979	.0424	(660)
1980	.0631	(777)
1981	.0412	(800)
1982	.0687	(921)

* Five children had unknown year of birth.

Table 8.4

Probabilities of Dying Between Birth and Selected Ages
Swaziland National Nutrition Status Survey, 1983
(Rural Sample Only)

Exact Age (Years)	Indirect Estimates	Direct Estimates
1 (1q0)	.113	.058
2 (2q0)	.137	.069
3 (3q0)	.151	.074
5 (5q0)	.178	.078

NOTE: Indirect estimates are based on the Brass method using Trussell multipliers (Model West Life Table).

Table 8.5

Probabilities of Dying Between Birth and Selected Ages
Swaziland National Nutrition Status Survey, 1983
(Peri-Urban Sample Only)

Exact Age (Years)	Indirect Estimates	Direct Estimates
1 (1q0)	.094	.070
2 (2q0)	.119	.082
3 (3q0)	.116	.087
5 (5q0)	.143	.087

NOTE: Indirect estimates are based on the Brass method using Trussell multipliers (Model West Life Table).

Last death reported was 30 months of age.

Table 8.6

Direct-Estimate Probabilities of Dying
in Infancy and Early Childhood
By Country
Swaziland National Nutrition Status Survey, 1983

Country and Date of Survey		Before 1 Year of Age 1q0	Between Birth and 5 Years of Age 5q0
Swaziland (Rural Sample)	1983	.0577	.0841
Sudan (North)	1978-9	.0794	.1473
Senegal	1978	.1118	.2624
Kenya	1977-8	.0866	.1416
Lesotho	1977	.1258	.1737

SOURCES: Rutstein SO. Infant and child mortality: levels, trends and demographic differentials. WFS Comparative Studies, No. 24. Voorburg, Netherlands: International Statistical Institute, 1983.

Swaziland National Nutrition Survey, 1983.

* GPO-86-635-664