PD-AAQ-819
ISN: 32622

NUTRITION CRSP - EGYPT PROJECT

SIX-MONTH REPORT

October 1, 1984 - March 31, 1985

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Submitted April 10, 1985

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I. INTRODUCTION AND OVERVIEW

Phase II core research activities peaked during the last three months of 1984. According to the original plan, all qualifying households were enrolled in the study by December 1984 and several completed their 12 months in the study in December 1984, also. During the peak period, the field staff included approximately 100 data collectors and supervisors and 12 senior investigators.

The Egypt project has succeeded in resolving some of the problems which plagued it for a long time. These include 1) malfunctioning of the Beckman equipment for determining RMR; 2) difficulties in establishing a local data entry and verification system; 3) culture-specific issues in securing food consumption data on individuals and households and associated miscommunication about CRSP procedures; and 4) difficulties in initiating and maintaining cognitive tests.

We are pleased to report that RMR data collection is now proceeding satisfactorily and local data entry started in Cairo in October, 1984 (Attachment A). The food intake issue has also been resolved (Attachment C, Appendix A) and alternative validation studies commenced in December 1984. In the cognitive area, new staff has been recruited and trained and cognitive testing of children and adults have been reinstated. Studies on mother - infant interaction, late in starting, will begin shortly.

Data processing and analysis activities currently have very high priority at the Nutrition Institute and U.S. institutions (Refer to Attachments A, B, C and D for analyses of various subsets of data).

A major highlight of the past six months was the data analysis meeting which was hosted by the Egyptian investigators in Cairo, January 5-10, 1985. Most of the Egyptian investigators and U.S. PIs attended as did representatives from the Kenya and Mexico projects and ME. The agenda of the meeting is consistent with the emphasis which is being placed on data analysis.

II. STATUS OF H.H. IN SAMPLE
(MARCH, 1985)

Date	Household Entry by Reason					Household Exit by Reason				
	Preg.	Todd. Only	Sch. Only	Multi-ple	Total	* With-drawal	** In-complete	*** Completed Study	Total	Total H.H. Currently in Study
Oct. 83	0	4	1	0	5	0	0	0	0	5
Nov. 83	0	9	0	10	19	0	0	0	0	24
Dec. 83	0	13	0	6	19	0	1	0	1	42
Jan. 84	1	11	6	0	18	0	2	0	2	56
Feb. 84	9	10	3	7	29	0	0	0	0	87
March 84	34	13	1	4	52	0	6	0	6	133
Apr. 84	14	10	7	2	33	0	3	0	3	163
May 84	5	2	0	7	14	0	3	0	3	174
June 84	10	0	0	7	17	0	3	0	3	188
July 84	15	0	0	7	22	0	0	0	0	210
August 84	32	0	0	5	37	0	0	0	0	247
Sept. 84	6	0	0	10	16	0	0	0	0	263
Oct. 84	10	4	5	10	29	0	3	0	3	289
Nov. 84	0	0	7	2	9	1	5	0	6	292
Dec. 84						0	0	11	11	281
Jan. 85						0	0	11	11	270
Feb. 85						2	3	20	25	245
March 85						0	22	32	54	191
Apr. 85										
May 85										
June 85										
July 85										
August 85										
Sept. 85										
Oct. 85										
Nov. 85										
Dec. 85										
					319					

* Withdrawal: An eligible respondent who withdrew from the study

** Incomplete: Incomplete data due to death, false preg., incorrect age, abortion or conflicting information on respondent status

*** Completed Study: H.H. completed month 13 for Toddler or Schooler and/or 6 months for Infant

III. RESEARCH ACTIVITIES

A. Anthropometry

Descriptive statistics have been generated for all target groups using November 1983 to January 1984 data. Estimates of technical error of measurement were calculated as outlined in the CRSP Anthropometry Manual. These compare favorably with other published studies. Expectedly, technical error is higher for toddlers' measurements than for other targets. Means, standard deviations and frequency distributions were made for lead males and females for height and weight, body mass index, mid-arm circumference and triceps skinfolds. Descriptive data for target schoolers and toddlers were presented by sex for length, weight, and weight/length Z-scores (with reference to the NCHS reference population), mid-arm circumference; and triceps skinfold. Height and weight change indices (change in height or weight/# of months observed) were calculated to depict rate of change in these two measures in time (For details, refer to Attachment, B pp. 2-9).

A small substudy was performed in February, 1985 to estimate the day-to-day (intra-individual) variance component in toddlers' body weight. Preliminary results indicate this variance is very small.

B. Child Care-giving

Preliminary analyses have been performed on data obtained from 119 households based on the observational frequency - of - caregiving protocol, and on 74 of the same households based on the observational context - of - caregiving protocol. Of the 11 pre-determined child-care activities, two are dominant - serving food (over 90% of households) and preparing food (over 80% households). Attending to children's personal hygiene occurred rarely, in less than 7 percent of households. Children are served food and beverages frequently throughout the day. This finding of constant, casual feeding and eating by Kalama children supports the ethnographic field research. Children eat all day long principally on candy, bread, cheese and fruit. (Refer to Attachment C for details).

Scales for measuring effectiveness of caregiving (an indirect index of appropriateness of caregiving) are being developed with the data provided to date on this function.

C. Cognition

Testing and observation of toddlers, schoolers, adult females and adult males continue. Testing on infants has only recently begun.

During the past six months the following individuals have been assessed:

- 110 toddlers
- 108 school-age children
- 69 adult females
- 37 adult males

Unfortunately, data points on toddlers were lost as psychologists left the project (for reasons unrelated to the project, e.g. marriage, job changes, etc.) and Dr. Yunis became seriously ill. The situation, however, has

improved as a new group of psychologists have been trained and Dr. Yunis has regained his health.

Protocols for data cleaning have been developed for all aspects of psychology data except for that of infants which are currently being developed. Procedures outlined in the protocols allow for data error identification by computer analysis. A preliminary run on a back sample of our data was quite successful in identifying data errors which are now being corrected. However, until our data has been cleaned and corrected we do not recommend any preliminary analyses.

Reliability data on observation protocols continues to be monitored in the United States with satisfactory results. Initial reliability data on testing has been received recently. Based on a preliminary analysis, these data also appear to be within acceptable ranges.

Potential data analytic strategies have been discussed among Egypt project psychologists and also with Dr. Sigman of the Kenya project. A specific set of data analytical proposals has been developed by the project psychologists and will be submitted to the CRSP Data Analysis Group. Also a variables list and scores derived from cognitive testing and behavioral observations have been developed for the psychology data and have been submitted to the Data Analysis Group. Preliminary data analysis is regarded as extremely tentative since significance is likely to occur only with a full sample and with data aggregated across testing occasions (See Attachment D, pp. 2 to 3).

D. Food Intake

A close scrutiny of the method of calculating energy intake from food intake records was undertaken in January and February and a revised data set has been forwarded to Berkeley.

Preliminary analyses of updated data through July 1985 are presented in the table below.

				Coefficient of Variation		
Class	Subjects	Observations	Mean	Between	Within	Within 6 day mean
Lead Male	135	945	2486	22.4%	38.2%	15.2%
Lead Female	141	1002	2322	18.9%	37.5%	15.3%
Schooler Male	30	185	1918	25.6%	33.9%	13.8%
Schooler Female	35	220	1920	19.5%	44.8%	18.3%
Toddler Male	61	438	1007	34.3%	47.2%	19.3%
Toddler Female	54	432	1017	35.6%	41.9%	17.1%

The data show an apparent low intake/kg in adult males. Steps are now underway to delete males with incomplete food intake data (one or more meals missing). The data also show an apparently high average intake/kg in toddlers. This anomaly is difficult to explain although the child caregiving data show a pattern of constant eating among toddlers.

E. Hematology

Preliminary data have been reported for the measurements of hemoglobin, hematocrit and ferritin for approximately 250 target individuals in Egyptian households (See Attachment D, pp. 2 to 4). Guidelines for the International Nutritional Anemia Consultative Group were used as criteria to examine the hematological data for this population and to determine the incidence of low values for hemoglobin, hematocrit and ferritin (Attachment D, Table 1, p. 4). These data indicated that the toddler was the target individual most vulnerable to iron deficiency anemia followed by the adult female, while the incidence of anemia was lowest among the adult male and school age child. Also, adult females and female children (schooler) showed a higher incidence of low values for ferritin compared to values for their male couterparts. Quality control procedures for hemoglobin and ferritin have been instituted and initial results have been sent to Management Entity. Interproject quality control assessment and comparisons of ferritin measurements have been initiated with the Kenya project.

F. Hygiene and Sanitation

Decsriptive statistics have been generated for households and for target individuals in 99 households. Household level data include information on the care and storage of eating and drinking utensils, description and care of latrine, laundering practices, uses of boiled water, manufacture of dung cakes, condition of house and presence of pests in and around the house.

Information on target individuals includes condition of hands, face, feet and clothing based on the observational protocol. Age (or stage in the life cycle) and gender (in adults) are important factors in personal sanitation and hygiene practices. Compared with infants, toddlers showed more dirt on their hands, face and clothing, and an increased number of flies on or near their faces. This pattern ceases at the end of toddlerhood. In general, personal hygiene and sanitation improves from the toddler stage through the adult stage, but improves greatly in adult males. (Refer to Attachment C for details).

Scales for assessing sanitation and hygiene in households and in individuals have been devolped from the data (Attachment C).

G. Immunology

To date, about 525 samples of adult, schooler or toddler, and pregnant female serum samples have been analyzed for IgG, IgA, IgM, C_3, albumin, and transferrin. (For details, refer to Attachment B, pp 10-13).

H. Morbidity

Morbidity recall data obtained for toddlers from November 1983 - August 1984 were tabulated as percent subjects well and with respiratory and/or gastrointestinal illness. Respiratory and gastrointestinal illness in toddlers exhibit a distinct (and expected) seasonal pattern, with respiratory illness higher in winter and gastrointestinal illness higher in summer (For details, refer to Attachment B, pp 1 & 2).

I. Parasitology

The second survey of target households for parasitic infections was completed in February 1985 in order to provide data on the prevalence of infections during the winter season. The first screening done during the summer of 1984 revealed a high incidence of parasitic infection among core families. Data from the two investigations provide a profile of the intestinal and urinary parasitic infections in the population (approximately 150 households) at two different seasons of the year. The incidence of gastrointestinal parasitic infection was much greater during the winter than summer. A total of 402 individuals, 60.5% of 664 individuals examined, had one or more parasites (Attachment D, pp. 4 to 7). The most prevalent infection was Entamoeba histolytic (37%) followed by Hymenolepis nana (17%). The infection rate was quite significant and will be regarded as an important factor in evaluating the marginal nutritional status of individuals. Infected individuals and families have received treatment. A third suvery is scheduled to be preformed next winter.

J. Reproduction

Reproduction histories (Attachment D, Table 5, p. 10), completed for approximately 100 target females, indicated that most women had their first pregnancies between the ages of 15 and 17 years. Most of these women reported normal deliveries. Their mean number of pregnancies was 4.2 and mean number of living children was 3.4. Most of the women did not smoke, did not take vitamin/mineral supplements and did not use birth control measures. Approximately 80 pregnant women enrolled in the project had delivered by February 1985 and birthweights were obtained within 24-28h on more than 80% of the infants. Frequency distribution of birthweights and mean weights at birth, 8 days and monthly are shown for 60 infants born between July and December 1984 (Attachment D, p. 16). Approximately 11% of the infants were low birthweight (2500g) and 37% were 37wk gestational age by Dubowitz scores. Mean monthly weights of infants were between the 25th and 50th percentiles of the NCHS standards (Attachment D, p. 16). Preliminary results of the history of infant feeding practices indicated that all mothers breastfed their infants and 95% breastfed for 12 months or longer. Among these mothers, 49% breastfed to 18 months and 28% for 24 months or longer. Approximately 20% of the mothers did not introduce supplementary foods until their infants were 12 mo of age.

K. Resting Metabolic Rate

A total of 650 RMR measurements were performed to February 1985. An RMR technician from the U.S. spent 6 months (October 1984-April 1985) in Egypt reducing the back-log of RMR measurements which had accumulated before the resting equipment could be made operational. Also, Egyptian personnel have been recruited and trained in the performance of RMR measurements. All RMR data have been reviewed and a determination made of data which fell outside acceptable limits. Values for computer range checks have been established. Quality control procedures for RMR measurements have been instituted. RMR tests performed on the same individuals in Egypt, Kenya and UCLA have shown differences no greater than 7%; differences of less than 10% are considered acceptable. These results suggested that RMR procedures and the data collected in the Egypt and Kenya projects are comparable (See Attachment D, p. 21).

L. SES: Social Standing and Economic Situation

Scales for determining level of SES have been developed further with data obtained on household demography; household assets; agricultural assets; occupation and education, particularly in males, and working patterns. Descriptive statistics have been generated from the initial sociodemographic village survey and 6-9 month updates on core households.

M. Time Allocation/Activity

Time use data collected in 29 Kalama case study households yield preliminary results on typical activities performed by the target male, female, schooler and toddler during a composite ten hour day. Time use data on core households are not ready for interpretation at the time of writing this report.

Activity data were collected by both observation and interview procedures. The following results are drawn from observation data as quality control measures indicate that interview data are not reliable.

Trained fieldworkers collected a total of ten hours of observation data per target individual - from either 8:00 am to 6:00 pm or from 9:00 to 7:00 pm - divided into five two-hour observation periods on five different observation days. This is equivalent to the data collection procedure scheduled for each core household every three months.

Case study time allocation data suggest that the principal activities of target males (n=8), schoolers (n=11) and toddlers (n=10) are regenerative activities such as resting/napping, "socializing" and playing (children only). The target female's activities (n=11), however, are more evenly distributed between food-related activities (e.g. processing and preparing), cleaning and maintenance and regenerative activities.

These results should be interpreted with caution as the sample size for each group of target individuals is quite small. Consequently, also expect that results obtained from the larger core households data set are likely to be different from those reported here.

N. Water Quality

(i) Chlorinated hydrocarbons or phosphorous compounds: In October 1984 samples of water from several sources in Kalama were collected and transported to the University of Arizona for analysis of organic insecticides. This crosssectional analysis yielded no detectible chlorinated hydrocarbons or phosphorous compounds (Details in Attachment C, Appenidix C).

(ii) Microbes: Water sampling and bacteriological examination have been made of all major sources of water in the village: public pump, private pump, public tap, private tap, reservoir and canal. In addition drinking water was sampled biweekly from 104 core households. Among these households 87.5% had positive coliforms and 48.1%, positive E. coli (See Attachment D, pp. 21-23). In all cases water from the canal contained unacceptable levels of

positive coliforms and E. coli and approximately one-fourth of the water samples from public pumps had unaccepatable levels of both positive coliforms and E. coli. Although the samples were limited in number, water from the reservoir and public taps in Kalama were least contaminated by positive coliforms and E. coli.

O. Other Research Activities

Please refer to data analysis on toddler food intake, anthropometry, morbidity, hygiene and sanitation, and SES submitted by the project as part of the EEP report through Gail Harrison.

IV. STATUS OF DATA ENTRY, MANAGEMENT AND ANALYSIS

Data entry has been localized at the Al-Ahram Management and Computer Center in Cairo, beginning in October, 1984. Data obtained from August, 1984 will be entered, verified and checked in Cairo and sent by magnetic tape to the U.S. for further verification and organizing into SAS files. The status of this activity is presented on page 15. Catch-up of the data accumulated during the transitional phase is expected by June, 1985. (Refer to Attachment A, p. 1 for details). Generally there is an 8-month lag in data processing; data that can be processed easily are key entered first, with the most difficult given lower priority. The project is in the process of reviewing this situation in order to accelerate data flow from the field to the United States.

The University of Kansas has completed key entering the numerous boxes of data which arrived in July, August and September 1984. Detailed data management/analysis activities are presented in Attachment C pages 47-55. All collaborating institutions have been provided clean tapes and printouts of most of the data collected from October 1984 through July 1985.

Negotiations are currently underway to have parallel data analyses performed by statisticians at Purdue University. This, however, does not preclude the important analytic work that is being done on data subsets at the Egypt Nutrition Institute (Attachment A) and at the U.S. institutions (Attachments B, C and D).

DATA FLOW FROM KALAMA AND THE N.I. THROUGH AL-AHRAM TO THE U.S.
(Egypt Project)

Type Of Data	Data Reviewed By Interviewer Or Staff	Coding Completed	Data Sent To Al-Ahram For Entry	Data Entered & Printouts Received by NI	Data Verified	Official Tapes Prepared & Sent To KS	Total Number Of Forms	Remarks
Form 01 = Medical History Examination								
Month 8/84	+	+	+	+	reviewed by doctors but no range checks			
9/84	+	+	+	+				
10/84	+	+	-	-	-	-		
11/84	+	+	-	-	-	-		
12/84	+	+	-	-	-	-		
1/85	+	+	-	-	-	-		
2/85	+	-	-	-	-	-		
3/85	-	-	-	-	-	-		
Form 03 = Morbidity Recall								
Month 8/84	+	+	+	+	reviewed by doctors but no range checks			
9/84	+	-	-	-	-	-		
10/84	+	+	-	-	-	-		
11/84	+	-	-	-	-	-		
12/84	+	-	-	-	-	-		
1/85	+	-	-	-	-	-		
2/85	+	-	-	-	-	-		
3/85	-	-	-	-	-	-		
Form 02 = (Reproduction) Schedule 1 = Reproduction History (First Visit)								
Month 8/84	+	+	+	+	-			
9/84	+	+	+	+	-			
10/84	+	+	+	+	-			
11/84	+	+	+	+	-			
12/84	+	+	+	+	-			
1/85		-	-	-	-			
2/85	-	-	-	-	-			
3/85	-	-	-	-	-			

Type Of Data	Data Reviewed By Interviewer Or Staff	Coding Completed	Data Sent To Al-Ahram For Entry	Data Entered & Printouts Received by NI	Data Verified	Official Tapes Prepared & Sent To KS	Total Number Of Forms	Remarks
Form 02 = (Reproduction) Schedule 2 = Lactation & Infant Feeding History (First Visit)								
Month 8/84	?							
9/84	?							
10/84	+	+	+	+	-			
11/84	+	+	+	+	-			
12/84	+	+	+	+	-			
1/85	+	+	+	+	-			
2/85	+	-	-	-	-			
3/85	-	-	-	-	-			
Form 02 = (Reproduction) Schedule 3 = Pregnancy Monthly Visits								
Month 8/84	+	+	+	+	-			
9/84	+	+	+	+	-			
10/84	+	+	+	+	-			
11/84	+	+	+	+	-			
12/84	+	+	+	+	-			
1/85	+	-	-	-	-			
2/85	+	-	-	-	-			
3/85	-	-	-	-	-			
Form 02 = Schedule 4 = Pregnancy Outcome								
Month 8/84	+	+	+	+	-			
9/84	+	+	+	+	-			
10/84	+	-	-	-	-			
11/84	+	-	-	-	-			
12/84	+	-	-	-	-			
1/85	+	-	-	-	-			
2/85	+	-	-	-	-			
3/85	-	-	-	-	-			

Type Of Data	Data Reviewed By Interviewer Or Staff	Coding Completed	Data Sent To Al-Ahram For Entry	Data Entered & Printouts Received by NI	Data Verified	Official Tapes Prepared & Sent To KS	Total Number Of Forms	Remarks
Form 02 = (Reproduction) Schedule 5 = Dubowitz								
Month 8/84	+	+	+	+	-			
9/84	+	+	+	+	-			
10/84	+	+	+	+	-			
11/84	+	+	+	+	-			
12/84	+	+	+	+	-			
1/85	+	-	-	-	-			
2/85	+	-	-	-	-			
3/85	-	-	-	-	-			
Form 02 = (Reproduction) Schedule 7 = Lactation & Infant Feeding (8 days & Monthly)								
Month 8/84	+	+	+	+	-			
9/84	+	+	+	+	-			
10/84	+	+	+	+	-			
11/84	+	+	+	+	-			
12/84	+	+	+	+	-			
1/85	+	+	+	+	+			
2/85	+	-	-	-	-			
3/85	-	-	-	-	-			
Form 02 = (Reproduction) Schedule 8 Supplementary Foods Monthly								
Month 8/84								
9/84								
10/84								
11/84								
12/84								
1/85								
2/85								
3/85								

	Of Staff		For Entry	Received by NI		Sent to KS	Of Forms	
Form 04 = Anthropometry								
Month 8/84	+	+	+	+				
9/84	+	+	+	+				
10/84	+	+	+	-				
11/84	+	+	+	-				
12/84	+	+	+	-				
1/85	+	+	-	-				
2/85	+	-	-	-				
3/85	-	-	-	-				
Form 02 = Anthropometry (Sched. 6,11,12)								
Month 8/84	+	+	+	-				
9/84	+	+	+	-				
10/84	+	+	+	-				
11/84	+	+	+	-				
12/84	+	+	+	-				
1/85	+	+	-	-				
2/85	+	-	-	-				
3/85	-	-	-	-				
Form 02 = (Reproduction) Sched. 13 = Reproduction/lactating History: Supplementary Form								
Month 12/84	+	+	+	+	-			
1/85	+	+	+	+	-			
Form 06 = Sched. 2 = Hematology & Urine								
Month 7/84	+	+	+	+	-			
8/84	+	+	+	+	-			
9/84	+	+	+	+	-			
10/84	+	+	+	+	-			
11/84	+	+	+	+	-			
12/84	+	+	+	+	-			
1/85	-	-	-	-	-			
2/85	-	-	-	-	-			
3/85	-	-	-	-	-			

Type Of Data	Data Reviewed By Interviewer Or Staff	Coding Completed	Data Sent To Al-Ahram For Entry	Data Entered & Printouts Received by NI	Data Verified	Official Tapes Prepared & Sent To KS	Total Number Of Forms	Remarks
Form 06 = Sched. 4 = Immunology								
Month 11/83	+	+	+	+	-			
12/83	+	+	+	+	-			
1/84	+	+	+	+	-			
2/84	+	+	+	+	-			
3/84	+	+	+	+	-			
4/84	+	+	+	+	-			
5/84	+	+	+	+	-			
6/84	+	+	+	+	-			
7/84	+	+	+	+	-			
20/8/84	+	+	+	+	-			
Form 06 = Sched. 8 = Parasitology								
Month 1/85	+	-						
2/85	+	-						
Form 07 = Sched. 3 = School Age Child Obser.								
Month 10/84	+	+	+	+	-			
11/84	+	+	+	+	-			
12/84	+	+	+	+	-			

Type Of Data	Data Reviewed By Interviewer Or Staff	Coding Completed	Data Sent To Al-Ahram For Entry	Data Entered & Printouts Received by NI	Data Verified	Official Tapes Prepared & Sent To KS	Total Number Of Forms	Remarks
Form 10 = Food Intake								
Sched. 1 = Census								
Sched. 2 = Food Intake								
Sched. 3 = HH Recipes								
Sched. 4 = Individual F.I.								
Month 8/84	+	+	+	-				
9/84	+	+	+	+				
10/84	+	+	-					
11/84	+	-	-					
12/84	+	-	-					
1/85	-	-	-					
2/85	-	-	-					
3/85	-	-	-					

N.B. All other data (copy) are being sent to the United States in raw state at this time for processing. Sociodemography, household assets, agricultural assets, Activity/Time Allocation, Child Caregiving, Hygiene, Sanitation, Community commodity and food prices, wage scale, and geography.

V. QUALITY CONTROL PROCEDURES

Details on quality control procedures are presented in Attachments B, C and D.

A. Serum Zinc
(See Attachment B, pp. 22-39)

B. Milk IgA, IgG and Lysozyme Measurements
(See Attachment B, pp. 40 - 44)

C. Anthropometry
(See Attachment D, Table 1, p. 4)

D. Food Intake
(See Attachment C, pp. 62-64)

E. Village Census/demography
(See Attachment C, p. 46)

F. Household Assets
(See Attachment C, p. 46)

G. Agricultural Assets
(See Attachment C, p. 46)

H. SES
(See Attachment C, p. 46)

I. Child Care-giving
(See Attachment C, pp. 43-44)

J. Household Hygiene and Sanitation
(See Attachment C, pp. 43, 46)

K. Time Allocation/Activity
(See Attachment C, p. 42)

L. Laboratory
(See Attachment D, p. 24)

M. RMR Measurements
(See Attachment D, p. 25)

VI. CURRENT STATUS AND PLANS FOR THE NEXT PERIOD

The U.S. Principal Investigators plan to continue rotating in Egypt through December, 1985 in order to assist the Egyptian P.I. manage the project. All study investigators expect to finalize data collection and field research on all functions in December 1985, or no later than February 1986. The U.S. Field Coordinator who resides in Cairo is expected to return to the U.S. no later than April 30, 1986.

In addition to collecting data, we expect to focus much of our effort in the coming months to model building and data analysis.

ATTACHMENT A

SIX-MONTH REPORT
NUTRITION INSTITUTE

SIX-MONTH REPORT

September 1, 1984 - February 28, 1985

Nutrition Institute
Cairo, Egypt

Nutrition CRSP Project

Osman Galal, Principal Investigator

I. ACTIVITIES

Activities during this six-month interval of the project marked the start of the second year of data collection. This gave our senior scientists the opportunity to think about whether or not adherence to actual protocols has been effective. It was also identified by the fact that data started to be entered in Cairo on to tape and a copy sent to US for analysis. Our staff in the NI also started to think in more depth about strategies for analysis and try to produce examples for that.

1. Data collection and validity methods. During the weekly meetings it was always emphasized to revise and study the tests being done for validation of the various on going methodologies and in particular the food intake method. Dr. Wafaa Mousa was able to clarify much of the miscommunications which happened in the past. Two memos were written in that respect for further clarification. Those validation tasks have been discussed in length with Dr. Beaton during January 1985, Cairo meetings. Much has been elucidated and more has to be done. Details on the various views were documented and circulated. Other validation activities and quality control for the chemical analysis are being implemented. Results for Hemoglobin and Serum Ferritin are available where errors term if duplicate assays were performed showed 1.2 to 1.9% for hemoglobin and 10 to 15% for ferritin. Further validation and explanation for the ferritin results are being performed. Similar quality control activities were performed for the RMR and immunological assays. Results are both promising and encouraging.

2. Data management. It was decided that data collected from 1st of August 1984 to the end of the project be entered in Egypt on to tape and sent a copy to US. This entailed rearrangement of the DMU to be able to face this new objective. One important aspect was to contract with Al Ahram for entering our data. This has been accomplished and data now is flowing to Al Ahram in a scheduled manner. The process is still slow but it is expected to be more efficient and quicker. All data are being entered now i.e., morbidity, anthropometry, chemical analysis, immunology and cognition. Food intake data are being coded and ready for entry.

3. Analysis of data. Following the visit of the EEP members to Cairo in July 1984 it became clear that part of the time allocated for the project activities would be to try to analyze the data and study its behavior. Not much had been done in that respect. The decision by the SCB during early October 1984 that a meeting for senior scientists to be held in Egypt to look at data, encouraged them to start to analyze the data. Much of that has been done since then in respect to description of data and setting up a strategy for analysis.

4. The intra-individual variance in body weight. A substudy was called for to look at the day-to-day variance in body weight for toddlers. This study was performed on 14 toddlers. The results of that study were circulated during February 1985 SCB meeting.

5. RMR activities. There was much delay in initiating the study on the RMR of targets. The reason for the delay was due to technical faults in the Beckman apparatus. Since rectification of those faults and the arrival of Mr. Reters to Cairo in September 1984, the collection of RMR data is running in a satisfactory manner. It is anticipated that within another 2-3 months, the RMR results will be in good shape and will not be considered as a defaulted activity.

II. MEETINGS

NI staff and senior scientists from other Universities participated positively in January 1985 meetings. Much of the discussions were devoted to setting a strategy for analysis. The toddler as being the nucleus for analytical trials led to other various issues during the meeting concerning how the CRSP hypotheses would be examined. Most of these analytical trials are in the appendix. Reports from cognition and child behavior are also included in appendix. The results of chemical analysis of blood including immunology are in the appendix.

Dr. Galal attended both September and February SCB meetings.

III. STAFF AT FIELD

The work load on staff did increase since September 1984 until it reached its peak during December 1984. During that time all the households were included in the study. It was not until the end of December 1984 that early entries began exiting from the study. It is expected that work load would remain on a plateau for some time i.e., another two months. After that period it is expected that a tailing off of activities would occur. There are nearly 100 data collectors working in the field now, as well as seven senior investigators from the NI and five from different Egyptian University.

IV. BUDGET

NI revised its budget and submitted it to Purdue University after re-calculating actual expenses and making various consessions to allow for the budget restriction. Much of that was dealt with by increasing the cost sharing of the NI in favor of the CRSP project.

APPENDIX A

A REPORT ON THE COGNITIVE TESTING AND ARE PROPOSED ANALYTICAL STRATEGY FOR THE CRSP PROJECT

By: Feisal Yunis, Ph.D
Project Psychologist

The team of cognitive testing for the Egypt CRSP was assembled and started working on the project on April, 1983, a year later than the rest. We had to work under extremely difficult conditions. First, there were a whole battery of psychological tests proposed and agreed upon in the protocol most of them have never been tried or standardized on Egyptian populations. Our job involved, among other things, translating these tests into the native language (an extremely difficult job that can take years), recruiting qualified psychologists to test the subject populations, get training on some of these tests and training my psychologists on all of them, and then test the feasibility of applying these tests in an Egyptian cultural set up. We managed to accomplish almost all of these tasks by the end of December.

During the course of translating training and initial testing , we faced some problems. Those problems concerns mainly the applicability of some of the psychological tests in an Egyptian ecological setting. We put in detailed proposals for changes in the tests and in the testing procedures. We worked out all the modifications needed in all subjects groups. We then started introducing these changes and retrain the psychologist colleagues in administrating them.

This work took some time until April 1984. The batteries of tests for each group of subjects are enclosed. The training procedures involves for the tests of observation and rating reaching almost 100% agreement with senior scientist who already had reached the same level with the American counterpart.

V. PLANS FOR NEXT SIX MONTHS

1. Proceeding with collection of data.

2. Catching up on data entry in El Ahram

3. Enrolling pregnant women from core families to cover missing data

4. Continue the validation study on food intake.

Following this good start we faced a second major problem. 5 out of the seven part-time psychologists who worked with us left the project during the summer of 1984 for different reasons. We had to retrain new recruits in very difficult conditions.

The situation of data collection now as it stands can be summarized in terms of missing data and the subjects tested.

For toddlers we have tested until late December 110 toddler out of 175 with a missing ratio of 38%. For schoolers we tested 108 out of 120 with a missing ratio of 10%. For adult women 69 out of 97 were tested (missing value of 29%) and for adult men only 37 out of 95 were tested with a missing value of 61%. The adult figiures are not so alarming since we still have till the end of the data collection period to complete them. We are now looking forward to complete our reliability study which is slowly being carried out (for the above mentioned circumstances)

Pilot analysis were carried out on 20 toddlers tested at the age of 18 months on the Bayley Scale (mental) and the infant behavior record IBR activity level in conjunction with a food intake parameter (total Kcal per day) and some anthropometric variables (weight per height, weight gain per month). Non of the simple correlation computed proved to be significant nor were there any signs of significant non linear correlation. Any multi variate analysis will be of no value here because of the very small sample size.

SUGGESTED ANALYTICAL STRATEGY

The analytical strategy proposed here in takes the following factors into consideration:-

1. The large amount of data and the large numbers of variables measured in each area of the study (cognitive , behavioral food intake, morbidity, anthropometry etc.)

2. Each area suffers from the presence of missing data and many of the variables are of unknown variability and validity, especially an Egyptian cultural set-up. These problems have to be dealt with first before attempting to carry out any joint analyses

3. Cognitive variables as well as any other variables in the study are multiply determined Hence, the analytical techniques that should be used are those of multi-variate statistical techniques. Specifically discriminant function analyses and multiple regression techniques are the statistical techniques of choice in the analyses of parallel data sets. The first will be optimal as a diagnostic tool and the second for prediction purposes. More ellaborate techniques like path analysis and time series analysis will be most useful in looking for over time variabilities. Taking

Taking all these considerations into accounts, a three stage analytical strategy is proposed :-

Stage I:- is a specific area analyses period which could be started immediately. The objectives of this stage are:-

1. Establishing reliability and validity of the tools used on the study.

2. Deciding on the best methods to deal with the missing information from the area in question

3. Determination of the more significant variables or ranking the variables in the area (based on objective and clear criteria) as to their scientific credability .

StageII. limited joint analyses based on the more credible variables in each area. This will acheive the following objectives

1. Testing the main hypotheses of the study in the most suitable conditions i.e.

   A- more manageable set of data
   B- more powerful measures

2. Achieving the main objectives of the study in a short period of time

3. It could be used as a feasibility study for the more expensive andmore time consuming full and final data analysis.

4. It could be used as a training and getting more familiar excercise for those of us less familiar with the more modern and more complex multi-variate analytical techniques

Stage III. Full and final data analysis considering all suitable variables of the study.

ATTACHMENT B

SIX-MONTH REPORT
UNIVERSITY OF ARIZONA

SIX-MONTH REPORT

September 1, 1984 - February 28, 1985

University of Arizona
Egypt Project, Nutrition CRSP

Submitted February, 1985

Gail G. Harrison

Gail G. Harrison, Principal Investigator

I. COUNTRY PROJECT STATUS

A. Travel

Dr. Watson traveled to Egypt November 12-25 to participate in the on-going quality control for immunologic assays and to begin analysis of data collected to that point.

Dr. Ritenbaugh traveled to Egypt September 11 - December 2 to contribute toward the maintenence of the collection and beginning analysis of anthropometry, morbidity, and reproduction data. She also worked to facilitate the transition to data entry in Egypt. Her airfare and partial perdiem were charged to other sources.

Dr. Harrison traveled to the SCB Meeting in Berkeley September 26 - October 1. From December 30, 1984 to January 22, 1985 Dr. Harrison was in Egypt on non-CRSP business. During that time she helped to organize and participated in the interproject data analysis meeting which took place in Cario January 5-10. Drs. Harrison and Mare' traveled to Berkeley in February, 1985 for the SCB and IC meetings there.

B. Negotiations with Counterpart Institutions

A revised budget proposal for periods IV, V, and VI (October 1984- August 31, 1987) was submitted to Purdue University in September. This proposal complied with the monetary restrictions requested by Purdue in order to project the total Egypt Project budget within its allocation. Significant deletions in work are projected if this budget is the final one. Final negotiations are pending.

C. Recruitment of Staff for the Project

In the quarterly report for April - July, 1984 Ms. Norma Seaver was reported to have replaced Ms. Pam Shubart as the immunology laboratory technician. This account was incorrect; Ms. Seaver is funded by other research grants. Jill Durall was also hired part time into the CRSP project as an administrative assistant.

D. Research Activities

Morbidity

1. Data collection forms. The monthly morbidity summary form mentioned in the April - July quarterly report was finalized in October with subsequent reproduction of forms at the Nutrition Institute (see Appendix A). An illness subroutine form was developed to summarize changes in activity and food intake during the course of an illness (see Appendix B). This double-sided form was accompanied by an addendum to the Morbidity Manual.

2. Data Analysis. Initial reduction and analysis of morbidity recall data for toddlers from November, 1983 to August 1984 was done at Arizona prior to the January interproject data analysis meeting. Five-day periods throughout each month were tabulated as percent subjects well and with respiratory and/or gastrointestinal illness (see Figures 1-3). Respiratory and gastrointestinal illness in toddlers exhibit a distinct (and expected) seasonal pattern, with respiratory illness higher in winter and gastrointestinal illness higher in summer.

   Currently analysis centers on developing measures of incidence, duration, and severity of gastrointestinal, respiratory and communicable illnesses and correlating these variables with toddler anthropometric data.

Water Quality

In October 1984 samples of water from several sources in Kalama were collected and transported to the University of Arizona for analysis of organic insecticides. This cross-sectional sampling yeilded no detectible chlorinated hydrocarbons or phosphorus compunds (see attached report in Appendix C).

Anthropometry

The January data analysis meeting reviewed descriptive statistics generated for all target groups using November 1983 through July 1984 data. Estimates of technical error of measurement were calculated as outlined in the Anthropometry Manual (see Table 1). These compare favorably with other published studies. Not unexpectedly, technical error is higher for toddlers' measurements than for other targets. Means, standard deviations and frequency distributions were made for lead males and females for height and weight, body mass index, mid-arm circumference and triceps skinfolds (see Table 2 and Figures 4-7). Descriptive data for target schoolers and toddlers were presented separately by sex for length, weight, and weight/length Z-scores (with reference to the NCHS reference population), mid-arm circumference; and triceps skinfold (see Figures 8-15). Height and weight change indices (change in height or weight/# of months observed) were calculated to depict rate of change in these two measures with time (refer to Figure 16).

During the Cairo data analysis meeting, the issue was raised by Dr. Beaton that nowhere is the CRSP attempting to estimate the day-to-day (intra-individual) variance component in body weight, and that this information especially for toddlers will be important in interpreting monthly anthropometric data. Accordingly, the Egypt project volunteered to initiate a small substudy to estimate the magnitude of this term for toddlers in Kalama. Following the meeting, Drs. Harrison and Shaheen developed a protocol for

Percent Toddler Well, With Gastrointestinal or Respiratory Illness by Time

Figure 1.

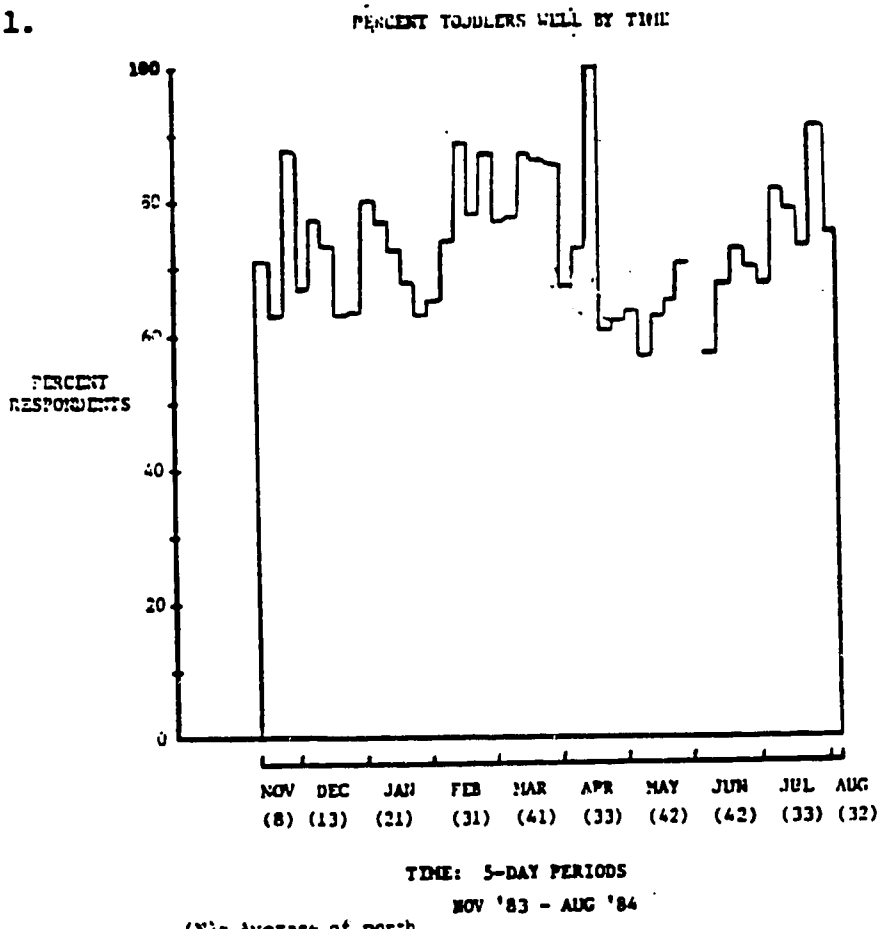

Figure 2.

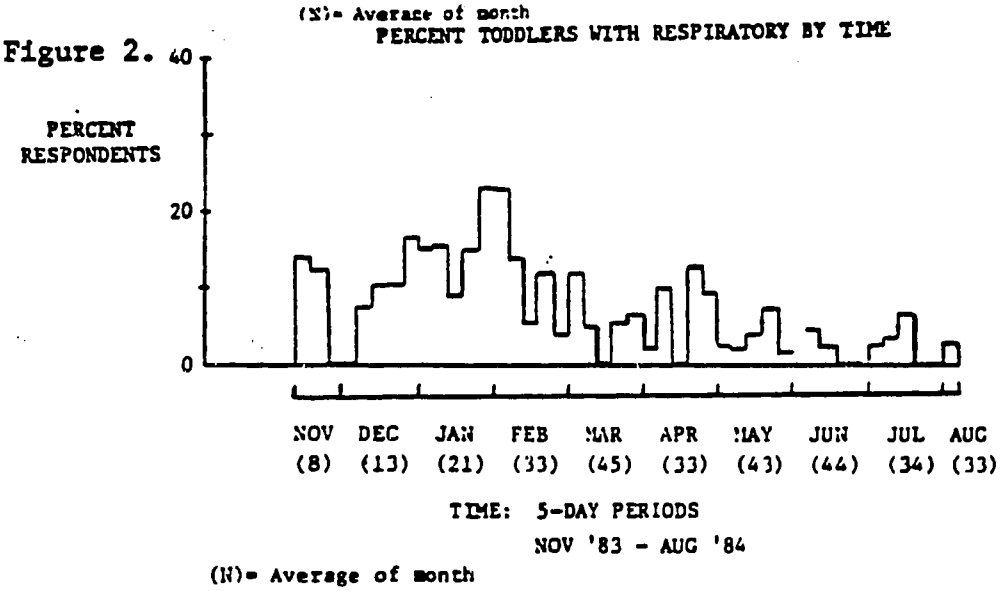

Figure 3.

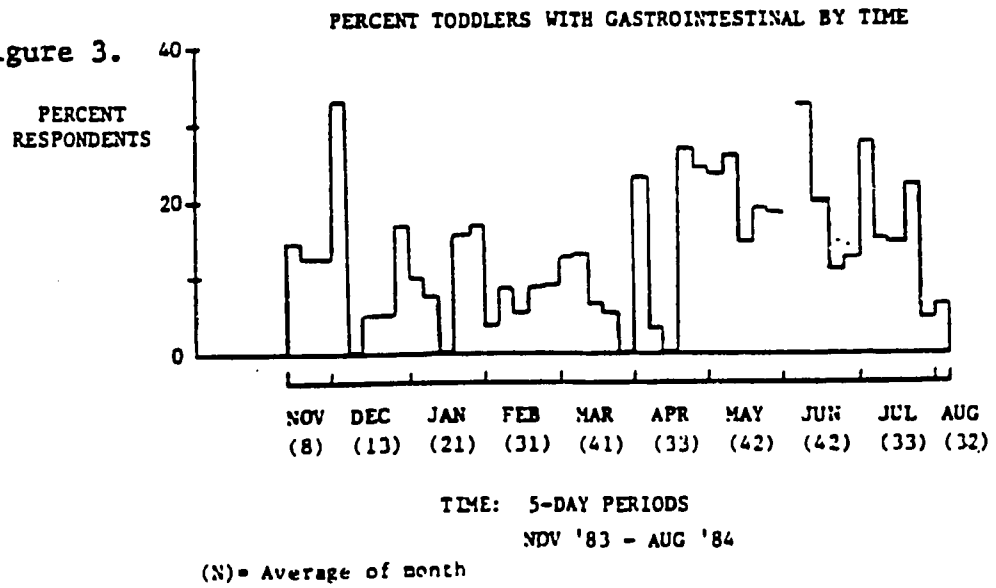

Table 1. Inter-Observer Reliability

(11/83 - 7/84)

	N	Technical Error	Coefficient of Variation
Weight			
Lead Males	62	.11	.16
Lead Females	152	.07	.11
Schoolers	91	.31	1.41
Toddlers	171	.96	8.89
Height			
Lead Males	47	.22	.13
Lead Females	100	.24	.16
Schoolers	92	.16	.13
Toddlers(length)	169	2.49	3.20
Triceps Skinfold			
Lead Males	56	.73	7.24
Lead Females	1[illegible]6	.64	3.03
Schoolers	74	.30	3.79
Toddlers	147	.87	9.64

Table 2. Adults, First Observation Only

	Lead Males		Lead Females	
	(n)	$\bar{x} \pm SD$	$\bar{x} \pm SD$	(n)
Height (cm)	(34)	167.5 ± 5.4	154.4 ± 10.2	(76)
Weight (kg)	(39)	67.7 ± 10.5	63.8 ± 13.7	(83)
Arm circum.(cm)	(45)	26.2 ± 3.3	27.1 ± 5.9	(93)
Triceps Skinfold(mm)	(46)	10.8 ± 6.9	19.2 ± 8.9	(94)
Biceps Skinfold(mm)	(45)	5.8 ± 3.7	10.4 ± 5.8	(94)
Subscopular Skinfold (mm)	(15)	8.3 ± 5.3	13.9 ± 5.8	(29)
BMI	(37)	23.9 ± 3.4	25.9 ± 4.6	(74)

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Distribution of Lead Male and Lead Female Heights and Weights

Figure 4.

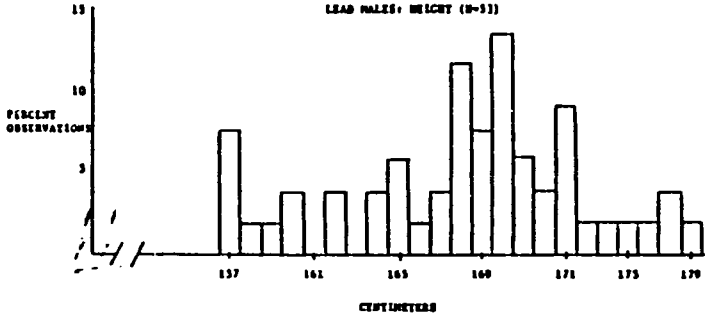


Figure 6.

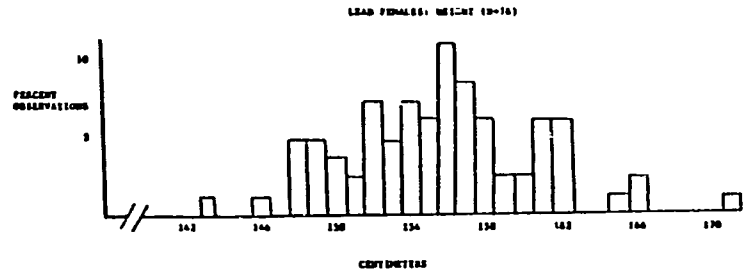


Figure 5.

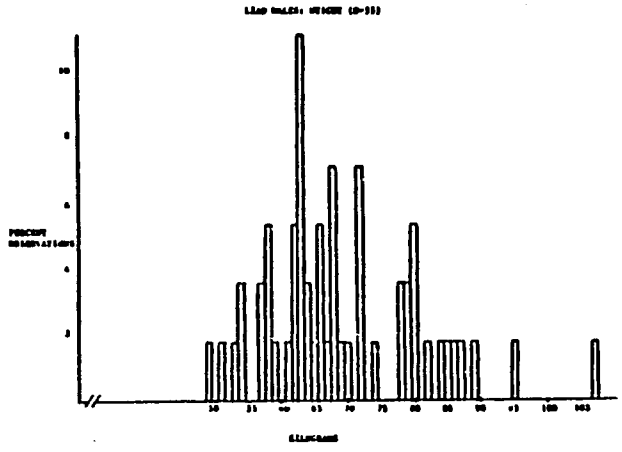


Figure 7.

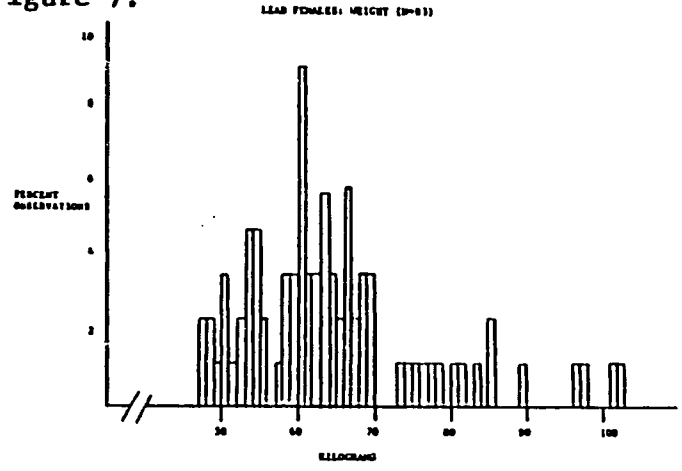


Figure 8. Z-Score Distribution of Male & Female Schoolers Height

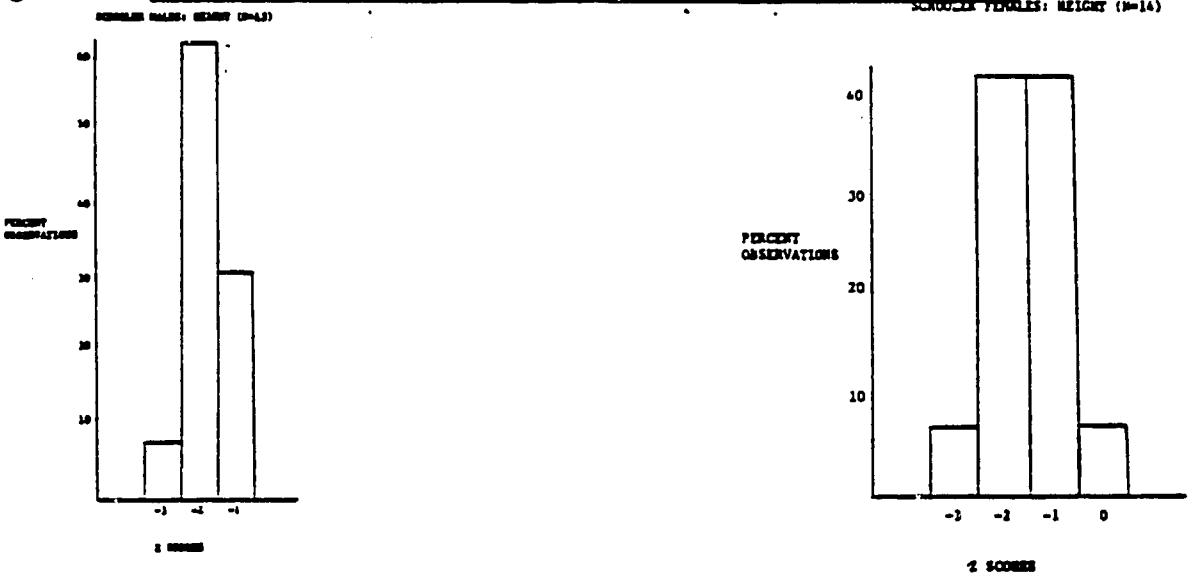


Figure 9. Z-Score Distribution of Male & Female Schoolers Weight

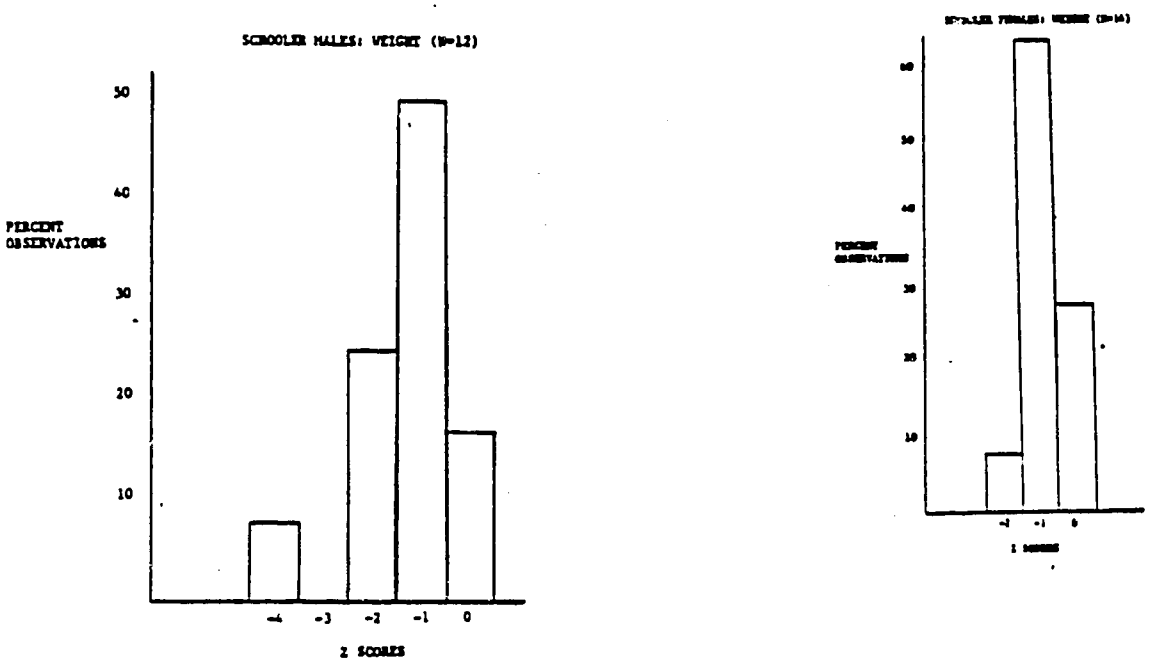


Figure 10. Z-Score Distribution of Male & Female Schoolers Weight/Height

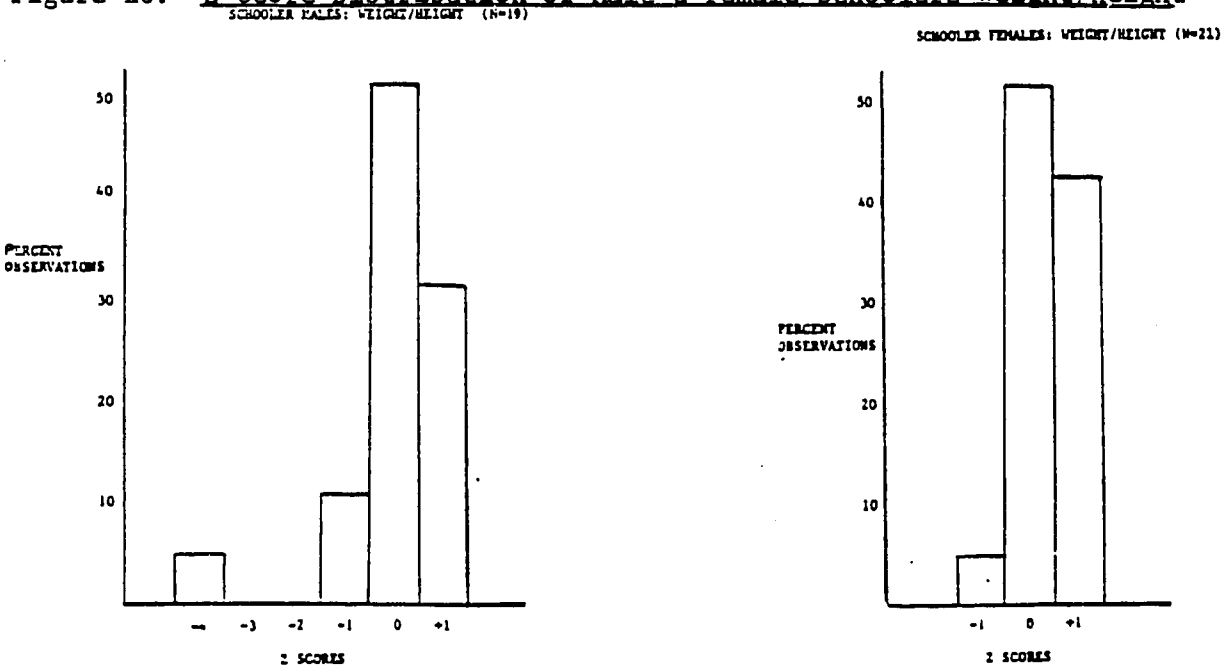
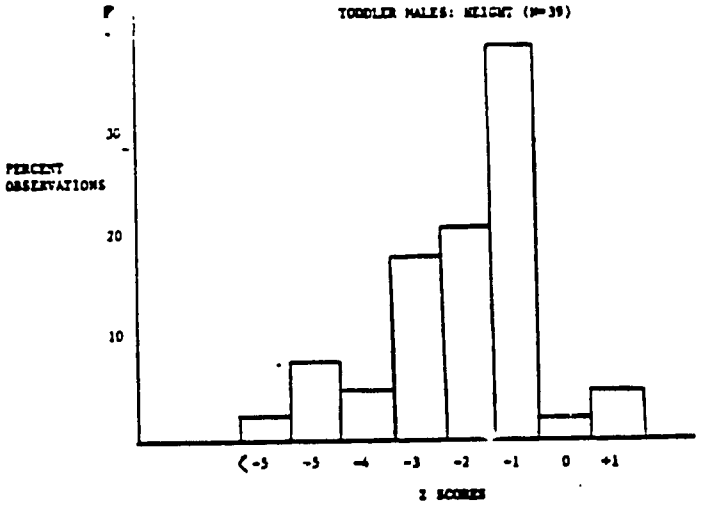


Figure 11. Z-Score Distribution of Male & Female Toddlers Height



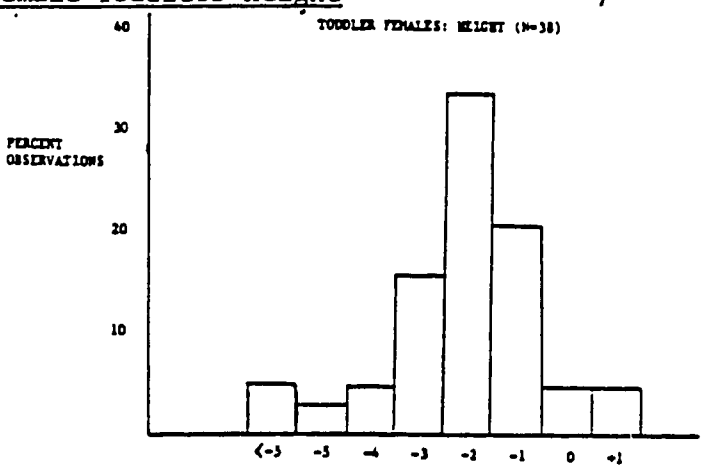
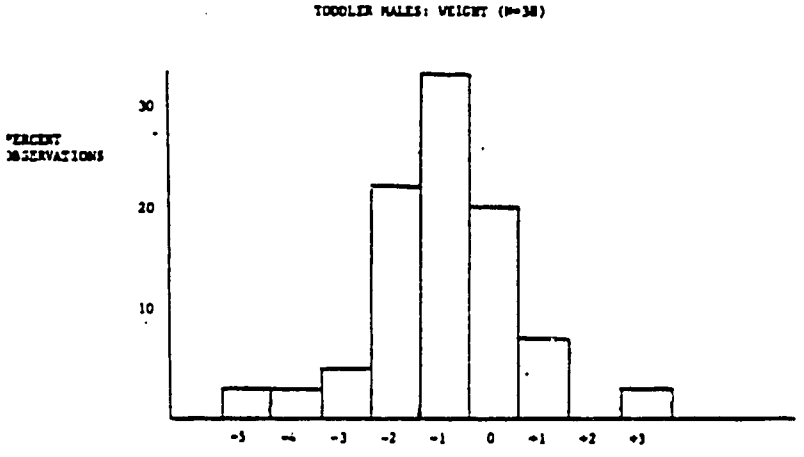


Figure 12. Z-Score Distribution of Male & Female Toddlers Weight



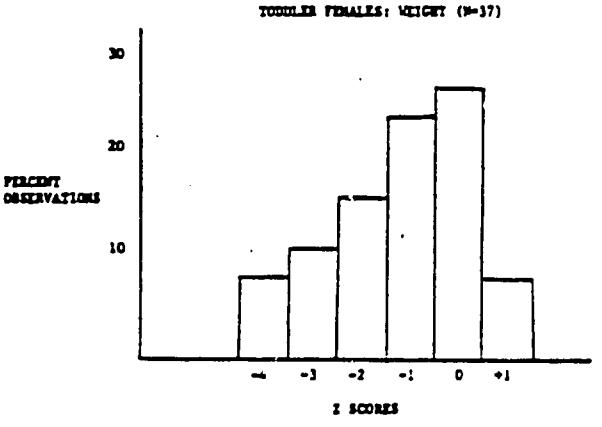
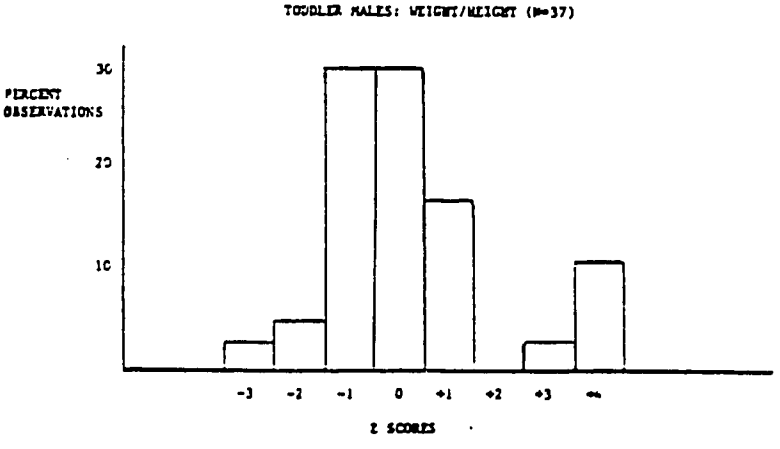
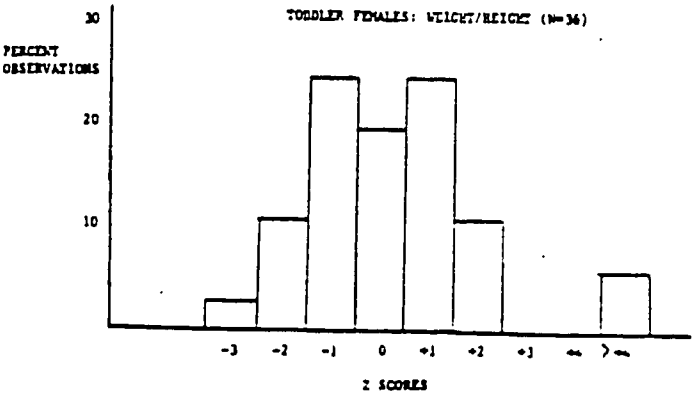
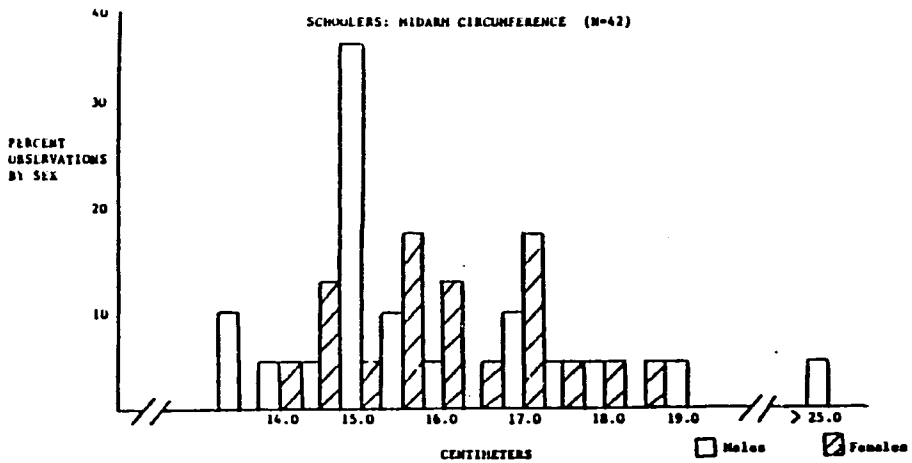


Figure 13. Z-Score Distribution of Male & Female Toddlers Weight/Height







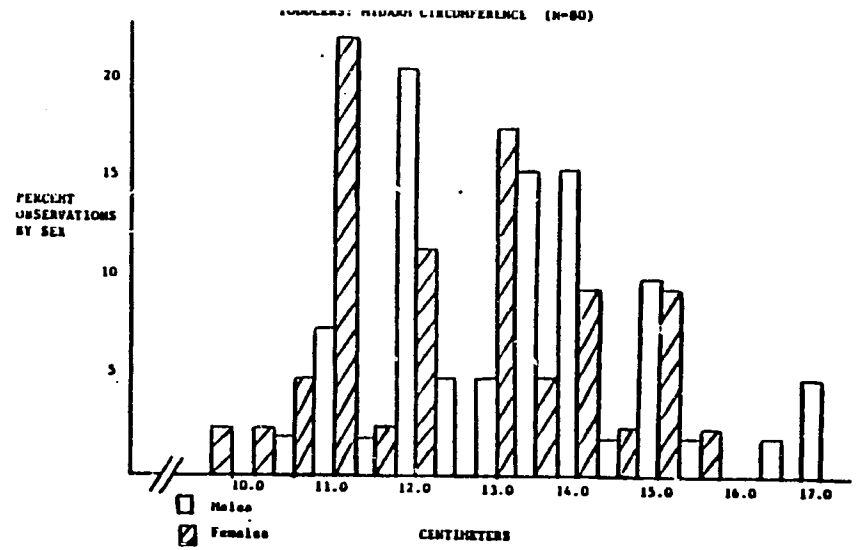
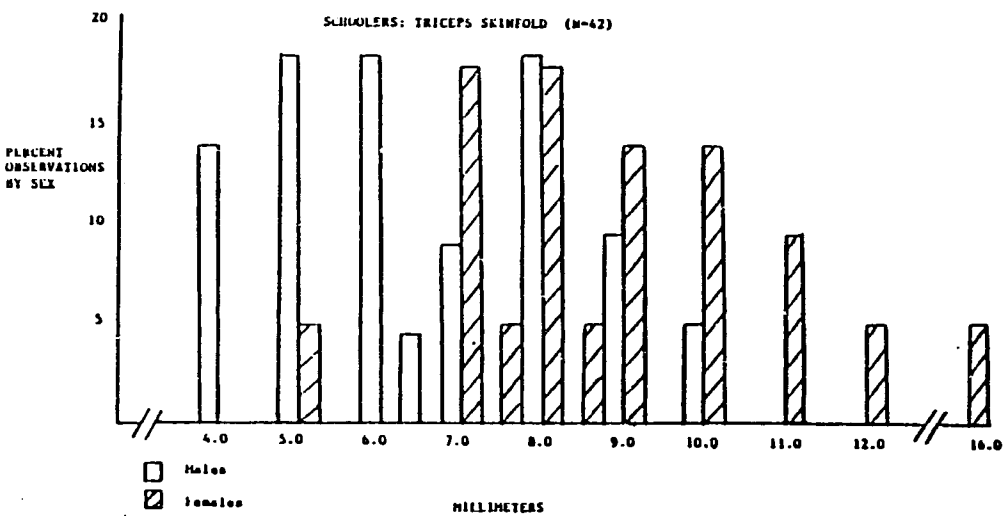


Figure 15. Distribution of Male & Female Toddlers Triceps Skinfold



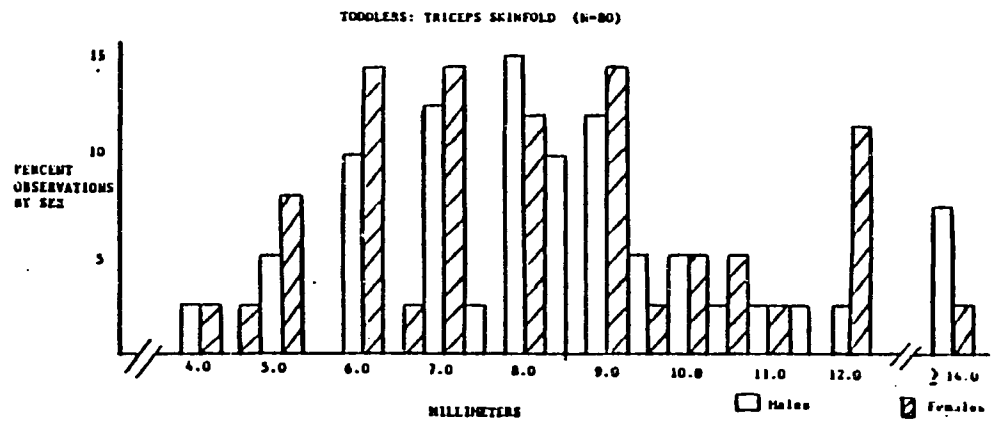
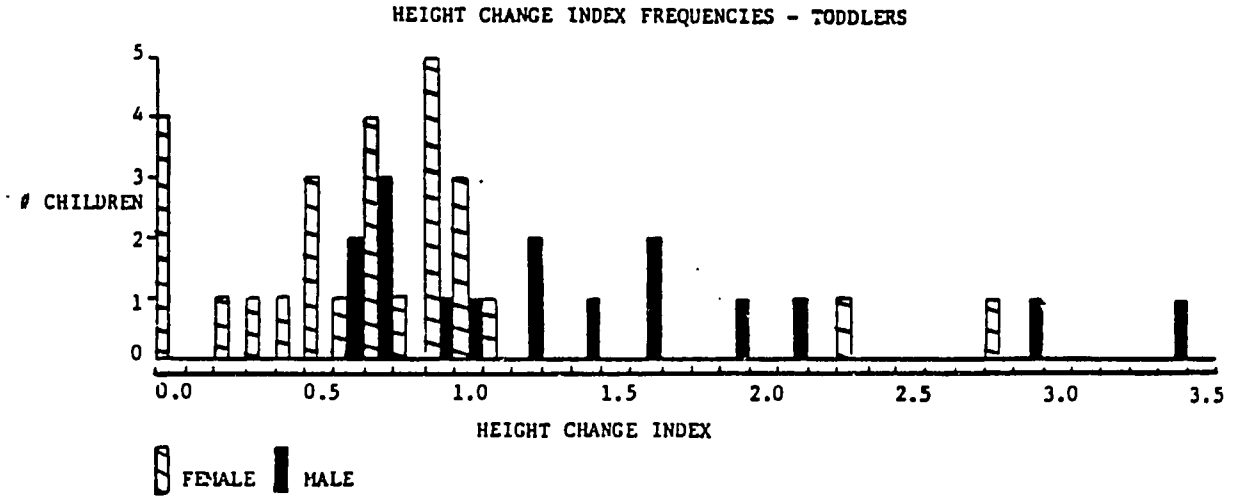
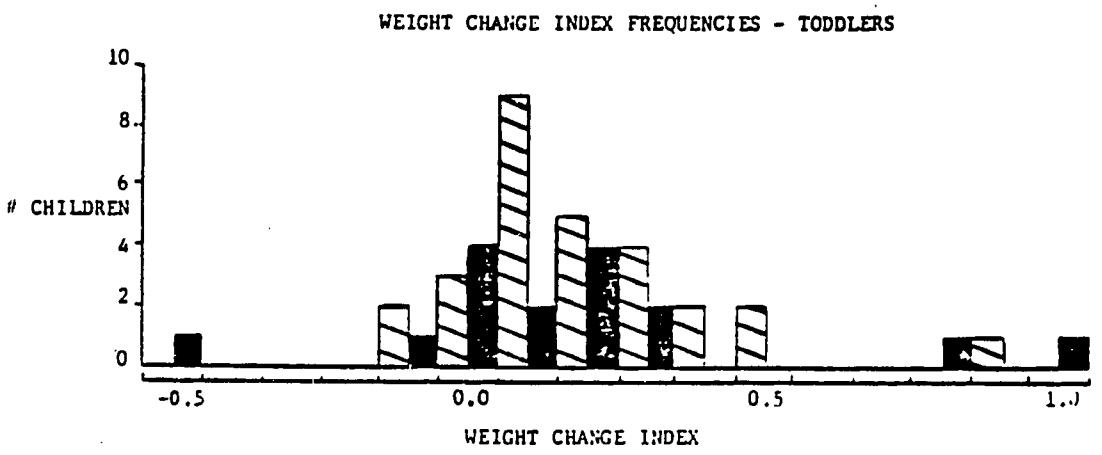


Figure 16. Distribution of Height & Weight Change Indices for Toddlers





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such a substudy. This protocol was circulated to PI's and Management later in January. The substudy has been carried out and data will be analyzed in the next several weeks.

During February 1985, we acquired from CDC a microcomputer floppy-disc piece of software which converts weights and heights of children to Z-scores, % of median and percentiles in reference to the NCHS (and now international) reference population. We made copies of this available immediately to Dr. Kirksey and to the Nutrition Institute. We also supplied the Nutrition Institute with a copy of this program on magnetic tape (already available at the US institutions) for use at Al-Ahram Computer Center.

Currently our data analysis efforts concern plotting a "standard" or expected rate of growth for target toddlers by sex so that deviations from the expected rate can be related to morbidity and food intake measures. In addition, we are creating a floppy disc data entry and graphics package for mini-computers for rapid anthropometric data plotting. This will be shared with all projects.

Zinc Status

Serum and hair samples continued to be transported from Egypt to Dr. Weber's laboratory; a total of 165 and 123 serum and hair samples, respectively, have arrived to date. Hair samples are being stored for future analyses. One hundred and sixty-six serum samples have been analyzed for zinc content. Approximately 25% of target toddlers and 15% of target schoolers fall in the "deficient" range for serum zinc. (see Tables 3 & 4). A quality control protocol (see Appendix) was approved and distributed for laboratory use, and this laboratory has drawn blood from a sample of healthy individuals and pooled the serum for control analyses. The monthly quality control reporting system for serum zinc is beginning to be implemented with this first set of analyses.

Immunology

Beginning in August 1984 capillary serum samples were collected from schoolers and toddlers in increasing numbers and delivered to the immunology laboratory in the Nutrition Institute. They have been analyzed within 30 days of receipt. To date, about 525 samples of adult, schooler or toddler, and pregnant female serum samples have been analyzed for IgG, IgA, IgM, C3, albumin, and transferrin. Results of the first set of serum immunology assays are presented in Tables 5 & 6. C-reactive protein determination has been continued and will be correlated with incidence of infectious diseases. Total lymphocyte counts, percent T-lymphocytes and total T-lymphocyte counts are done on all venous blood samples. These assays are done daily in Cairo at the Nutrition Institute. Saliva samples were collected, centrifuged and

Table 3. Serum Zinc of Toddlers and Schoolers (ug/dl)

Group	(N)	$\bar{X} \pm$ S.D.	Range	"Adequate" minimum
Toddlers, boys	(43)	58.3 ± 28.1	31.5 - 171.2	83
Toddlers, girls	(35)	68.1 ± 26.1	38.2 - 159.3	83
Schoolers, boys	(32)	93.3 ± 34.3	43.4 - 163.3	70
Schoolers, girls	(42)	76.6 ± 23.3	34.5 - 148.9	70

Table 4.

Percent of Target Toddlers and Schoolers With Serum Zinc in "Deficient" and "Adequate" Ranges

		Deficient	Borderline		Adequate
Toddlers	(N)	(< 57ug/dl)	(57-68ug/dl)	(68.1-83ug/dl)	(> 83ug/dl)
Boys	(43)	25.6	20.9	25.6	27.9
Girls	(35)	20.0	31.4	28.9	20.0
All	(78)	23.1	25.6	26.9	24.4
Schoolers		(< 60ug/dl)	(60.64.9ug/dl)	(65-69.9ug/dl)	(> 70ug/dl)
Boys	(32)	15.6	0	9.4	75.0
Girls	(42)	16.7	19.1	16.7	47.6
All	(74)	16.2	10.8	13.5	59.5

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Table 5. Serum Immunology Test Results of Pregnant Women

	E. Rosette %	IgG mg/dl	IgM mg/dl	Transferrin mg/dl	C_3 mg/dl
N	70	68	70	70	70
Mean ± S.D.	45.39±15.58	1399.4±459.37	215.09±81.16	275.79±111.3	130.67±36.77
Range	14-73	120-2720	57-548	77-515	32-245

Table 6. Serum Immunology Test Results of Target Groups

Target (N)	E. Rosette %	IgA mg/dl	IgG mg/dl	IgM mg/dl	Prealbumin mg/dl	Transferrin mg/dl	C_3 mg/dl	cRP
Expected Mean	65	150	1500	150	30	280	130	
Lead Males (33)								
Mean ± S.D.	36.7±17.98	321.2±163.89	1336.6±297	217.3±82.06	18.86±4.7	153.36±86.2	107.5 ±26.5	1.5±.8
Range	4-75	102-706	810-2102	80-506	8-32	19-355	42.5-178	0-16*
Lead Females (41)								
Mean ± S.D.	37.5 ±18.3 **	252.15±130.1	1250.65±333.4	189.5±61.6	16.98±5.48	202.5±86.3	123.3 ±28.29	1.029±.8
Range	5-72	60-590	800-2117	100-326	6-33	22-442	77-220	0-38
Schoolers (3)								
Mean ± S.D.	27.3±19.1	212.6±160.4	1440±127.7	150.3±22	13.16±2.45	89.3±41.58	120.3±4.5	1.6
Range	7-45	66-384	1300-1550	126-169	11.6-16	42-120	116-125	***

* N= 10
** N= 40
*** N= 1

60

stored at -20C until January 1985 when they were sent to Arizona for analysis. In Feburary 1985 the first milk samples arrived in Arizona for analysis for IgA and IgG. These assays have been set up and tested for milk, and are being applied to the samples just received.

Some interruption in skin test assays occurred during the summer in conjunction with field staff changes, but these tests are being applied routinely again.

Issues of quality control have been addressed on an ongoing basis. Dr. Fleita visited the University of Arizona in August and September 1984, and Dr. Watson went to Cairo in November to update the quality control procedures. Duplicate measures are done on serum proteins whenever sample size permits, which is not always possible with capillary samples. Dr. Fleita regularly checks the quality control on serum protein assays. Attached as Appendix E is the final revision of the quality control protocol for immunology assays on colostrum and milk developed by Dr. Watson.

II. INTERPROJECT ACTIVITES

The Principal Investigator participated in the SCB meetings in September-October 1984 and February 1985. Aside from this and continuing communication with other US investigators, the major interproject activity was the data analysis meeting which took place in Cairo January 5-10. Dr. Harrison served, at Management Entity request, as US organizer for that gathering, which was hosted by the Egyptian investigators.

The meeting was attended by most of the Egyptian investigators, Drs. Harrison and Kirksey, representatives of the Kenya Project (Drs. Neumann, Bwibo, Coulson and Carter) and the Mexico Project (Dr. Allen), Dr. Hugh Horan from ME and consultant Dr. George Beaton. Notes of that meeting have been circulated to attendees, other PI's and Dr. Calloway.

Quality control protocols for zinc analyses and for milk immunological assays were developed and circulated during the past six months.

III. CURRENT STATUS AND PLANS

Our plans for the next six months include:

1) Continuation of data analysis in the areas of morbidity, anthropometry, zinc status and immunology, and the relationship of these to other relevant variables, in order to develop appropriate models which can be tested at the end of Phase II.

2) Continued collaboration with our Egyptian colleagues to facilitate data collection and maintain quality control

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in the field.

3) Continued analysis of zinc samples from Egypt, and, if requested, from the Kenya project.

4) The status of activities in immunology is unclear. Given the budget allocation which Purdue asked us to meet, we cannot accomplish the entire scope of work previously planned. The Arizona budget as proposed eliminates immunology laboratory work at Arizona, retaining only Dr. Watson's role as collaborator and consultant to the work taking place overseas. If this budget cannot be supplemented, we will attempt to move all milk assays to Egypt, and continue to collect and retain (frozen) saliva samples but not analyze them until further funding can be found. Of course this arrangement is undesirable from the standpoint of ongoing data analysis and with regard to quality control.

5) Travel planned for the next six months includes:

- Dr. Harrison to domestic meetings as required by project and CRSP needs. (Probably 1 or 2 meetings, Berkeley or Purdue).

- Dr. Harrison to Egypt approximately May 1-July 5 for general project oversight and management.

-Dr. Ritenbaugh to Egypt, about 3 weeks in April, (other funding, may use a few days of CRSP per diem) - ongoing assistance in anthropometry and morbidity data management and quality control.

-Dr. Watson to Egypt for 2-3 weeks, time to be determined, depending on funding and decisions to change location of some immunology assays.

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C. Insecticide Analysis Report of Kalama Water Samples

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E. Immunologic Assays on Colostrum and Milk Quality Control Protocol

EGYPT CRSP - MONTHLY MORBIDITY FORM

Block No. ___ ___ Household No. ___ ___ ___ ___ Date Form Submitted to DMU ___ ___ ___ ___ ___ ___ (D D M M Y Y)

Individual ID ___ ___ ___ Individual Name _____

Interviewer ID ___ ___ ___

No.	Diagnostic Category	Illness Duration Start (D D M M)	Illness Duration End (D D M M)	Severity 1=Mild 2=Severe	Diagnostic Method (list all used) 1=Recall 2=Observation/ examination 3=Laboratory			Treatment 1. Traditional	2. Symptomatic	3. Protocols	4. Antihelminth	5. Other	6. No Treatment	Outcome 1=Recovered 2=Died 3=Absent	Change in Activity 1=No Change 2=Mod. Reduction 3=Bedridden 4=Critical

Block No. ___ ___ Household No. ___ ___ ___ ___ Date Form Submitted to DHU ___ ___ ___ ___ ___ ___
D D M M Y Y

Individual ID ___ ___ ___ Individual Name _____

Interviewer ID ___ ___ ___

No.	Change in Food Intake & Appetite 1=Usual intake 2=Decreased 3=Liquid (calorie) 4=Clear Liquids 5=Nothing/anorexia	M M: ___ ___			M M : ___ ___			M M: ___ ___		
		D D	Weight (kg) Observer A	Weight (kg) Observer B	D D	Weight (kg) Observer A	Weight (kg) Observer B	D D	Weight (kg) Observer A	Weight (kg) Observer B
___	___	___ ___	___ ___ ___.___	___ ___ ___.___	___ ___	___ ___ ___.___	___ ___ ___.___	___ ___	___ ___ ___.___	___ ___ ___.___
___	___	___ ___	___ ___ ___.___	___ ___ ___.___	___ ___	___ ___ ___.___	___ ___ ___.___	___ ___	___ ___ ___.___	___ ___ ___.___
___	___	___ ___	___ ___ ___.___	___ ___ ___.___	___ ___	___ ___ ___.___	___ ___ ___.___	___ ___	___ ___ ___.___	___ ___ ___.___
___	___	___ ___	___ ___ ___.___	___ ___ ___.___	___ ___	___ ___ ___.___	___ ___ ___.___	___ ___	___ ___ ___.___	___ ___ ___.___
___	___	___ ___	___ ___ ___.___	___ ___ ___.___	___ ___	___ ___ ___.___	___ ___ ___.___	___ ___	___ ___ ___.___	___ ___ ___.___
___	___	___ ___	___ ___ ___.___	___ ___ ___.___	___ ___	___ ___ ___.___	___ ___ ___.___	___ ___	___ ___ ___.___	___ ___ ___.___
___	___	___ ___	___ ___ ___.___	___ ___ ___.___	___ ___	___ ___ ___.___	___ ___ ___.___	___ ___	___ ___ ___.___	___ ___ ___.___
___	___	___ ___	___ ___ ___.___	___ ___ ___.___	___ ___	___ ___ ___.___	___ ___ ___.___	___ ___	___ ___ ___.___	___ ___ ___.___
___	___	___ ___	___ ___ ___.___	___ ___ ___.___	___ ___	___ ___ ___.___	___ ___ ___.___	___ ___	___ ___ ___.___	___ ___ ___.___
___	___	___ ___	___ ___ ___.___	___ ___ ___.___	___ ___	___ ___ ___.___	___ ___ ___.___	___ ___	___ ___ ___.___	___ ___ ___.___
___	___	___ ___	___ ___ ___.___	___ ___ ___.___	___ ___	___ ___ ___.___	___ ___ ___.___	___ ___	___ ___ ___.___	___ ___ ___.___
___	___	___ ___	___ ___ ___.___	___ ___ ___.___	___ ___	___ ___ ___.___	___ ___ ___.___	___ ___	___ ___ ___.___	___ ___ ___.___
___	___	___ ___	___ ___ ___.___	___ ___ ___.___	___ ___	___ ___ ___.___	___ ___ ___.___	___ ___	___ ___ ___.___	___ ___ ___.___
___	___	___ ___	___ ___ ___.___	___ ___ ___.___	___ ___	___ ___ ___.___	___ ___ ___.___	___ ___	___ ___ ___.___	___ ___ ___.___
___	___	___ ___	___ ___ ___.___	___ ___ ___.___	___ ___	___ ___ ___.___	___ ___ ___.___	___ ___	___ ___ ___.___	___ ___ ___.___
___	___	___ ___	___ ___ ___.___	___ ___ ___.___	___ ___	___ ___ ___.___	___ ___ ___.___	___ ___	___ ___ ___.___	___ ___ ___.___
___	___	___ ___	___ ___ ___.___	___ ___ ___.___	___ ___	___ ___ ___.___	___ ___ ___.___	___ ___	___ ___ ___.___	___ ___ ___.___

EC-MCF-2 10/84

EGYPT CRSP - MONTHLY MORBIDITY FORM

Block No. ___ ___ Household No. ___ ___ ___ ___ Date Form Submitted to DMU ___ ___ ___ ___ ___ ___
D D M M Y Y

Individual ID ___ ___ ___ Individual Name _____

Interviewer ID ___ ___ ___

No.	Change in Food Intake & Appetite 1=Usual intake 2=Decreased 3=Liquid (calorie) 4=Clear Liquids 5=Nothing/anorexia	M M: ___ ___			M M : ___ ___			M M: ___ ___		
		D D	Weight (kg) Observer A	Weight (kg) Observer B	D D	Weight (kg) Observer A	Weight (kg) Observer B	D D	Weight (kg) Observer A	Weight (kg) Observer B
___	___	___ ___	___ ___ ___.___	___ ___ ___.___	___ ___	___ ___ ___.___	___ ___ ___.___	___ ___	___ ___ ___.___	___ ___ ___.___
___	___	___ ___	___ ___ ___.___	___ ___ ___.___	___ ___	___ ___ ___.___	___ ___ ___.___	___ ___	___ ___ ___.___	___ ___ ___.___
___	___	___ ___	___ ___ ___.___	___ ___ ___.___	___ ___	___ ___ ___.___	___ ___ ___.___	___ ___	___ ___ ___.___	___ ___ ___.___
___	___	___ ___	___ ___ ___.___	___ ___ ___.___	___ ___	___ ___ ___.___	___ ___ ___.___	___ ___	___ ___ ___.___	___ ___ ___.___
___	___	___ ___	___ ___ ___.___	___ ___ ___.___	___ ___	___ ___ ___.___	___ ___ ___.___	___ ___	___ ___ ___.___	___ ___ ___.___
___	___	___ ___	___ ___ ___.___	___ ___ ___.___	___ ___	___ ___ ___.___	___ ___ ___.___	___ ___	___ ___ ___.___	___ ___ ___.___
___	___	___ ___	___ ___ ___.___	___ ___ ___.___	___ ___	___ ___ ___.___	___ ___ ___.___	___ ___	___ ___ ___.___	___ ___ ___.___
___	___	___ ___	___ ___ ___.___	___ ___ ___.___	___ ___	___ ___ ___.___	___ ___ ___.___	___ ___	___ ___ ___.___	___ ___ ___.___
___	___	___ ___	___ ___ ___.___	___ ___ ___.___	___ ___	___ ___ ___.___	___ ___ ___.___	___ ___	___ ___ ___.___	___ ___ ___.___
___	___	___ ___	___ ___ ___.___	___ ___ ___.___	___ ___	___ ___ ___.___	___ ___ ___.___	___ ___	___ ___ ___.___	___ ___ ___.___
___	___	___ ___	___ ___ ___.___	___ ___ ___.___	___ ___	___ ___ ___.___	___ ___ ___.___	___ ___	___ ___ ___.___	___ ___ ___.___
___	___	___ ___	___ ___ ___.___	___ ___ ___.___	___ ___	___ ___ ___.___	___ ___ ___.___	___ ___	___ ___ ___.___	___ ___ ___.___
___	___	___ ___	___ ___ ___.___	___ ___ ___.___	___ ___	___ ___ ___.___	___ ___ ___.___	___ ___	___ ___ ___.___	___ ___ ___.___
___	___	___ ___	___ ___ ___.___	___ ___ ___.___	___ ___	___ ___ ___.___	___ ___ ___.___	___ ___	___ ___ ___.___	___ ___ ___.___
___	___	___ ___	___ ___ ___.___	___ ___ ___.___	___ ___	___ ___ ___.___	___ ___ ___.___	___ ___	___ ___ ___.___	___ ___ ___.___
___	___	___ ___	___ ___ ___.___	___ ___ ___.___	___ ___	___ ___ ___.___	___ ___ ___.___	___ ___	___ ___ ___.___	___ ___ ___.___
___	___	___ ___	___ ___ ___.___	___ ___ ___.___	___ ___	___ ___ ___.___	___ ___ ___.___	___ ___	___ ___ ___.___	___ ___ ___.___
___	___	___ ___	___ ___ ___.___	___ ___ ___.___	___ ___	___ ___ ___.___	___ ___ ___.___	___ ___	___ ___ ___.___	___ ___ ___.___

EC-MMF-3 10/8

Morbidity Manual Addendum -- Illness Subroutine Form, Rev. Nov. 1984

The following pages display a copy of the double-sided Illness Subroutine Form developed to summarize onto a single form all morbidity schedules and selected functional data of a target individual during an illness. One subroutine form is used for each follow-up visit during an illness (including the day on which the illness is identified) and is to be filled out at the time of interview.

The front side of the form contains the block, household, individual ID and respondent ID numbers recorded at the top of the sheet. Three sections appear on the two-sided form to allow for ease in providing all necessary data for the particular target individual experiencing the illness. Information on all target individuals is included on the left-hand section of page one: date of follow up visit, day since identification of the illness, activity index and illness diagnosis/diagnoses. The activity index has four codes provided on the form from which to choose a response. The physician will list all illness diagnoses by name and after the visit diagnostic codes will be attached to each illness name. The four-digit illness diagnostic codes to be used for listing on this form are found in the Morbidity Manual (Rev. 7/84) on pages 24 through 26. The letter of each morbidity schedule filled out for the follow up visit is to be recorded at the time of interview under the column labeled schedule. All morbidity schedules used are then to be attached to the illness subroutine form as soon as possible after the interview is completed.

Only target infants and toddlers will have the right-hand section of page one completed, for weight (self-explanatory) and quantitative food intake record. The food intake recall is to be taken from the mother (if taken from another caretaker, please note). A blank space is available for the observer to record food intake. Up to twenty spaces for food codes and grams consumed are available to be completed by a dietitian after the interview using the 24-hour recall taken from the mother and the standard food codes currently available for the project. Care should be taken by the interviewer to completely record amounts of foods consumed.

Page two (on the back side of the form) is to be filled out for lead males, lead females or schoolers. Again, block, household, individual ID and respondent ID numbers found at the top of the page should be completed. Information on qualitative food intake and task assignments should be recorded at the time of interview. Codes and explanations for qualitative food intake evaluations are provided on the form. For the section on task assignments, the interviewer will ask the target (or caretaker of the schooler) whether any of the individual's usual tasks were either (1) completed totally by the target alone, (2) assumed totally by another family member, (3) partially completed by another person to help the target in completing what he/she could not do, or (4) not done by anyone. Task codes are listed under the directions with the list progressing from those tasks usually done by males only followed by tasks done by either male or female adults, then females only, and finally schoolers. The interviewer should ask the target whether each applicable task was or was not completed for that day. Tasks of attending school and studying should only be asked of schoolers. If another family member totally assumed the task or helped the target individual, then that person's ID number should be recorded in the appropriate column. If the target completed the task or if the task was not done by anyone only a check mark should be placed in the correct column.

ILLNESS SUBROUTINE FORM

BLOCK NO. ___ ___ HOUSEHOLD NO. ___ ___ ___ ___ INDIVIDUAL ID NO. ___ ___ ___ RESPONDENT ID NO. ___ ___ ___

ALL TARGETS

Date:

DD MM YY

___ ___ ___ ___ ___ ___

Day Since Identification of Illness:

1 ___ (Day of Identification)
3 ___
5 ___
7 ___
14 ___
21 ___
28 ___

Other _____

Activity Index: (Fill in response choosing code from below)

[ ]

1=No change
2=Mod. reduction
3=Bedridden
4=Critical

Illness Diagnosis (Attach Schedules):

Illness Name	Illness Code	Schedule
_____	___ ___:___ ___	___
_____	___ ___:___ ___	___
_____	___ ___:___ ___	___
_____	___ ___:___ ___	___
_____	___ ___:___ ___	___
_____	___ ___:___ ___	___
_____	___ ___:___ ___	___
_____	___ ___:___ ___	___

TARGET INFANT, TARGET TODDLER

Weight (kg): ___ ___ ___.___ ___ ___ ___.___ (If done in duplicate)

Quantitative Food Intake: 24-hour recall from caretaker. All items except breastmilk:

ITEM	AMOUNT	ITEM	AMOUNT

(food item code)	(state of food)	(grams food consumed)
___ ___ ___ ___ ___ ___		_____
___ ___ ___ ___ ___ ___		_____
___ ___ ___ ___ ___ ___		_____
___ ___ ___ ___ ___ ___		_____
___ ___ ___ ___ ___ ___		_____
___ ___ ___ ___ ___ ___		_____
___ ___ ___ ___ ___ ___		_____
___ ___ ___ ___ ___ ___		_____
___ ___ ___ ___ ___ ___		_____
___ ___ ___ ___ ___ ___		_____

(food item code)	(state of food)	(grams food consumed)
___ ___ ___ ___ ___ ___		_____
___ ___ ___ ___ ___ ___		_____
___ ___ ___ ___ ___ ___		_____
___ ___ ___ ___ ___ ___		_____
___ ___ ___ ___ ___ ___		_____
___ ___ ___ ___ ___ ___		_____
___ ___ ___ ___ ___ ___		_____
___ ___ ___ ___ ___ ___		_____
___ ___ ___ ___ ___ ___		_____
___ ___ ___ ___ ___ ___		_____

BLOCK NO. ___ ___ HOUSEHOLD NO. ___ ___ ___ INDIVIDUAL ID NO. ___ ___ ___ RESPONDENT ID. NO. ___ ___ ___

Qualitative Food Intake:

___

(Fill in response choosing code from below)

1=Usual intake

2=Decreased

3=Liquid (calorie)

4=Clear Liquids

5=Nothing/anorexia

NOTES

Task Assignment: Ask whether any of the subject's USUAL tasks were done today.

Refer to task codes when asking what are usual tasks appropriate to subject:

01=Field work
02=Regular nonfarm job
03=Tending animals
04=Marketing activity
05=Collecting water
06=Laundry
07=Housekeeping
08=Child care
09=Food preparation
10=Attending school
11=Study
12=Other _____
13=Other _____

Task Code	Check if done TOTALLY by subject	Task TOTALLY ASSUMED by a family member (list ID number)	Subject HELPED by a family member (list ID number)	Check if task NOT done by any person
___ ___	___	___ ___ ___	___ ___ ___	___
___ ___	___	___ ___ ___	___ ___ ___	___
___ ___	___	___ ___ ___	___ ___ ___	___
___ ___	___	___ ___ ___	___ ___ ___	___
___ ___	___	___ ___ ___	___ ___ ___	___
___ ___	___	___ ___ ___	___ ___ ___	___
___ ___	___	___ ___ ___	___ ___ ___	___
___ ___	___	___ ___ ___	___ ___ ___	___
___ ___	___	___ ___ ___	___ ___ ___	___
___ ___	___	___ ___ ___	___ ___ ___	___
___ ___	___	___ ___ ___	___ ___ ___	___
___ ___	___	___ ___ ___	___ ___ ___	___
___ ___	___	___ ___ ___	___ ___ ___	___

APPENDIX C

THE UNIVERSITY OF ARIZONA

COLLEGE OF AGRICULTURE

DEPARTMENT OF VETERINARY SCIENCE

VETERINARY DIAGNOSTIC LABORATORY

ROOM 102, Bldg. 90
Tucson, Arizona 85721
(602) 621-2356

Mesa Branch Station
P.O. Box 304
Mesa, Arizona 85201
(602) 964-4043

Reference Number 84-2968
Egyptian water samples
October 30, 1984

Dr. Gail Harrison
Dept. of Family and Community Medicine
Arizona Health Sciences Center
U of A

Dear Dr. Harrison:

The analyses you requested have been completed on the three water samples from Egypt: 1) Kalama canal water, 2) Kalama public pump, and 3) public pump on canal bank. Organic compounds including organochlorine and organophosphorus insecticides were not detected in any of the samples.

We will keep the samples at least 30 days if you decide to request further analyses such as elements or others. Please contact us if you have further questions.

Sincerely,

G. L. Meerdink, D.V.M.
Chief Diagnostician

GLM/gw

REPORT OF LABORATORY EXAMINATION

APPENDIX D

NUTRITION CRSP--UNIVERSITY OF ARIZONA 12/84

ality Control Measures for Serum Zinc Analysis

The quality control measures used in the serum zinc analysis procedures are being done in view of the fact that a very small amount (90 microliters optimal maximum) per subject is collected under sample collection restraints. Therefore, two ideal quality control methods, analyzing duplicates of unknown samples and having an independent laboratory also analyze volumes from the unknowns, are not possible.

Crucial criteria for quality control measures in this case are: is it possible given the small volumes of unknowns, to adequately measure intra and inter-sample variation and intra and inter-laboratory variation? Conventional quality control procedures in terms of use of an known standard series for comparison and calculation of values for unknowns and reference controls will be followed. Pooled serum and blanks will be used as the reference control. A series of one ml aliquots of pooled serum will be frozen and stored for future use. Dilution blanks will also be used to measure laboratory-introduced contamination.

A laboratory notebook will retain records by subject ID's and dates on which lab routines are performed in the event of later problems.

The project will report an average of the three direct measurements done on each sample on a continuing basis. For quality control purposes a ndom 10% sample will also be reported with the unaveraged raw direct measurements shown. This will be done on an ongoing basis, spaced over time. With each assay, a check reference sample will be included. Analysis of the control will be done at the same time that the unknown samples are analyzed.

When a sufficient number of samples have been run, data and control information will be reported to Berkeley.

The dilution method used by the independent laboratory should be identical to that used by the University of Arizona zinc analysis laboratory. The Atomic Absoroption Spectro-photometer (AAS) used in the Arizona laboratory is a 180-70 Hitachi Polarized Zeeman AAS. It is sensitive enough for use with extreme microdilutions. In addition, it is stable with microvolumes due to its unique dual beam giving a stable baseline reading. This feature, plus the auto screen readout and printer, which give instant final results, enabled the use of the 1:20 dilution level and the direct reading analysis method developed for this series in our laboratory. The independent laboratory should have an equally sensitive and stable AAS.

If necessary, the independent laboratory could use a different dilution method which gives a more concentrated dilution and an integrated reading mode for analysis. In this case, we suggest that the unmodified thod of Smith, Butrimivitz, and Purdy (Clinical Chemistry 25(8):1487-1491, 1979) be used. At a 1:20 dilution, the viscosity of diluted serum is so low that a de-ionized, double distilled water base is used for standards. With a lesser dilution (1:4 or 1:9), increased viscosity of

sample may necessitate use of a glycerol/H_2O base for standards to equalize viscosities of standards and samples. In this case, analytical grade ycerol and $DDDH_2O$ can be mixed as per Smith, Butrimovitz, and Purdy's method for the standard series.

If it proves necessary to use the carbon furnace of the AAS by the independent laboratory, the University of Arizona laboratory should be informed of the methods they used.

This protocol constitutes the report to Management Entity of the procedures that have been implemented to maintain internal quality control. Results of quality control procedures will be fully recorded on an ongoing basis in the laboratory record book in a manner that can be examined retrospectively should any apparent problems in the data be detected. The form for reporting the procedures is attached on the following page. Also attached are the guidelines for evaluation of serum/plasma zinc for different ages for males and females, and forms for reporting values obtained.

Based on ranges and cutoff points cited in the literature concerning serum zinc, the following ranges and cutoff points have been chosen for use by the University of Arizona laboratory. The deficient, borderline, and adequate ranges overlap in some cases. This reflects the diversity shown in the literature. The presence of overt clinical signs of zinc deficiency should be demonstrated to differentiate deficient from borderline states. This necessitates the use of morbidity data.

	Serum (ug/dl)		
	Deficient	Borderline	Adequate
Adult Male	<69	64-72	≥70
Adult Female:			
Nonpregnant	<65	64-72	≥70
Pregnant-I Trimester		<55	55-136
" II Trimester		<54	54-109
" III Trimester		<45	45-82
Infant	<64	53-84	≥74
Pre-schooler	<57	57-83	≥68
Schooler	<65	60-70	≥70

SUMMARY OF DIFFERENT GUIDELINES FOR THE EVALUATION OF SERUM* ZINC (ug/dl)

Infants (Both Sexes)

Age	Plasma, given	Serum, projected* or given	Reference
ADEQUATE:			
0-25 months	72-157 (Cited range)	82.8-180.5*	1
mean of 24.8 months	71-107 (Mean ± 3SD)	81.7-123.1*	2
Infants	63-153 (Mean ± 3SD)	72.5-176 *	3
BORDERLINE:			
0-25 months	<70 (Cited cutoff)	<80.5 *	4
mean of 24.8 months	53-84 (Mean ± 1 SD)	61-96.6*	2
3 months	57-67 (Means ± 3SDs)	65.6-77*	5
6 months	66-76 (Means ± 3SDs)	75.9-87.4*	5
DEFICIENT:			
11 months		13	6
≥ 1½ months-12 yrs	17.2-42.4 (Mean ± 3SD)	19.8-48.8*	7

Toddlers/Preschoolers (Both Sexes)

ADEQUATE:			
≥3 years	68-110 (Cited range)	78.2-126.5*	8
1-5 years	78-116 (Mean ± 1SD)	89.8-133.4*	9
≥ 3 years	76-148 (Mean ± 3SD)	87.4-170.2*	10
≥3 years		≥60 (AM fasting cutoff)	11
"		≥65 (AM nonfast cutoff)	11
"		≥70 (PM cutoff)	11
BORDERLINE:			
2-6 years	57-83 (Mean ± 1SD)	65.6-95.5*	12
3-5 years		<68 (termed low)	5
3-5 years	70.4-78.8 (Mean ± 3SD)	80.9-90.6*	5
DEFICIENT:			
mean of 24.8 months	27.5-56.5 (Mean ± 1SD)	31.6-65*	2
≥3 years		<60 (AM fasting cutoff)	11
"		<65 (AM nonfast cutoff)	11
"		<70 (PM cutoff)	11
≥3 years	< 65 (Cutoff)	<74.75*	28

* Whenever the reference gave plasma values, they are listed, and serum values are projected also on the basis of a 15% higher serum value corresponding to the given plasma value.

SUMMARY OF DIFFERENT GUIDELINES FOR THE EVALUATION OF SERUM* ZINC (ug/dl)

Age	Plasma, given	Serum, projected* or given	Reference
Schoolers: Preadolescent and Adolescent (Both Sexes)			
ADEQUATE:			
5-12 years		84-117 (Mean ± 1SD)	9
3-19 years	76-148 (Mean ± 3SD)	87.4-170.2*	10
General childhood	106-189 (Cited range)	121.9-2.7.35*	13
10-17 years	60.9-96 (Cited range)	70-110.4*	14
9-11 years (Male)		96.3-138.9 (Mean±3SD)	29
8½-9½ years (Female)		95.8-115.8 (Mean±3SD)	29
8½-9½ (Female)		82.8-103.2 (Mean±3SD)	29
BORDERLINE:			
All ages	60-70	69-80.5*	11
DEFICIENT:			
3-19 years	<65 (Cited cutoff)	74.8*	10
10-16 years	46.2 (Mean)	53.1*	14
Adults- Male			
ADEQUATE:			
All ages		>60 (AM fasting cutoff)	11
		>65 (AM nonfast cutoff)	11
		>70 (PM cutoff)	11
All ages (U.S.)		55-150 (Cited range)	15
All ages (Britain)	70-160 (Cited range)	80.5-172.5*	16
Young men (U.S.)	71-111 (Cited range)	81.7-127.7*	17
All ages (Japan)	78-116.5 (Mean ±1SD)	89.7-134*	18
16-19 years (Egypt)	89-115 (Mean ±1SD)	102.4-132.3*	20
62-68 years	73-91 (Mean ± 3SD)	84-104.7*	19
BORDERLINE:			
53-61 years	56-83 (Mean ± 3SD)	64.4-95.5*	19
DEFICIENT:			
Young men (U.S.)	29-69 (Cited range)	33.4-79.5*	17
16-19 years (Egypt)	56-78 (Cited range)	64.4-89.7*	20
55-65 years	65 (Mean)	74.8*	21
All ages	10-65 (Cited range)	11.5-74.8*	24
All ages	<65 (Cutoff)	<74.75*	28
All ages		<60 (AM fasting cutoff)	11
"		<65 (AM nonfast cutoff)	11
"		<70 (PM cutoff)	11

SUMMARY OF DIFFERENT GUIDELINES FOR THE EVALUATION OF SERUM ZINC (ug/dl)

Age	Plasma, given	Serum, projected* or given	Reference
Adults-Nonpregnant Females			
ADEQUATE:			
46-54 years	80-92 (Mean ± 3 SD)	92-105.8*	19
Various ages	98-119 (Mean ± 3SD)	112.7-136.9*	22
Various ages		82-136 (Mean ± 3SD)	23
BORDERLINE:			
33-50 years	76-94 (Mean ± 3SD)	87.4-108*	19
DEFICIENT:			
All ages	10-65 (Cited range)	11.5-74.8*	24
26 years		<40	25
All ages	<65	<74.75*	28
All ages		<60 (AM fasting cutoff)	11
"		<65 (AM nonfast cutoff)	11
"		<70 (PM cutoff)	11
Adults-Pregnant Females			
ADEQUATE:			
1st Trimester, ave. of all weeks		73-136 (Means ± 3SDs)	23
1st Trimester, ave. of 1st half		54-119 (Means ± 1SDs)	26
1st Trimester, ave. of 2nd half		55-95 (Means ± 1SDs)	26
2nd Trimester, ave. of all weeks		54-109 (Means ±3 SDs)	23
3rd Trimester, ave. of all weeks		42-82 (Means ± 3SDs)	23
3rd Trimester, ave. of all weeks	>45-50 (Cutoff)	>52-58*	27
BORDERLINE/DEFICIENT:			
3rd Trimester, ave of all weeks	≤ 45-50 (Cutoff)	≤ 52-58*	27

Best Available Document

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Micromethod for Serum Zinc Analysis

A modification of the standard method adapted from J.C. Smith Jr., B. Burrimovitz, and Purdy, Clinical Chemistry 25(8), 1979, pp 1487-1491., "Proposed Selected Methods. Direct Measurement of Zinc in Plasma by AAS"

NOTE: Glassware and Containers- Preparation

All glassware as well as nalgene storage containers and lids and plastic graduated cylinders must be acid-washed and rinsed in double-distilled, de-ionized water ($DDDH_2O$). All these procedures are to be done according to methods discussed under the cleaning procedures section of the sampling protocol.

All water used in preparation, dilution, and analysis procedures will be double-distilled, de-ionized water at all times.

Zinc Standards for serum Curve

1. Make 1000 ppm zinc working standard in 100ml volumetric flask. Use a 1000 ppm zinc reference standard and pipette 1ml of it into the flask and fill to volume with the double distilled, deionized H20 base. 1000 X = (10) (100) or X = 1. Mix well. Decant into acid washed nalgene containers and label.

2. Make Zinc Standards with a base of de-ionized water. Do according to chart directions- in 100 ml volumetric flasks.

Std. Zn Level	ppm*Zinc	Amt of 10 ppm* Zn Std. in flasks	Amt of H_2O Base
0	0	0	100 ml (Blank)
.01 mg	.010	.10 ml	fill to 100 ml volume
.015 mg	.015	.15 ml	"
.02 mg	.020	.20 ml	"
.03 mg	.030	.30 ml	"
.04 mg	.040	.40 ml	"
.05 mg	.050	.50 ml	"
.1 mg	.10	1.0 ml	"
.2 mg	.20	2.0 ml	"
.3 mg	.30	3.0 ml	"
.4 mg	.40	4.0 ml	"

* ppm = parts per million

Use automatic pipettes with disposable tips for pipetting. Eppendorf is one possibility.

3. Mix standards well. Transfer to EDTA-rinsed or acid-washed nalgene 125 ml containers. Date and label containers.

4. Dilution of samples. Allow serum to come to room temperature.

a. Pooled Serum- is used as a comparison (control reference) serum by which to judge normality of other serums and accuracy and reproducibility of the analysis method. After it is frozen the albumin delta S configuration may bind zinc to itself differently. This will not affect the amount of zinc in the sample, however.
The reference serum will be analyzed in triplicate to check intra-sample variability also. Use of pooled serum helps monitor inter-day reproducibility also. Store in 1 ml portions in polyethylene vials at 20 C. Thaw aliquot at room temperature and analyze ,after dilution, for comparison with unknown samples.

b. Basic Method for 1:20 dilution of serum samples- this method will be used to analyze pooled reference serum, unknowns, and blanks. Mix serum samples by gently shaking each tube 6 times. Deliver 50ul of serum sample with a disposable micropipette tip into a 1.5ml microfuge tube (by eppendorf). Add 950 ul of de-ionized water for a total volume of 1ml. Mix the solution for 30 seconds. Repeat for serum samples in groups of 10. Similarly prepare control sample of pooled serum, in triplicate. Similarly prepare two blank samples of de-ionized water. These are a check on method-introduced zinc contamination.

5. To Analyze Samples & Standards by Flame method on 180-70 Hitachi Polarized Zeeman

Follow manufacture's instructions on machine operation. Optimize aspiration rate with 10ml aliquots of DD water. Then lock the nebulizer flow adjustment in place. Aspirate. Do water solution into the luminescent flame and set the baseline to read + or - .001 absorbance (A). Take a baseline reading before and after each sample and reset the baseline as required. Sample the zinc working standards sequentially from most dilute to most concentrated, aspirating until the reading is stable (+or- .001 absorbance). Then record 6 successive 1-S integration readings. After standards are read for curve place machine in direct reading mode and repeat 5 direct readings per standard. This is for comparison purposes. Then, read a sample, stablizing the baseline before and after each reading of a sample with the DD water solution. Record readings for the sample. Each sample will give 5 direct readings; record them all. Discard the first and the last. Average the middle three readings.

6. Calculate zinc content of samples by least squares comparison to standard curve. Serum zinc usually is expressed as ug/dl.

7. Alternative Standard series - use if 200 ml. volumetric flasks are available, and if 200 or 250 ml nalegne containers are available.

Make zinc standards with a base of de-ionized water. Do according to chart directions- in 200 ml volumetric flasks.

Std Zn Level	ppm* Zinc	Amt of 10 ppm* Zn Std. in flasks	Amt of H_2O Base
0	0	0	200 ml (Blank)
.02 mg	.010	.20 ml	fill to 200 ml volume
.03 mg	.015	.30 ml	"
.04 mg	.020	.40 ml	"
.06 mg	.030	.60 ml	"
.08 mg	.040	.80 ml	"
.1 mg	.050	1.0 ml	"
.2 mg	.10	2.0 ml	"
.4 mg	.20	4.0 ml	"
.6 mg	.30	6.0 ml	"
.8 mg	.40	8.0 ml	"

Mix standards well. Transfer to EDTA-rinsed or acid-washed nalgene 200 to 250 ml containers. Date and label containers.

*ppm = parts per million

(Submit with each report)
Form I

Nutrition CRSP
Interlaboratory Quality Control
General Information

Project Egypt ☐ Kenya ☐ Mexico ☐

Laboratory Determination _____

Location of Laboratory _____

_____

_____

Individual responsible for Quality Control _____

Laboratory Assay Procedure Used _____

Report Prepared by _____ Date _____

Submit completed forms to: Dr. Charles W. Weber
Department of Nutrition and Food Science
Home Economics 310
University of Arizona, Tucson, AZ 85721

Nutrition CRSP
Interlaboratory Quality Control Procedures
Blind Control Samples

Assay in duplicate/triplicate two blind control samples which will be sent by the laboratory responsible for interlaboratory control. Report results from your laboratory in the form below:

Code Number on Vial	Date of Assay	Performed by	Observed Values Serum Zinc (ug/dl) 1	2	3	Mean +SD

Please send a copy of the standard curve used for this assay.

Also, values obtained for control samples may be reported (optional).

Submit with general information form to:

Charles W. Weber, Ph.D.
Department of Nutrition & Food Science
310 Home Economics
University of Arizona, Tucson, AZ 86821

Nutritio CRSP
Interlaboratory Quality Control Procedures
Control Samples

Report values from control sample assays at least monthly. Control samples are obtained from the company which su the ferritin kits and should be analyzed routinely with the ferritin assay.

Control samples should be assayed in triplicate when possible.

Report results of control samples assayed during the past month on the form below. Report individual values for triplicate assays. Also, report the means and standard deviations.

Please send a copy of the standard curve that was obtained on the same day that the control samples were assayed.

Serum Zinc Concentrations in Control Samples

ssay Performed by: _____

Controls	Expected Values		OBSERVED VALUES FOR DIFFERENT ASSAYS Serum Zinc, ug/dl										
			Date of Assay:		Date of Assay:		Date of Assay:		Date of Assay:		Date of Assay:		
				Mean		Mean		Mean		Mean		Mean	Grand Mean
ow ug/dl		1											
		2											
		3											
edium ug/dl		1											
		2											
		3											
igh ug/dl		1											
		2											
		3											

Nutrition CRSP
Interlaboratory Quality Control Procedures
Pooled Serum Sample

Assay in duplicate/triplicate the pooled serum sample which will be sent by the laboratory responsible for interlaboratory control. Report results from your laboratory in the form below:

Code Number on Vial	Date of Assay	Performed by	Observed Values Serum Zinc (ug/dl) 1	2	3	Mean +SD

Please send a copy of the standard curve used for this assay.

Also, values obtained for control samples may be reported (optional).

Submit with general information form to

Charles W. Weber, Ph.D.
Department of Nutrition & Food Science
310 Home Economics
University of Arizona, Tucson, AZ 85721

Nutrition CASP

Interlaboratory Quality Control Procedures

SERUM SAMPLES ANALYZED FOR ZINC

Form A

Quarterly Report

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Number consecutively all the samples which you have analyzed over the past 3-month period

Report below the raw, unaveraged values which you obtained for each sample as well as the average of them for each sample

Sample Number	Subject		Direct values obtained from single samples Serum Zinc (ug/dl)			Averaged Mean ±SD	Date of Assay
	Age	Sex	1	2	3		

Submit with general information form to: Charles W. Weber, Ph.D., Department of Nutrition & Food Science, 310 Home Economics, University of Arizona, Tucson, AZ 85721

3. If several samples were assayed on the same day, please enclose a copy of the standard curves or the observed and expected values for the reference controls.

4. Are all the reported values within the range of the standard curve? Yes ☐ No ☐

If not, complete the form below:

Sample Number	Out-of-Limit Value		Re-test Value		Reasons for not Re-testing Sample
	ug/dl	Date of Assay	ug/dl	Date of Assay	

Submit with general information form to: Charles W. Weber, Ph.D.
Department of Nutrition & Food Science
310 Home Economics, University of Arizona
Tucson, AZ 85721

APPENDIX E

NUTRITION CRSP--UNIVERSITY OF ARIZONA 1/85

Quality Control: Milk IgA, IgG and Lysozyme Measurements

Storage and Processing of Milk. Milk samples should be collected, stood on ice during transport, and stored at -20 or -70°C. Every 20th sample of colostrum or milk should be subsampled after any processing (presumably milk would be cooled to 4°C, fat removed off the top, centrifuged, precipitated casein removed and the subsample taken). 100 ml should be put into a 0.2 ml sealed plastic testtube with label indicating Name, ID Number, Date, Country, whether milk or colostrum.

Samples will be measured and compared to values obtained by the local laboratories of the various CRSP projects. In addition, the reference laboratory will prepare 10 samples (5 colostrum and 5 milk) to send to country laboratories. If 25% or more of the samples differ by 30% from the reference laboratory's values, then additional stored samples will be tested for the item or items which differed to determine the cause or source.

Form 1
Monthly Report

Nutrition CRSP
Interlaboratory Quality Control for Milk and
Colostrum Immune Components

Project Egypt [ ] Kenya [ ] Mexico [ ]

Laboratory Determination _____

Location of Laboratory _____

_____

_____

Individual responsible
for Quality Control _____

Laboratory Assay
Procedure Used _____

Report Prepared by _____ Date _____

Form 2
Monthly Report

Controls		OBSERVED VALUES FOR DIFFERENT ASSAYS (mg/ml)										
		Date of Assay:		Date of Assay:		Date of Assay:		Date of Assay:		Date of Assay:		
			Mean		Mean		Mean		Mean		Mean	Grand Mean ±SD
IgA	1											
	2											
	3											
IgG (mg/ml)	1											
	2											
	3											
lysozyme (mg/ml)	1											
	2											
	3											

Submit with general information to: Ronald R. Watson
Department of Family & Community Medicine
University of Arizona
Tucson, Arizona 85724

Form 3
Monthly Report

Nutrition CRSP
Interlaboratory Quality Control Procedures
Blind Control Samples

Code Number on Vial	Date of Assay	Performed by	Observed Values Milk IgG (mg/ml) 1	2	Mean +SD

Submit with general information form to:

Ronald R. Watson, Ph.D.
Department Family & Community Medicine
University of Arizona
Tucson, Arizona 85724

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Form 4
Monthly Report

Nutrition CRSP
Interlaboratory Quality Control Procedures
Blind Control Samples

Code Number on Vial	Date of Assay	Performed by	Observed Values Milk IgA (mg/ml) 1	2	Mean +SD

Submit with general information form to:

Ronald R. Watson, Ph.D.
Department Family & Community Medicine
University of Arizona
Tucson, Arizona 85724

ATTACHMENT C

SIX-MONTH REPORT
UNIVERSITY OF KANSAS

SIX-MONTH REPORT

September 1, 1984 - March 15, 1985

University of Kansas
Egypt Project, Nutrition CRSP

USAID Contract #DAN-1309-G-SS-1070-00
Nutrition Intake and Function

Submitted March, 1985

Norge W. Jerome, Principal Investigator

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I. EGYPT PROJECT STATUS

A. Travel

Dr. Jerome left for Project Management in Egypt on March 18. In Berkeley from February 24 - March 3, Drs. Norge W. Jerome and Billy G. Hudson participated in the Scientific Coordination Board and Institutional Council meetings.

B. Negotiations with Counterpart Institutions

Dr. Jerome revised, prepared and submitted two University of Kansas Egypt Nutrition CRSP budgets (data management and scientific) for years 4,5 and 6 to Purdue University. Revised budgets were completed and resubmitted to Purdue University on March 12, 1985. This final budget (scientific, $266,000) will alter the scientific quality of the research and will also lead to constraints in meeting deadlines. Some important research activities such as a comprehensive village ethnography have been eliminated.

C. Recruitment of Staff for Project

Dr. Jerome and Judi Ricci interviewed candidates for the position of Research Assistant/Data Coding and Processing. They succeeded in recruiting Linda Jones for this position on October 7. Linda Jones resigned on November 30.

Michael Higgins was recruited to fill the position vacated by Linda Jones. He joined the Kansas research staff on January 7, 1985.

D. Placement of Staff in the Field

Dr. Jerome left for Project Management in Egypt on March 18 to function as U.S. Representative assisting the Egyptian PI in managing the Nutrition CRSP project. She will: 1) supervise field research on food intake, time allocation, village survey, child-care, sanitation and hygiene and social economic status; 2) assist in data processing and management activities locally and 3) facilitate data flow to the United States.

E. Research Activities

1. Child-Care Giving:

a. Computer Coding

The structure of the child-care activity descriptor code and computer coding sheet for Narrative Record on Child-Care Activity data were finalized. Antecedent and consequent event data were categorized and assigned code numbers for computer entry.

b. Research Report: Child-Care Giving Activities and Practices of Target Males' and Females

During specified two-hour time frames, target males and females in 119 Kalama households were systematically observed, as they performed child caregiving activities.

Trained fieldworkers recorded the occurrence of eleven targeted child-care activities.

- Breastfeeding
- Caring for children's clothing
- Feeding children
- Preparing food for children
- Holding/Carrying children
- Attending to children's personal hygiene
- Attending to children's illness
- Playing with children
- Serving children
- Socializing with children
- Supervising/Instructing/Mediating children

Two-hour time periods were sampled according to the scheme shown below on different days to yield a composite ten-hour day per three-month period for each household.

Period 1	8:00 - 10:00 am or	9:00 - 11:00 am
Period 2	10:00 - 12:00 pm or	11:00 - 1:00 pm
Period 3	12:00 - 2:00 pm or	1:00 - 3:00 pm
Period 4	2:00 - 4:00 pm or	3:00 - 5:00 pm
Period 5	4:00 - 6:00 pm or	5:00 - 7:00 pm

Child-caregiving activity patterns for the eleven targeted child-care activities are displayed in Figures 1-11. Each figure illustrates the proportion of households engaged in an individual child-care activity during each of the five time periods. The data show some trends which generally characterize the child-care activity pattern.

The dominant care-giving activities are serving food (over 90% of households) and food preparation (over 80% of households). Attending to children's personal hygiene occurred rarely, in less than 7% of the households.

The caregivers' responsibilities are numerous and varied. Because of the wide variety of chores (both child-related and non child-related) performed by the caregiver, a constant priority appraisal-reappraisal appears to be transpiring. Consequently, the caregivers attention shifts perpetually from one activity to another. As the complete activity pattern evolves (currently top priority at the Kansas DMU) the determinants of the child-care activity pattern will crystallize. Information on childrens' activity pattern will also contribute to understanding the caregivers' activity pattern.

Tables 1-11 show frequency counts for child-care activities in each time period of a composite ten hour day per 3-month period. The data indicate that except for "serving children" the majority of households provide care once or twice during each two-hour time period. However, children are served food and beverages more frequently and consistently throughout the day.

The peak hours for serving children are early afternoon (12:00 - 2:00 pm or 1:00 - 3:00 pm) when serving frequencies are fairly evenly distributed between one and seven-or-more times per two-hour period. Serving children (1-6 times) commonly occurs in the morning (8:00 am - 12:00 pm or 9:00 am to 1:00 pm) but drops off (to 1-4 times) on the late afternoon and early evening (2:00 - 6:00 pm or 3:00 - 7:00 pm).

This finding of constant, casual feeding and eating by Kalama children supports the ethnographic field research. Children eat all day long principally on candy, bread, cheese and fruit. Consequently, these data have important implications which cannot be overlooked when assessing the food intake of children, principally of toddlers, in Kalama.

The typical day can be characterized as high activity (period 3 then 1) and low activity periods (period 2 then 4). Period 5 falls in the intermediate category. Major activities of period 1 are feeding and holding/carrying the child. Periods 3, 4 and 5 are largely devoted to socializing with children and food preparation. Child supervision and mediating drop significantly during the afternoon, periods 3, 4 and 5.

In general, all care-giving activities (the 11 listed) decrease between periods 1 and 2 and periods 3 and 4, except for attending to personal hygiene and socializing. By contrast, all care giving activities increase between periods 2 and 3.

CAREGIVING ACTIVITY PATTERN

Figure 1

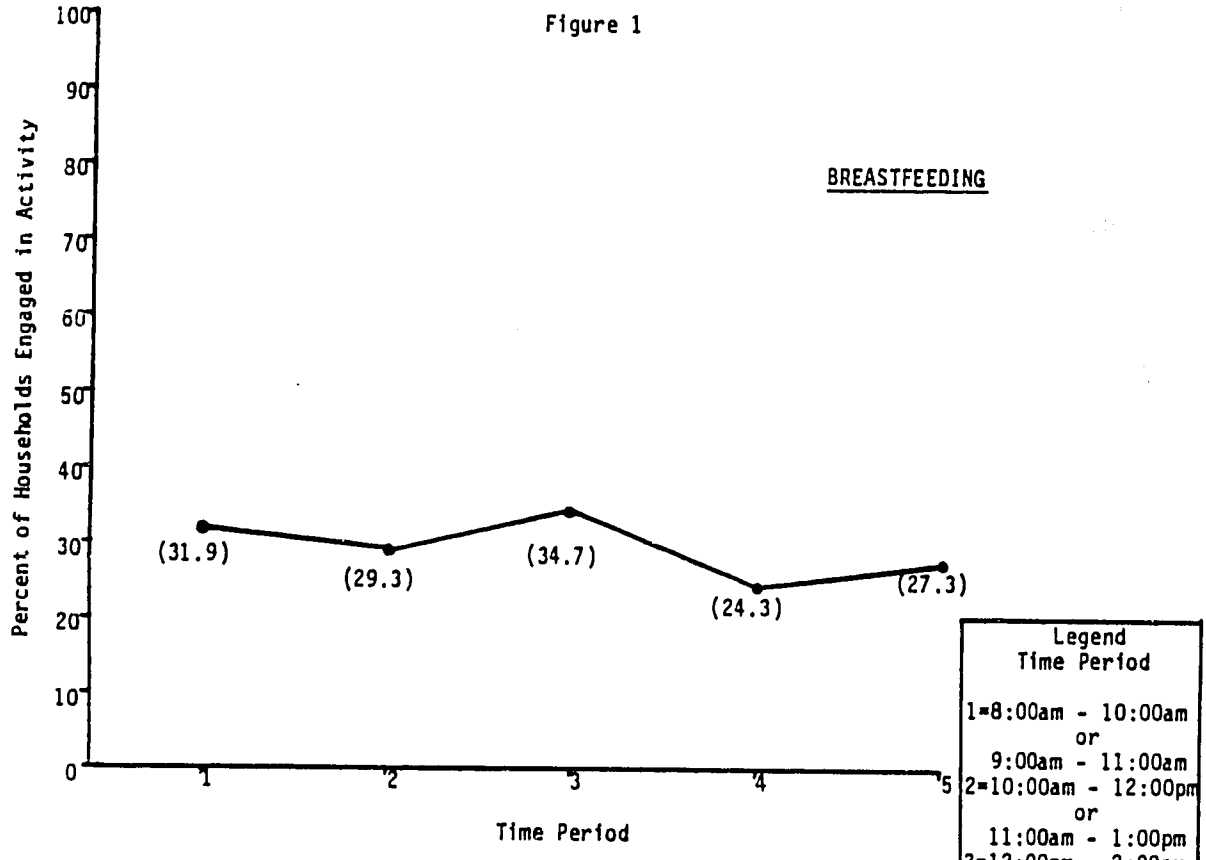
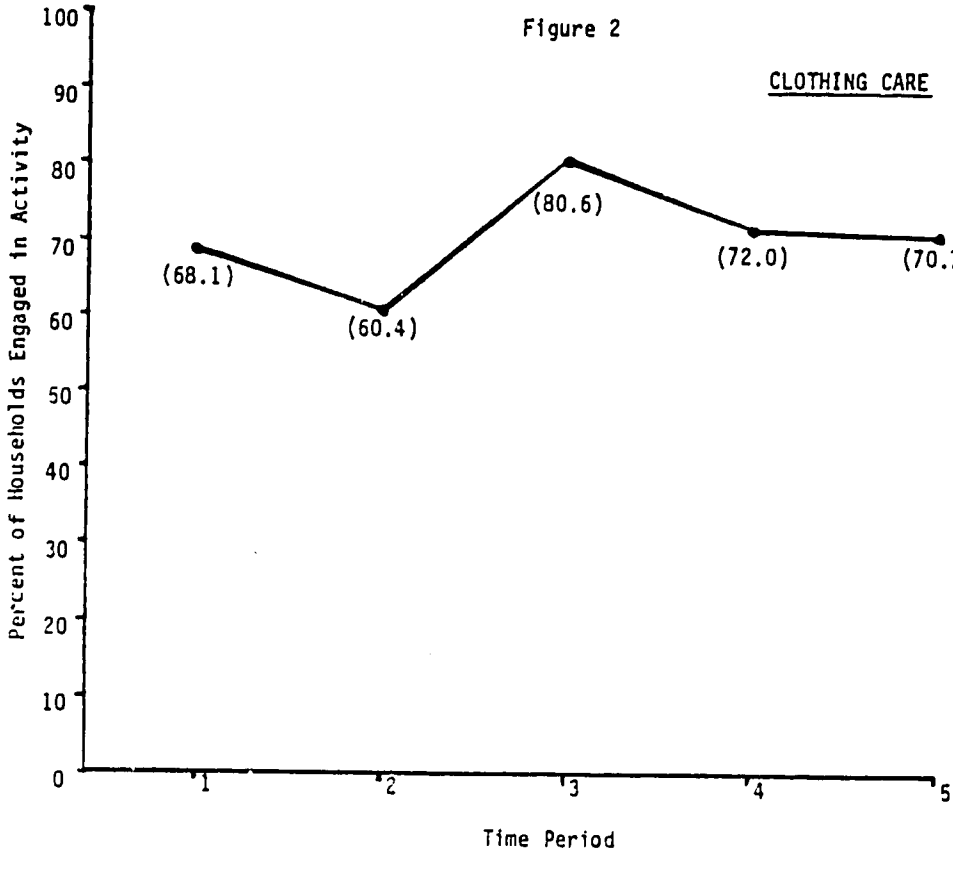


Figure 2



CAREGIVING ACTIVITY PATTERN

Figure 3

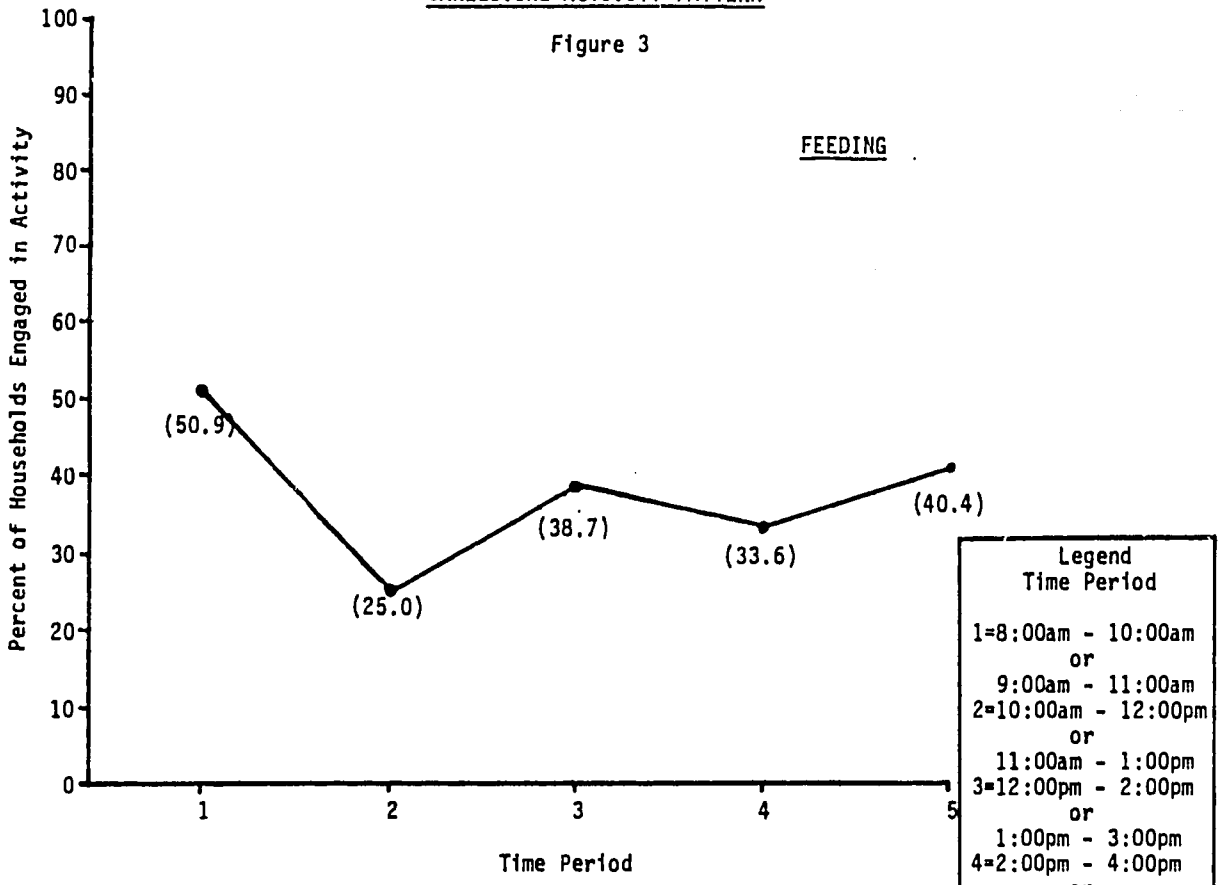
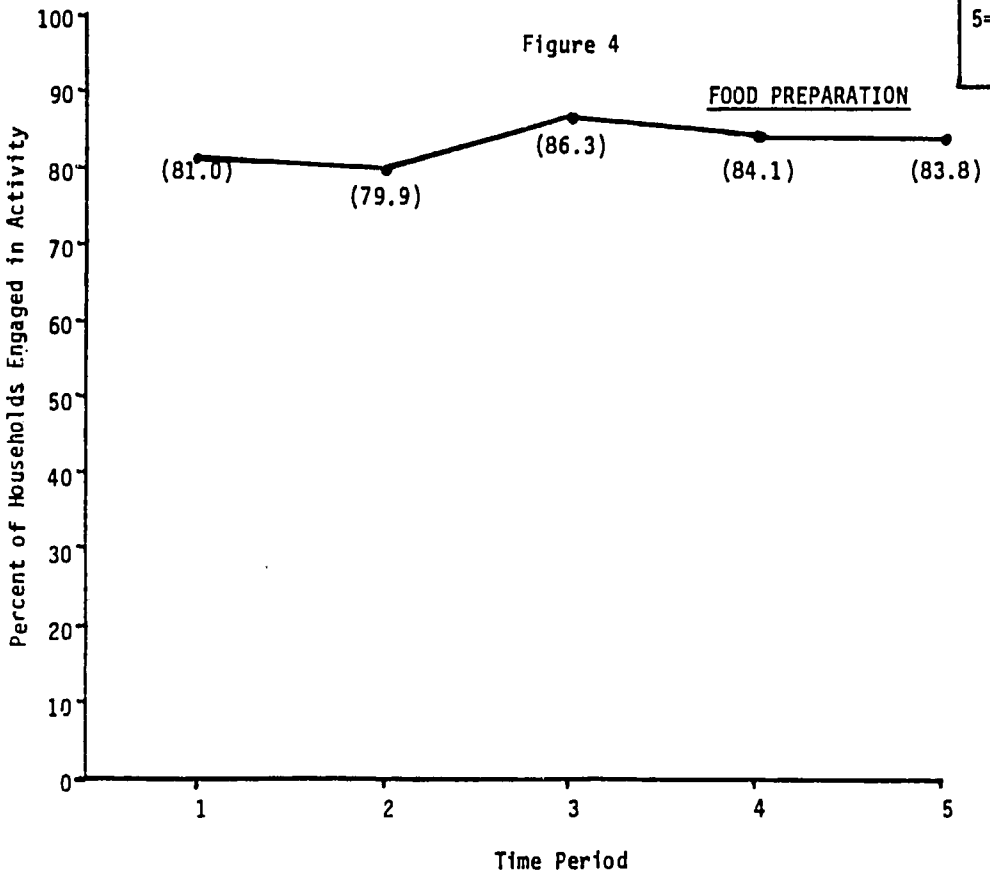


Figure 4



CAREGIVING ACTIVITY PATTERN

Figure 5

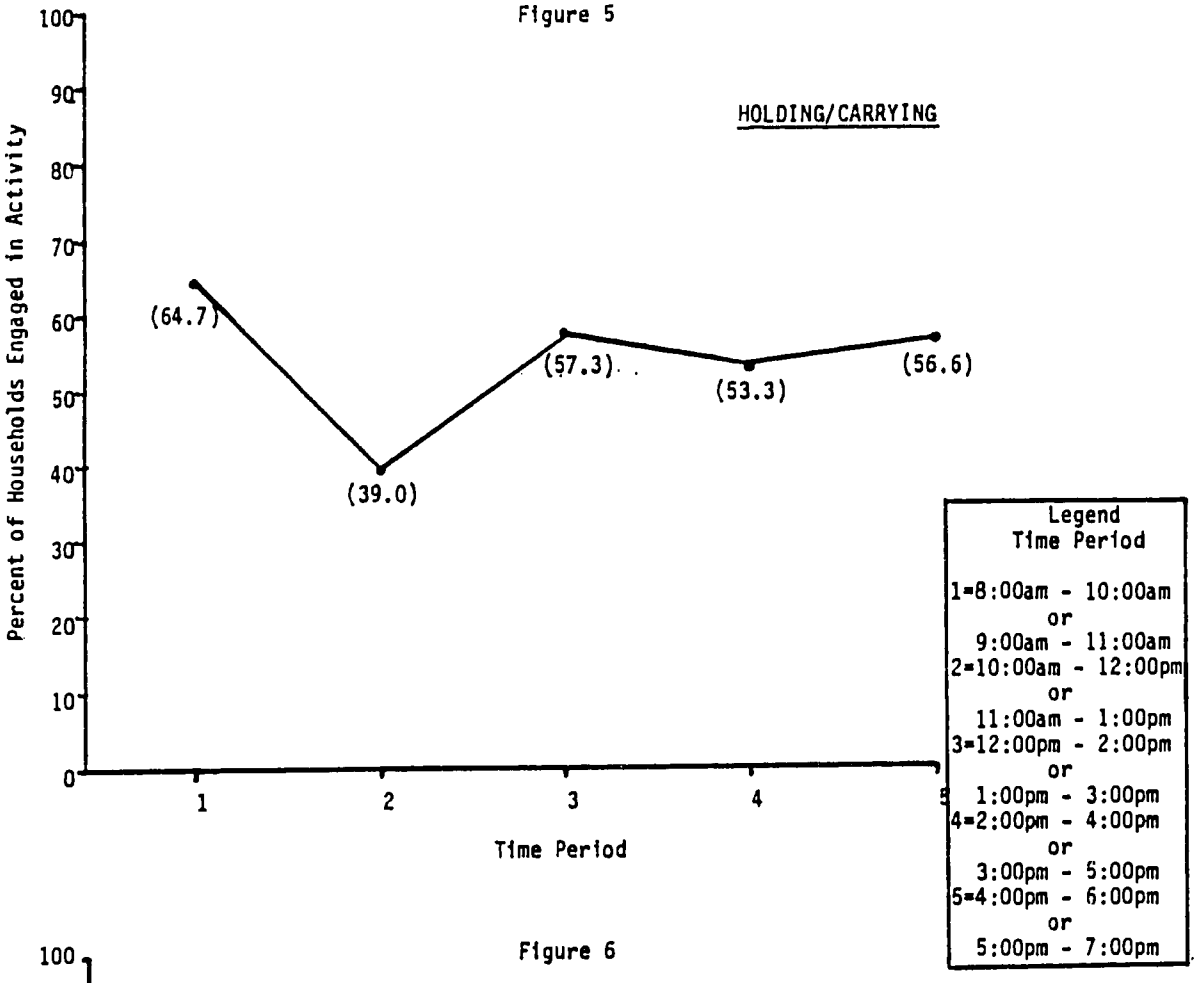
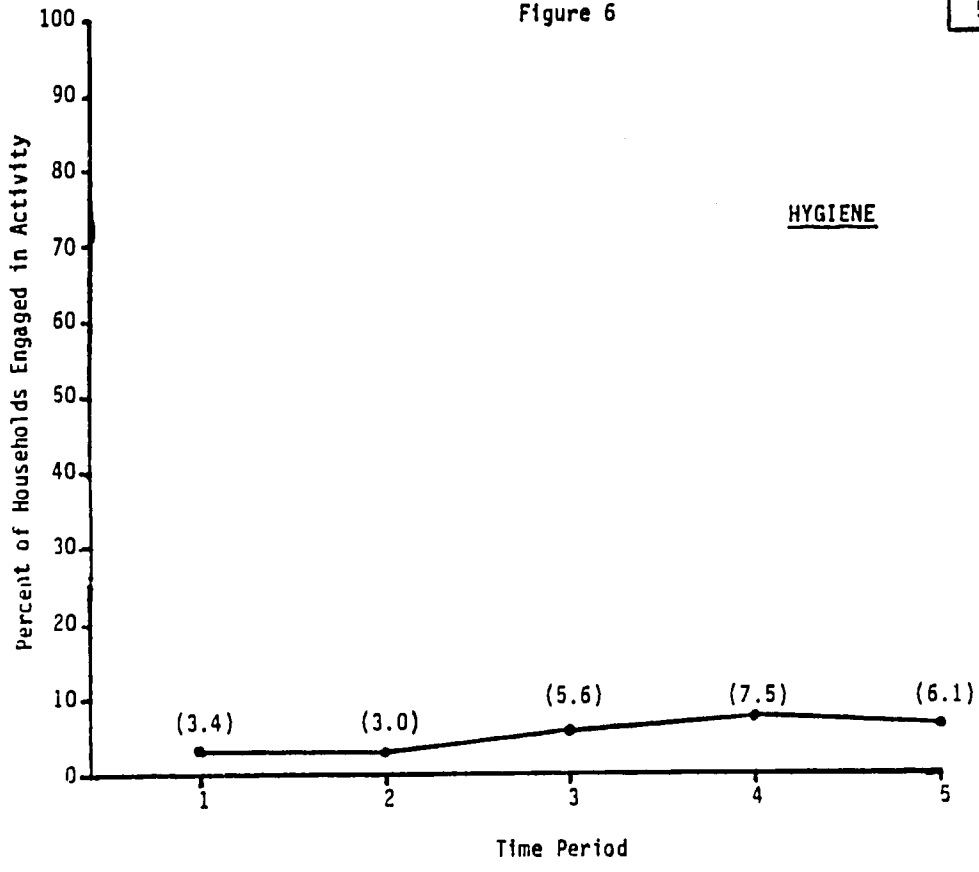


Figure 6



CAREGIVING ACTIVITY PATTERN

Figure 7

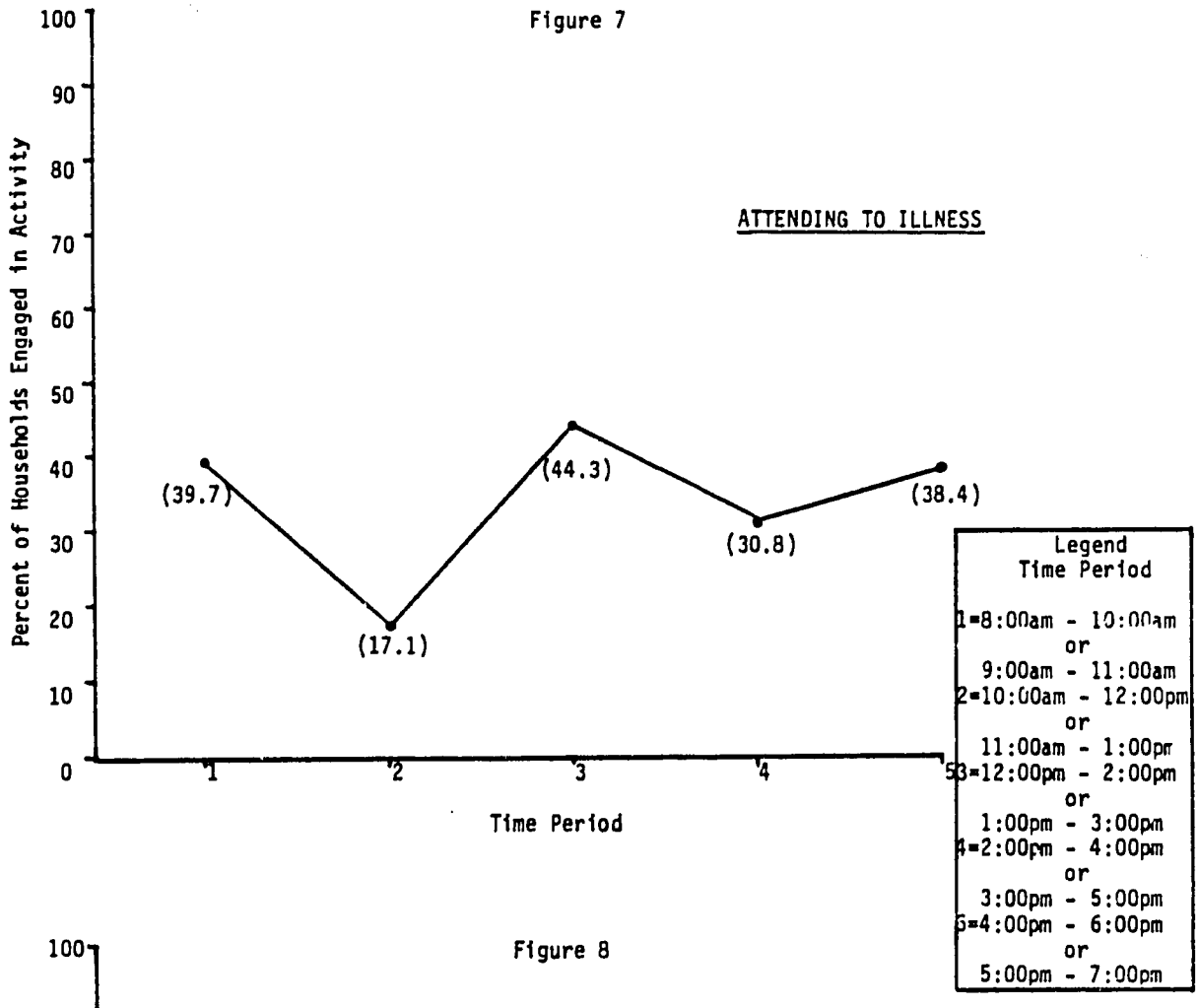
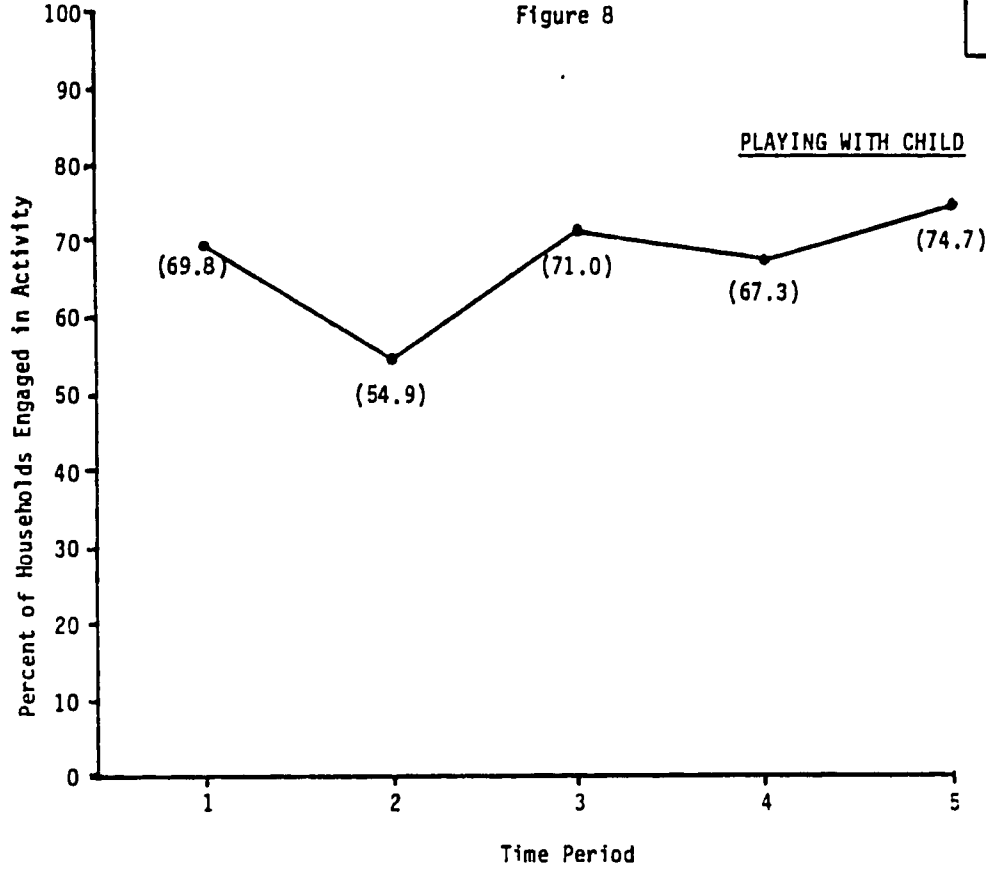


Figure 8



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CAREGIVING ACTIVITY PATTERN

Figure 9

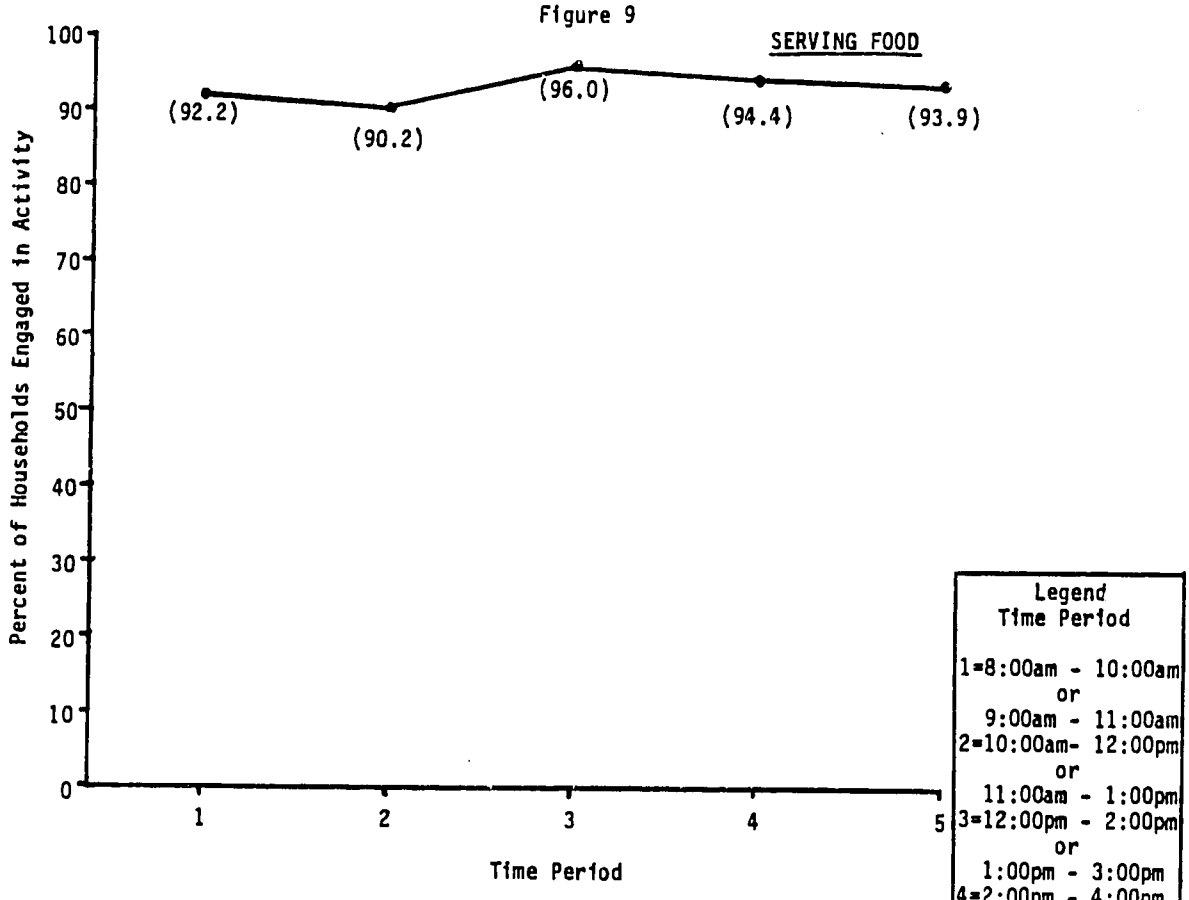
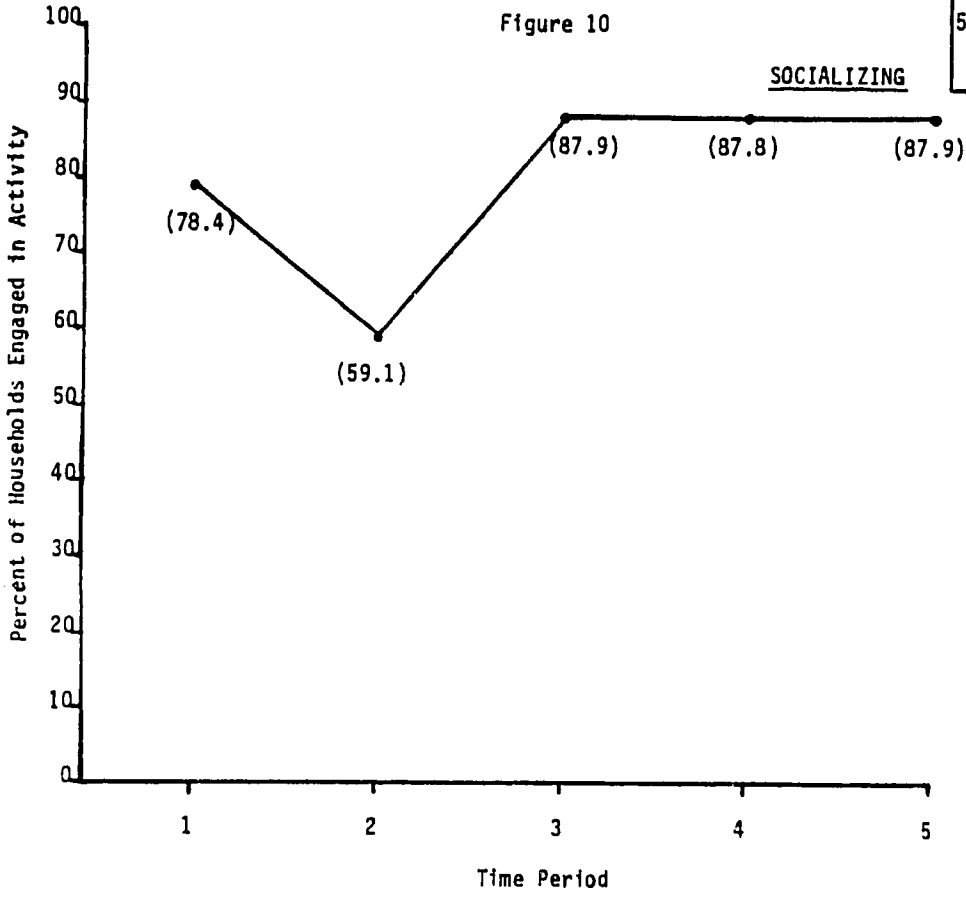


Figure 10



CAREGIVING ACTIVITY PATTERN

Figure 11

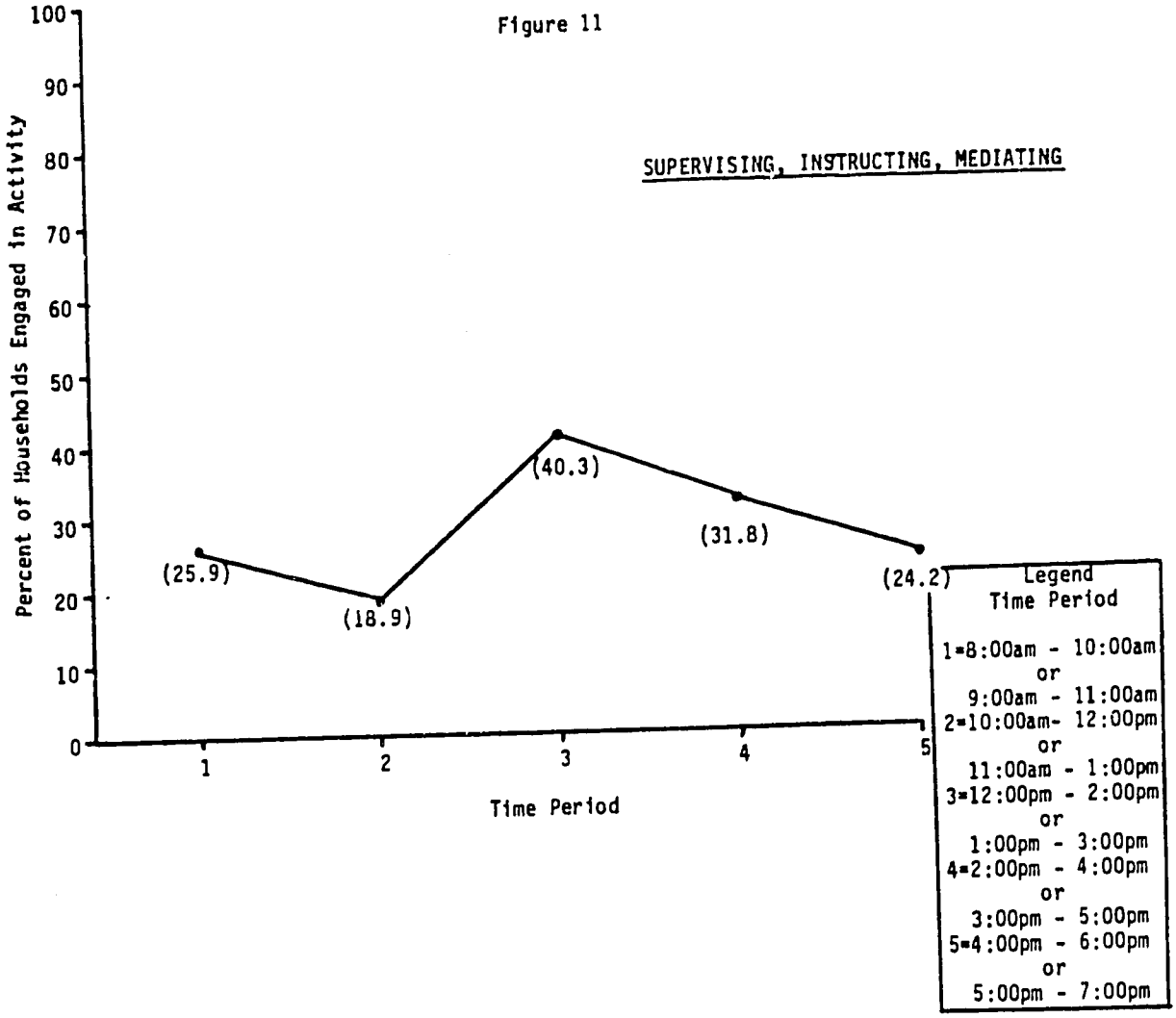


TABLE 1

FREQUENCY OF BREASTFEEDING BY
PERIOD OF OBSERVATION

PERIOD OF OBSERVATION	FREQUENCY OF BREASTFEEDING PER PERIOD							
	1-2 TIMES		3-4 TIMES		5-6 TIMES		7+ TIMES	
	% OF OCCUR.	NUMBER OF OCCURENCES	% OF OCCUR.	NUMBER OF OCCURENCES	% OF OCCUR.	NUMBER OF OCCURENCES	% OF OCCUR.	NUMBER OF OCCURENCES
8:00-10:00am 9:00-11:00am	78.4	29 (n=37)*	18.9	7	2.7	1	0.0	0
10:00-12:00pm 11:00- 1:00pm	79.2	38 (n=48)	16.7	8	4.1	2	0.0	0
12:00- 2:00pm 1:00- 3:00pm	93.0	40 (n=43)	7.0	3	0.0	0	0.0	0
2:00- 4:00pm 3:00- 5:00pm	80.8	21 (n=26)	15.4	4	3.8	1	0.0	0
4:00- 6:00pm 5:00- 7:00pm	66.7	18 (n=27)	33.3	9	0.0	0	0.0	0

*n=total number of times data were collected during each period of observation

TABLE 2

FREQUENCY OF CARING FOR CHILDREN'S CLOTHING BY
PERIOD OF OBSERVATION

PERIOD OF OBSERVATION	FREQUENCY OF CARING FOR CLOTHES PER PERIOD							
	1-2 TIMES		3-4 TIMES		5-6 TIMES		7+ TIMES	
	% OF OCCUR.	NUMBER OF OCCURENCES	% OF OCCUR.	NUMBER OF OCCURENCES	% OF OCCUR.	NUMBER OF OCCURENCES	% OF OCCUR.	NUMBER OF OCCURENCES
8:00-10:00am 9:00-11:00am	86.1	68 (n=79)*	12.6	10	1.3	1	0.0	0
10:00-12:00pm 11:00- 1:00pm	90.9	90 (n=99)	8.0	8	1.1	1	0.0	0
12:00- 2:00pm 1:00- 3:00pm	98.0	98 (n=100)	0.0	0	1.0	1	1.0	1
2:00- 4:00pm 3:00- 5:00pm	94.8	73 (n=77)	5.2	4	0.0	0	0.0	0
4:00- 6:00pm 5:00- 7:00pm	92.9	65 (n=79)	7.1	5	0.0	0	0.0	0

*n=total number of times data were collected during each period of observation

TABLE 3

FREQUENCY OF FEEDING CHILDREN BY
PERIOD OF OBSERVATION

PERIOD OF OBSERVATION	FREQUENCY OF FEEDING PER PERIOD							
	1-2 TIMES		3-4 TIMES		5-6 TIMES		7+ TIMES	
	% OF OCCUR.	NUMBER OF OCCURENCES	% OF OCCUR.	NUMBER OF OCCURENCES	% OF OCCUR.	NUMBER OF OCCURENCES	% OF OCCUR.	NUMBER OF OCCURENCES
8:00-10:00am 9:00-11:00am	94.9	56 (n=59)*	5.1	3	0.0	0	0.0	0
10:00-12:00pm 11:00- 1:00pm	95.1	39 (n=41)	4.9	2	0.0	0	0.0	0
12:00- 2:00pm 1:00- 3:00pm	97.9	47 (n=48)	2.1	1	0.0	0	0.0	0
2:00- 4:00pm 3:00- 5:00pm	100.0	36 (n=36)	0.0	0	0.0	0	0.0	0
4:00- 6:00pm 5:00- 7:00pm	97.5	39 (n=40)	2.5	1	0.0	0	0.0	0

*n=total number of times data were collected during each period of observation

TABLE 4

FREQUENCY OF PREPARING FOOD FOR CHILDREN BY
PERIOD OF OBSERVATION

PERIOD OF OBSERVATION	FREQUENCY OF PREPARING FOOD PER PERIOD							
	1-2 TIMES		3-4 TIMES		5-6 TIMES		7+ TIMES	
	% OF OCCUR.	NUMBER OF OCCURENCES	% OF OCCUR.	NUMBER OF OCCURENCES	% OF OCCUR.	NUMBER OF OCCURENCES	% OF OCCUR.	NUMBER OF OCCURENCES
8:00-10:00am 9:00-11:00am	54.2	51 (n=94)*	39.4	37	5.3	5	1.1	1
10:00-12:00pm 11:00- 1:00pm	61.1	80 (n=131)	28.2	37	10.7	14	0.0	0
12:00- 2:00pm 1:00- 3:00pm	66.4	71 (n=107)	30.8	33	2.8	3	0.0	0
2:00- 4:00pm 3:00- 5:00pm	63.3	57 (n=90)	31.1	28	5.6	5	0.0	0
4:00- 6:00pm 5:00- 7:00pm	68.7	57 (n=83)	22.9	19	8.4	7	0.0	0

*n=total number of times data were collected during each period of observation

TABLE 5

FREQUENCY OF HOLDING/CARRYING CHILDREN BY PERIOD OF OBSERVATION

PERIOD OF OBSERVATION	FREQUENCY OF HOLDING/CARRYING PER PERIOD							
	1-2 TIMES		3-4 TIMES		5-6 TIMES		7+ TIMES	
	% OF OCCUR.	NUMBER OF OCCURENCES	% OF OCCUR.	NUMBER OF OCCURENCES	% OF OCCUR.	NUMBER OF OCCURENCES	% OF OCCUR.	NUMBER OF OCCURENCES
8:00-10:00am 9:00-11:00am	92.0	69 (n=75)*	8.0	6	0.0	0	0.0	0
10:00-12:00pm 11:00- 1:00pm	92.2	59 (n=64)	7.8	5	0.0	0	0.0	0
12:00- 2:00pm 1:00- 3:00pm	98.6	70 (n=71)	1.4	1	0.0	0	0.0	0
2:00- 4:00pm 3:00- 5:00pm	98.2	56 (n=57)	1.8	1	0.0	0	0.0	0
4:00- 6:00pm 5:00- 7:00pm	100.0	56 (n=56)	0.0	0	0.0	0	0.0	0

*n=total number of times data were collected during each period of observation

TABLE 6

FREQUENCY OF ATTENDING TO CHILDREN'S PERSONAL HYGIENE BY PERIOD OF OBSERVATION

PERIOD OF OBSERVATION	FREQUENCY OF ATTENDING TO HYGIENE PER PERIOD							
	1-2 TIMES		3-4 TIMES		5-6 TIMES		7+ TIMES	
	% OF OCCUR.	NUMBER OF OCCURENCES	% OF OCCUR.	NUMBER OF OCCURENCES	% OF OCCUR.	NUMBER OF OCCURENCES	% OF OCCUR.	NUMBER OF OCCURENCES
8:00-10:00am 9:00-11:00am	100.0	4 (n=4)*	0.0	0	0.0	0	0.0	0
10:00-12:00pm 11:00- 1:00pm	100.0	5 (n=5)	0.0	0	0.0	0	0.0	0
12:00- 2:00pm 1:00- 3:00pm	100.0	7 (n=7)	0.0	0	0.0	0	0.0	0
2:00- 4:00pm :00- 5:00pm	100.0	8 (n=8)	0.0	0	0.0	0	0.0	0
4:00- 6:00pm 5:00- 7:00pm	100.0	6 (n=6)	0.0	0	0.0	0	0.0	0

*n=total number of times data were collected during each period of observation

TABLE 7

FREQUENCY OF ATTENDING TO CHILDREN'S ILLNESS BY PERIOD OF OBSERVATION

PERIOD OF OBSERVATION	FREQUENCY OF ATTENDING TO ILLNESS PER PERIOD							
	1-2 TIMES		3-4 TIMES		5-6 TIMES		7+ TIMES	
	% OF OCCUR.	NUMBER OF OCCURENCES	% OF OCCUR.	NUMBER OF OCCURENCES	% OF OCCUR.	NUMBER OF OCCURENCES	% OF OCCUR.	NUMBER OF OCCURENCES
8:00-10:00am 9:00-11:00am	97.8	45 (n=46)*	2.2	1	0.0	0	0.0	0
10:00-12:00pm 11:00- 1:00pm	96.3	27 (n=28)	3.7	1	0.0	0	0.0	0
12:00- 2:00pm 1:00- 3:00pm	98.2	54 (n=55)	1.8	1	0.0	0	0.0	0
2:00- 4:00pm 3:00- 5:00pm	90.9	30 (n=33)	9.1	3	0.0	0	0.0	0
4:00- 6:00pm 5:00- 7:00pm	87.8	33 (n=38)	13.2	5	0.0	0	0.0	0

*n=total number of times data were collected during each period of observation

TABLE 8

FREQUENCY OF PLAYING WITH CHILDREN BY PERIOD OF OBSERVATION

PERIOD OF OBSERVATION	FREQUENCY OF PLAYING PER PERIOD							
	1-2 TIMES		3-4 TIMES		5-6 TIMES		7+ TIMES	
	% OF OCCUR.	NUMBER OF OCCURENCES	% OF OCCUR.	NUMBER OF OCCURENCES	% OF OCCUR.	NUMBER OF OCCURENCES	% OF OCCUR.	NUMBER OF OCCURENCES
8:00-10:00am 9:00-11:00am	81.5	66 (n=81)*	17.3	14	1.2	1	0.0	0
10:00-12:00pm 11:00- 1:00pm	81.1	73 (n=90)	14.4	13	4.5	4	0.0	0
12:00- 2:00pm 1:00- 3:00pm	94.3	83 (n=88)	3.4	3	2.3	2	0.0	0
2:00- 4:00pm 3:00- 5:00pm	98.6	71 (n=72)	1.4	1	0.0	0	0.0	0
4:00- 6:00pm 5:00- 7:00pm	85.1	63 (n=74)	14.9	11	0.0	0	0.0	0

*n=total number of times data were collected during each period of observation

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TABLE 9

FREQUENCY OF SERVING CHILDREN BY
PERIOD OF OBSERVATION

PERIOD OF OBSERVATION	FREQUENCY OF SERVING PER PERIOD							
	1-2 TIMES		3-4 TIMES		5-6 TIMES		7+ TIMES	
	% OF OCCUR.	NUMBER OF OCCURENCES	% OF OCCUR.	NUMBER OF OCCURENCES	% OF OCCUR.	NUMBER OF OCCURENCES	% OF OCCUR.	NUMBER OF OCCURENCES
8:00-10:00am 9:00-11:00am	22.4	24 (n=107)*	39.3	42	31.8	34	6.5	7
10:00-12:00pm 11:00- 1:00pm	31.7	47 (n=148)	38.5	57	20.3	30	9.5	14
12:00- 2:00pm 1:00- 3:00pm	38.6	46 (n=119)	36.0	43	21.8	26	3.3	4
2:00- 4:00pm 3:00- 5:00pm	48.5	49 (n=101)	37.6	38	9.9	10	4.0	4
4:00- 6:00pm 5:00- 7:00pm	51.6	48 (n=93)	36.5	34	9.7	9	2.2	2

*n=total number of times data were collected during each period of observation

TABLE 10

FREQUENCY OF SOCIALIZING WITH CHILDREN BY
PERIOD OF OBSERVATION

PERIOD OF OBSERVATION	FREQUENCY OF SOCIALIZING PER PERIOD							
	1-2 TIMES		3-4 TIMES		5-6 TIMES		7+ TIMES	
	% OF OCCUR.	NUMBER OF OCCURENCES	% OF OCCUR.	NUMBER OF OCCURENCES	% OF OCCUR.	NUMBER OF OCCURENCES	% OF OCCUR.	NUMBER OF OCCURENCES
8:00-10:00am 9:00-11:00am	57.1	52 (n=91)*	35.2	32	5.5	5	2.2	2
10:00-12:00pm 11:00- 1:00pm	53.6	52 (n=97)	28.9	28	13.4	13	4.1	4
12:00- 2:00pm 1:00- 3:00pm	52.3	57 (n=109)	37.6	41	9.2	10	0.9	1
2:00- 4:00pm 3:00- 5:00pm	52.1	49 (n=94)	42.6	40	3.2	3	2.1	2
4:00- 6:00pm 5:00- 7:00pm	50.6	44 (n=87)	41.4	36	6.9	6	1.1	1

*n=total number of times data were collected during each period of observation

TABLE 11

FREQUENCY OF SUPERVISING/MEDIATING/INSTRUCTING CHILDREN BY PERIOD OF OBSERVATION

PERIOD OF OBSERVATION	FREQUENCY OF SUPERVISING/INSTRUCTING/MEDIATING PER PERIOD							
	1-2 TIMES		3-4 TIMES		5-6 TIMES		7+ TIMES	
	% OF OCCUR.	NUMBER OF OCCURENCES	% OF OCCUR.	NUMBER OF OCCURENCES	% OF OCCUR.	NUMBER OF OCCURENCES	% OF OCCUR.	NUMBER OF OCCURENCES
8:00-10:00am 9:00-11:00am	93.3	28 (n=30)*	6.7	2	0.0	0	0.0	0
10:00-12:00pm 11:00- 1:00pm	90.3	28 (n=31)	9.7	3	0.0	0	0.0	0
12:00- 2:00pm 1:00- 3:00pm	100.0	50 (n=50)	0.0	0	0.0	0	0.0	0
2:00- 4:00pm 3:00- 5:00pm	97.1	33 (n=34)	2.9	1	0.0	0	0.0	0
4:00- 6:00pm 5:00- 7:00pm	95.8	23 (n=24)	4.2	1	0.0	0	0.0	0

*n=total number of times data were collected during each period of observation

c. Scoring Levels of Effectiveness in Child-Care Giving Activities

Three-tier ordinal scales are being developed from data derived from the Narrative version of the Child Care Protocol in order to rank caregivers according to effectiveness in caregiving. Data from 74 households have been involved in this process. The focus is on both parent (caregiver) and child. (Refer to Table 12).

There are 11 caregiving activities which are triggered by a child's behavior or the antecedent event (e.g. child cries). A child's behavior is never predictable. The caregiver's response to the child's behavior (e.g. picks up child), or the caregiving activity, leads to a subsequent response by the child (e.g. child stops crying), from which levels of effectiveness are measured. Thus, the effectiveness scale is an indirect measure of appropriateness in child-caregiving.

The scale is ranked as follows:

Highly Effective = 3
Moderately Effective = 2
Slightly Effective = 1

DETERMINING LEVELS OF EFFECTIVENESS IN CHILD-CAREGIVING ACTIVITIES

CHILD'S BEHAVIOR (ANTECEDENT EVENT)	TARGET CARETAKER'S RESPONSE	INDICES OF EFFECTIVENESS		
		DESIREABLE CONSEQUENCES(S)	PERCENT OF DESIREABLE CONSEQUENCES(S)	LEVEL OF (RANK ORDER) EFFECTIVENESS
Child cries (n=225)	Holding/Carrying (n=95) ---------- Breastfeeding (n=20)	Child stops crying	71.6	Highly Effective = 3
	Socializing (n=35)	Child stops crying	51.4	Moderately Effective = 2
	Supervising/Instructing/ Mediating (n=35)	Child stops crying	28.6	Slightly Effective = 1
Child comes to caregiver (n=40)	Socializing (n=10)	Child responds verbally Child obeys Child kisses/hugs caregiver	100.0	Highly Effective = 3
	Holding/Carrying (n=9)	Child responds verbally Child is satisfied Child plays	75.0	Moderately effective = 2
	Supervising/Instructing/ Mediating (n=8)	Child responds verbally Child obeys	28.6	Slightly effective = 1
Child requests food or beverage (n=128)	Feeding (n=18)	Child eats/drinks	100.0	Highly effective = 3
	Serving food/beverage (n=18)	Child eats/drinks	88.6	Moderately effective = 2
	Food preparation (n=76)	Child eats/drinks	22.2	Slightly effective = 1

2. Food Intake

a. Egypt Project Nutrient Composition Data Base

Nutrient composition data (kcals) for Egyptian foods and beverages were revised, expanded and updated to include more accurate and comprehensive information on energy content of foods and beverages.

b. Data Analysis

A close scrutiny of the method of calculating energy intake from food intake records was undertaken in January and February and a revised data set has been forwarded to Berkeley.

Preliminary analyses of updated data through July 1985 are presented in the table below.

				Coefficient of Variation		
Class	Subjects	Observations	Mean	Between	Within	Within 6 day mean
Lead Male	135	945	2486	22.4%	38.2%	15.2%
Lead Female	141	1002	2322	18.9%	37.5%	15.3%
Schooler Male	30	185	1918	25.6%	33.9%	13.8%
Schooler Female	35	220	1920	19.5%	44.8%	18.3%
Toddler Male	61	438	1007	34.3%	47.2%	19.3%
Toddler Female	54	432	1017	35.6%	41.9%	17.1%

The data show an apparent low intake/kg in adult males. Steps are now underway to delete males with incomplete food intake data (one or more meals missing). The data also show an apparently high average intake/kg in toddlers. This anomaly is difficult to explain although the child caregiving data show a pattern of constant eating among toddlers.

c. Comparison of Individual Food Intake Data Collection Methods

A small substudy was undertaken to assess the reliability of several data collection methods for procuring accurate information on individual food consumption. Observation, short-term recall and 24-hour recall methods were each employed in collecting data on target individuals on designated days in a sample of 50 Kalama households.

Mean kcals/day for each group of target individuals were calculated from data obtained by the three methods and paired t-tests were performed to compare the following sets of means:

i. Observation with 24-hour recall
ii. Short-term recall with 24-hour recall
iii. Combined observation and short-term recall with 24-hour recall

Results of all three t-tests imply that for target males, females, schoolers, toddlers, the null hypothesis (H_0) cannot be rejected. However, small sample sizes (Refer to Table 13) prohibit the interpretation of these t-test results as conclusive statistical evidence that mean kcals/day obtained by observation, short-term recall and 24-hour recall methods are not significantly different at $p < 0.05$.

Table 13

SAMPLE SIZES OF TARGET INDIVIDUALS
IN PAIRED T-TEST PROCEDURES

PAIRED T-TEST PROCEDURES	SAMPLE SIZE*			
	TARGET MALES	TARGET FEMALES	TARGET SCHOOLERS	TARGET TODDLERS
Observation with 24-hour recall	7	7	2	5
Short-term recall with 24-hour recall	36	39	20	29
Combined observation and short-term recall with 24-hour recall	43	46	22	34

*Sample size equals number of days of food intake data collected for each group of target individuals.

3. Hygiene and Sanitation:

a. Research Report: Sanitation and Hygiene - Core Households

Interview and observational data on sanitation and hygiene were obtained in 99 Kalama households. Data are organized as (a) Household level data and (b) Individual level data. A summary of these data follow.

HOUSEHOLD LEVEL DATA

Care of Cooking, Eating and Drinking Utensils: (Interview data)

The majority of households (98%) report that drinking glasses/cups are washed after each use. Fewer households, however, (55%) report washing their cooking and eating utensils after each meal. Almost all households report using water (99%) and soap (100%) in cleaning these utensils.

Additional items used by some households in the cleaning process are scrubber (61%), dishcloth (59%) and straw (34%).

Storage of Cooking, Eating and Drinking Utensils: (Observational data)

As indicated in Table 14 the majority of households store a large proportion of their cooking and eating utensils exposed to dirt and insects, both on and off the floor. (These results are similar to the earlier case study statistics which also reported a high occurence of exposed utensils in the majority of households).

Table 14

PERCENT OF OBSERVATIONS OF HOUSEHOLDS
STORING UTENSILS IN EXPOSED AREAS

Type of Utensils	Percent of Observations	
	%	Number
Serving (plates, dishes)	91.4	298 (n=326)*
Food preparation (pots, pans, lids, bowls, cutting boards, cooking utensils)	90.7	769 (n=848)
Eating (knives, forks, spoons)	77.4	292 (n=377)
Drinking (cups, glasses)	75.5	206 (n=273)

*n refers to number of observations in the 99 households in which a storage area was observed.

Description and Care of Latrine (Interview data)

Virtually all households (99%) have a latrine. However, most of these latrines (96%) have no running water and require evacuation. Most are of the reservoir type. Fifty-five percent of the households reported that their latrines were built within the past 10 years. In 70% of the households, latrine evacuation is performed by a special worker. Target females in 33% of households report doing this work. Target males perform this activity in only 22% of the households. (These are not mutally exclusive).

Various cleaning devices are used in cleaning latrines. Water of course, is commonly used in 90% of households, soap, in 55%, scrubber in 29%; and disinfectant in 25%. Most households (83%) report that they have no problem with foul smells.

Laundering Practices: (Interview data)

Almost three-quarters of the households (70%) report that they wash clothes for the household two to three times per week. Almost all households wash at home (95%); some wash at the canal (31%).

Eighty-six percent of households report doing all of their laundry at home; while only 11% wash all laundry at the canal. Children's clothes or heavily soiled clothes were mentioned as types of laundry cleaned at the canal.

Since all core households do not contain an infant or a toddler, only 52% of households responded to questions about infants' laundry and 87% to questions about toddlers' laundry. The following results pertain to these households.

Infants clothes are treated in a special way in terms of frequency of laundering. When asked how often infants' clothes are washed, the most common responses were fairly evenly distributed between "everyday" (38%), "more than once per day" (27%) and "two to three times per week" (23%)

The responses for frequency of washing toddler's clothing were more clear. Almost one-half (48%) wash them two to three times per week.

More than 96% of all households report that they boil water for doing the laundry, including washing baby clothes, other children's clothes and general laundry.

Uses of Boiled Water: (Interview data)

In addition to the laundry, many households (69%) boil water for preparing baby food and for bathing children (58%) and adults (57%). (Case study data - differ from the above. Respondents did not indicate that water was boiled for any of these activities).

It is interesting to note, however, that only one percent of households boil water for drinking.

Manufacture of Dung Cakes: (Interview data)

Only 33.5% of households report collecting manure for making dung cakes. Of that group, 81% collect manure everyday and store it on the roof. In almost all households (96%) the target female makes the dung cakes. This is usually done everyday. In half of these households (51%) dung cakes are made with 100% animal manure.

Condition of House: (Observational data)

The majority of houses observed had litter covering approximately 0-25% of the reception room and the rooms where infants and toddlers sleep and play. (These results differ slightly from earlier case study statistics which reported litter covering 25-50% of the reception room and the rooms where infants and toddlers sleep and play.)

Presence of Pests: (Observational data)

As indicated in Table 15, rats, cockroaches, flies and ants were observed both inside and outside a large proportion of the houses. (These results differ significantly from the earlier case study statistics which reported few pests in the majority of households).

Table 15

PERCENT OF OBSERVATIONS OF HOUSEHOLDS
WITH PESTS INSIDE OR OUTSIDE THE HOUSE

TYPE OF PEST	PERCENT OF OBSERVATIONS			
	INSIDE HOUSE		OUTSIDE HOUSE	
	%	Number	%	Number
Flies	51.9	84 (n=162)*	51.5	84 (n=163)
Rats	49.4	80 (n=162)	37.5	75 (n=162)
Ants	30.7	50 (n=163)	25.8	42 (n=163)
Cockroaches	10.5	17 (n = 162)	9.8	16 (n=162)

*n refers to number of observations in the 99 households which were available for observation.

INDIVIDUAL TARGET LEVEL DATA

Age (or stage in the life cycle) and gender (in adults) are important factors in personal sanitation and hygiene practices.

As shown in Tables 16, 17 and 18 compared with infants, toddlers showed more dirt on their hands, face and clothing, and an increased number of flies on or near their faces. This pattern ceases at the end of toddlerhood.

Tables 16-18 also show the relative disadvantage of adult females when they are compared with adult males.

In general, personal hygiene and sanitation improves from the toddler stage through the adult stage but improves greatly in adult males.

Interestingly, Table 19 shows consistent progression in protecting the feet based on age, from infancy to adulthood, again with an advantage for the adult male, but with no disruption at the toddler age.

Age has both positve and negative consequences depending on whether the individual had made the transition from infancy to toddlerhood or from toddlerhood to some other stage. The toddler stage is an extremely vulnerable one.

TABLE 16

PERCENT OF OBSERVATIONS OF TARGET INDIVIDUALS WITH DIRT ON HANDS AND FACE

TARGET INDIVIDUALS	PERCENT OF OBSERVATIONS SHOWING HANDS AND FACE COVERED WITH DIRT					
	0% (NO DIRT)		25% COVERED		50% COVERED	
	%	Number	%	Number	%	Number
Infants	28.4	25(n=88)*	39.8	35(n=88)	18.2	16(n=88)
Toddlers	18.4	29(n=158)	51.3	81(n=158)	22.2	35(n=158)
Schoolers	31.3	41(n=131)	45.0	59(n=131)	14.5	19(n=131)
Adult Females	47.9	78(n=163)	41.1	67(n=163)	5.5	9(n=163)
Adult Males	57.7	45(n=78)	33.3	26(n=78)	1.3	1(n=78)

TABLE 17

PERCENT OF OBSERVATIONS OF TARGET INDIVIDUALS WITH DIRT ON CLOTHING

TARGET INDIVIDUALS	PERCENT OF OBSERVATIONS SHOWING CLOTHING COVERED WITH DIRT					
	0% (NO DIRT)		25% COVERED		50% COVERED	
	%	Number	%	Number	%	Number
Infants	27.0	24(n=89)*	42.7	38(n=89)	16.9	15(n=89)
Toddlers	18.2	29(n=159)	54.1	86(n=159)	17.6	28(n=159)
Schoolers	25.6	34(n=133)	50.4	67(n=133)	13.5	18(n=133)
Adult Females	46.0	75(n=163)	42.9	70(n=163)	5.5	9(n=163)
Adult Males	55.8	45(n=77)	37.7	29(n=77)	2.6	2(n=77)

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TABLE 18

PERCENT OF OBSERVATIONS OF TARGET INDIVIDUALS HAVING FLIES ON OR NEAR THEIR FACES

TARGET INDIVIDUALS	OBSERVATIONS SHOWING FLIES ON OR NEAR THE FACE			
	FLIES		1-4 FLIES	
	%	Number	%	Number
Infants	60.2	56(n=93)*	22.5	21(n=93)
Toddlers	40.5	64(n=158)	48.1	76(n=158)
Schoolers	58.9	79(n=134)	31.3	42(n=134)
Adult Females	85.8	140(n=163)	10.4	17(n=163)
Adult Males	88.5	69(n=78)	6.4	5(n=78)

TABLE 19

PERCENT OF OBSERVATIONS OF TARGET INDIVIDUALS WITH AND WITHOUT FOOT PROTECTION

TARGET INDIVIDUALS	OBSERVATIONS SHOWING TYPE OF FOOT PROTECTION			
	SLIPPERS OR SANDALS		NO PROTECTION (BAREFOOT)	
	%	Number	%	Number
Infants	2.2	2(n=90)*	85.6	77(n=90)
Toddlers	43.9	69(n=157)	51.6	81(n=157)
Schoolers	60.9	81(n=133)	24.1	32(n=133)
Adult Females	84.6	137(n=162)	14.8	24(n=162)
Adult Males	77.6	66(n=85)	4.7	4(n=85)

* n refers to number of individuals who were available for observation

SUMMARY

The data suggest three trends in an individual's personal hygiene. The first is the apparent intensity of care provided to infants which clearly diminishes as the child reaches 18 months of age. The poorer quality of hygiene observed in toddlers (18-36 months of age) compared with infants reflects this trend.

Infants rely completely on a caregiver (adults and non-adults) for personal hygienic care. However, the toddler is extremely active exploring his/her environment away from caregivers which limits the amount of time and attention devoted to toddler care. As a result, the infants' quality of hygiene is consistently better than that of toddlers'.

The second trend is the gradual but consistent improvement in all aspects of hygiene as an individual ages from toddlerhood to adulthood. As an individual becomes more capable and rehearsed in practicing personal hygiene, his or her degree of cleanliness also increases. Consequently, toddlerhood is the phase in the life cycle which renders the individual most vulnerable to infection, disease and other health problems that are linked to less than adequate hygiene.

A third trend is the gender factor in adults. Adult females are visibly less clean than adult males. (The gender factor in schoolers is being studied). This is consistent with the "activity" data which show that women not only spend more time working but also perform many of the dirty tasks such as evacuating latrines and making dung cakes.

b. Scale for Scoring Household Sanitation and Hygiene

Preliminary five point interval scales were developed from data derived from two Household Sanitation and Hygiene instruments, observational and interview protocols. Data from 96 households (observation protocol) and 99 households (interview protocol) were involved in this process. Specific components of household sanitation and hygiene can be evaluated singularly or compositely on these scales.

The scale ranges from one point (very poor) to five points (very good) with three points as a satisfactory or adequate score.

The household sanitation and hygiene score consists of seven components, each with several indices

- care and storage of cooking and eating utensils
- type and care of latrine
- laundry practices
- uses of boiled water
- manufacture of dung cakes
- condition of house
- location of animals
- presence and location of pests

The sanitation and hygiene score for each component is calculated by adding the numerical value assigned each index and then dividing by the total number of indices. Thus, bias is eliminated when data for an index is missing.

CARE AND STORAGE OF COOKING AND EATING UTENSILS:

1. Frequency of washing cooking and eating utensils.
   - After each meal = 5 (Highly adequate)
   - Two times per day = 3 (Adequate
   - Once per day or less = 1 (Highly inadequate)

2. Frequency of washing drinking cups.
   - After each use = 5 (Adequate)
   - After more than one use = 1 (Inadequate)

3. Items employed when washing cooking, eating and drinking utensils.
   - Water, soap and two or more abrasives = 5 (Highly adequate)
   - Water, soap and one abrasive = 4 (More than adequate)
   - Water and soap only = 3 (Adequate)
   - Water and abrasive(s) only = 2 (Less than adequate)
   - Water only = 1 (Highly inadequate)

4. Storage place for plates.
   - None exposed (covered/protected) = 5 (Very good)
   - Some not exposed and others exposed but not on floor = 4 (Good)
   - Some not exposed and others exposed both on floor and off floor
   - Some not exposed and others exposed on floor
   - All exposed off floor
   - = 3 (Satisfactory)
   - All exposed both on and off floor = 2 (Poor)
   - All exposed on floor = 1 (Very poor)

5. Storage place for dishes.
   - None exposed (covered/protected) = 5 (Very good)
   - Some not exposed and others exposed but not on floor = 4 (Good)
   - Some not exposed and others exposed both on floor and off floor
   - Some not exposed and others exposed on floor
   - All exposed off floor
   - = 3 (Satisfactory)
   - All exposed both on and off floor = 2 (Poor)
   - All exposed on floor = 1 (Very poor)

6. Storage place for cups.
   - None exposed (covered/protected) = 5 (Very good)
   - Some not exposed and others exposed but not on floor = 4 (Good)
   - Some not exposed and others exposed both on floor and off floor
   - Some not exposed and others exposed on floor
   - All exposed off floor
   - = 3 (Satisfactory)
   - All exposed both on and off floor = 2 (Poor)
   - All exposed on floor = 1 (Very poor)

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7. Storage place for glasses.

None exposed (covered/protected)	=	5 (Very good)
Some not exposed and others exposed but not on floor	=	4 (Good)
Some not exposed and others exposed both on floor and off floor Some not exposed and others exposed on floor All exposed off floor	=	3 (Satisfactory)
All exposed both on and off floor	=	2 (Poor)
All exposed on floor	=	1 (Very poor)

8. Storage place for spoons.

None exposed (covered/protected)	=	5 (Very good)
Some not exposed and others exposed but not on floor	=	4 (Good)
Some not exposed and others exposed both on floor and off floor Some not exposed and others exposed on floor All exposed off floor	=	3 (Satisfactory)
All exposed both on and off floor	=	2 (Poor)
All exposed on floor	=	1 (Very poor)

9. Storage place for forks.

None exposed (covered/protected)	=	5 (Very good)
Some not exposed and others exposed but not on floor	=	4 (Good)
Some not exposed and others exposed both on floor and off floor Some not exposed and others exposed on floor All exposed off floor	=	3 (Satisfactory)
All exposed both on and off floor	=	2 (Poor)
All exposed on floor	=	1 (Very poor)

10. Storage place for knives.

None exposed (covered/protected)	=	5 (Very good)
Some not exposed and others exposed but not on floor	=	4 (Good)
Some not exposed and others exposed both on floor and off floor Some not exposed and others exposed on floor All exposed off floor	=	3 (Satisfactory)
All exposed both on and off floor	=	2 (Poor)
All exposed on floor	=	1 (Very poor)

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11. Storage place for pots.

None exposed (covered/protected)	= 5 (Very good)
Some not exposed and others exposed but not on floor	= 4 (Good)
Some not exposed and others exposed both on floor and off floor Some not exposed and others exposed on floor All exposed off floor	= 3 (Satisfactory)
All exposed both on and off floor	= 2 (Poor)
All exposed on floor	= 1 (Very poor)

12. Storage place for pans.

None exposed (covered/protected)	= 5 (Very good)
Some not exposed and others exposed but not on floor	= 4 (Good)
Some not exposed and others exposed both on floor and off floor Some not exposed and others exposed on floor All exposed off floor	= 3 (Satisfactory)
All exposed both on and off floor	= 2 (Poor)
All exposed on floor	= 1 (Very poor)

13. Storage place for lids.

None exposed (covered/protected)	= 5 (Very good)
Some not exposed and others exposed but not on floor	= 4 (Good)
Some not exposed and others exposed both on floor and off floor Some not exposed and others exposed on floor All exposed off floor	= 3 (Satisfactory)
All exposed both on and off floor	= 2 (Poor)
All exposed on floor	= 1 (Very poor)

14. Storage place for mixing bowls.

None exposed (covered/protected)	= 5 (Very good)
Some not exposed and others exposed but not on floor	= 4 (Good)
Some not exposed and others exposed both on floor and off floor Some not exposed and others exposed on floor All exposed off floor	= 3 (Satisfactory)
All exposed both on and off floor	= 2 (Poor)
All exposed on floor	= 1 (Very poor)

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15. Storage place for cutting board.

None exposed (covered/protected)	=	5 (Very good)
Some not exposed and others exposed but not on floor	=	4 (Good)
Some not exposed and others exposed both on floor and off floor Some not exposed and others exposed on floor All exposed off floor	=	3 (Satisfactory)
All exposed both on and off floor	=	2 (Poor)
All exposed on floor	=	1 (Very poor)

16. Storage place for cooking utensils.

None exposed (covered/protected)	=	5 (Very good)
Some not exposed and others exposed but not on floor	=	4 (Good)
Some not exposed and others exposed both on floor and off floor Some not exposed and others exposed on floor All exposed off floor	=	3 (Satisfactory)
All exposed both on and off floor	=	2 (Poor)
All exposed on floor	=	1 (Very poor)

TYPE AND CARE OF LATRINE:

17. Type of latrine.

Toilet with reservoir (water)	=	5 (Highly adequate)
Reservoir/flat seatless latrine/ Baladi latrine	=	4 (More than adequate)
Barrel/Tub/Can	=	3 (Adequate)
Hole	=	2 (Less than adequate)
None	=	1 (Highly inadequate)

18. Presence of odor in latrine.

Absence of odor	=	5 (Good)
Presence of odor	=	1 (Poor)

19. Items employed when cleaning the latrine.

Water, soap/disinfectant, one or more abrasive	=	5 (Highly adequate)
Water and soap/disinfectant	=	4 (More than adequate)
Water and abrasive	=	3 (Adequate)
Water only	=	2 (Less than adequate)
None/No cleaning	=	1 (Highly inadequate)

LAUNDRY PRACTICES:

20. Frequency of washing household clothes.
    - Everyday/more than one time per day = 5 (Highly adequate)
    - Four to six times per week = 4 (More than adequate)
    - Two to three times per week = 3 (Adequate)
    - One time per week = 2 (Less than adequate)
    - Less than one time per week = 1 (Highly inadequate)

21. Location of laundry area.
    - At home only = 5 (Highly satisfactory)
    - Both at home and at canal = 3 (Satisfactory)
    - At canal only = 1 (Highly unsatisfactory)

22. Use of boiled water in washing general laundry.
    - Yes = 5 (Satisfactory)
    - No = 1 (Unsatisfactory)

23. Frequency of changing infant's clothes.
    - Everyday/more than one time per day = 5 (Highly adequate)
    - Four to six times per week = 4 (More than adequate)
    - Two to three times per week = 3 (Adequate)
    - One time per week = 2 (Less than adequate)
    - Less than one time per week = 1 (Highly inadequate)

24. Frequency of washing infant's clothes.
    - Everyday/more than one time per day = 5 (Highly adequate)
    - Four to six times per week = 4 (More than adequate)
    - Two to three times per week = 3 (Adequate)
    - One time per week = 2 (Less than adequate)
    - Less than one time per week = 1 (Highly inadequate)

25. Use of boiled water in washing baby's clothes.
    - Yes = 5 (Satisfactory)
    - No = 1 (Unsatisfactory)

26. Frequency of changing toddler's clothes.
    - Everyday/more than one time per day = 5 (Highly adequate)
    - Four to six times per week = 4 (More than adequate)
    - Two to three times per week = 3 (Adequate)
    - One time per week = 2 (Less than adequate)
    - Less than one time per week = 1 (Highly inadequate)

27. Frequency of washing toddler's clothes.
    - Everyday/more than one time per day = 5 (Highly adequate)
    - Four to six times per week = 4 (More than adequate)
    - Two to three times per week = 3 (Adequate)
    - One time per week = 2 (Less than adequate)
    - Less than one time per week = 1 (Highly inadequate)

28. Use of boiled water in washing toddler's and other children's clothes.
    - Yes = 5 (Satisfactory)
    - No = 1 (Unsatisfactory)

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USES OF BOILED WATER:

29. Use of boiled water (not tea) for drinking purposes.
    Yes = 5 (Satisfactory)
    No = 1 (Unsatisfactory)

30. Use of boiled water for bathing infant.
    Yes = 5 (Satisfactory)
    No = 1 (Unsatisfactory)

31. Use of boiled water in preparing infant's food.
    Yes = 5 (Satisfactory)
    No = 1 (Unsatisfactory)

32. Use of boiled water for children's baths.
    Yes = 5 (Satisfactory)
    No = 1 (Unsatisfactory)

33. Use of boiled water for adult's baths.
    Yes = 5 (Satisfactory)
    No = 1 (Unsatisfactory)

MANUFACTURE OF DUNG CAKES:

34. Frequency of making dung cakes.
    Never = 5 (Very good)
    One time per week or less = 4 (Good)
    Two to three times per week = 3 (Satisfactory)
    Four to six times per week = 2 (Poor)
    Everyday/more than everyday = 1 (Very poor)

CONDITION OF HOUSE:

35. Percent of reception room covered with litter.
    Completely free of litter = 5 (Very good)
    Litter covers 25% = 4 (Good)
    Litter covers 50% = 3 (Satisfactory)
    Litter covers 75% = 2 (Poor)
    Litter covers 100% = 1 (Very good)

36. Percent of room where infants sleep covered with litter.
    Completely free of litter = 5 (Very good)
    Litter covers 25% = 4 (Good)
    Litter covers 50% = 3 (Satisfactory)
    Litter covers 75% = 2 (Poor)
    Litter covers 100% = 1 (Very good)

37. Percent of room where infants play covered with litter.
    Completely free of litter = 5 (Very good)
    Litter covers 25% = 4 (Good)
    Litter covers 50% = 3 (Satisfactory)
    Litter covers 75% = 2 (Poor)
    Litter covers 100% = 1 (Very good)

38. Percent of room where toddlers sleep covered with litter.
    Completely free of litter = 5 (Very good)
    Litter covers 25% = 4 (Good)
    Litter covers 50% = 3 (Satisfactory)
    Litter covers 75% = 2 (Poor)
    Litter covers 100% = 1 (Very good)

39. Percent of room where toddlers play covered with litter.
    Completely free of litter = 5 (Very good)
    Litter covers 25% = 4 (Good)
    Litter covers 50% = 3 (Satisfactory)
    Litter covers 75% = 2 (Poor)
    Litter covers 100% = 1 (Very good)

40. Percent of room surrounding main entrance to house covered with litter.
    Completely free of litter = 5 (Very good)
    Litter covers 25% = 4 (Good)
    Litter covers 50% = 3 (Satisfactory)
    Litter covers 75% = 2 (Poor)
    Litter covers 100% = 1 (Very good)

LOCATION OF ANIMALS:

41. Presence and location of animals.
    Absence of animals in or adjacent to house = 5 (Good)
    Presence of animals outside, adjacent to house = 3 (Satisfactory)
    Presence of animals inside house = 1 (Poor)

42. Presence and location of birds.
    Absence of birds in or adjacent to house = 5 (Good)
    Presence of birds outside, adjacent to house = 3 (Satisfactory)
    Presence of birds inside house = 1 (Poor)

PRESENCE OF PESTS:

43. Presence and location of rats.
    None inside or outside house = 5 (Good)
    Present outside, in yard = 3 (Satisfactory)
    Present inside house = 1 (Poor)

44. Presence and location of cockroaches.
    None inside or outside house = 5 (Good)
    Present outside, in yard = 3 (Satisfactory)
    Present inside house = 1 (Poor)

45. Presence and location of flies.
    None inside or outside house = 5 (Good)
    Present outside, in yard = 3 (Satisfactory)
    Present inside house = 1 (Poor)

46. Presence and location of ants.
    None inside or outside house = 5 (Good)
    Present outside, in yard = 3 (Satisfactory)
    Present inside house = 1 (Poor)

c. Scales for Scoring Individual Sanitation and Hygiene

Preliminary five point interval scales were developed from data derived from the Individual Sanitation and Hygiene Observational Protocol. Data from 90 households were involved in this process. Individuals as well as households can be evaluated on these scales.

The scale ranges from one point (very poor) to five points (very good) with three points as a satisfactory or adequate score.

The hygiene and sanitation score for all individuals - except infants - consists of four components:

- condition of hands and face - dirt
- condition of clothing - dirt
- condition of face - flies
- type of foot protection

An additional component is included for infants

- protective cover with cloth or veil

The sanitation and hygiene score for each individual is calculated by adding the numerical value assigned each of the four or five indices and then dividing by the total number of indices. Thus, bias is eliminated when data for an index is missing.

TARGET INFANT:

1. Condition of hands and face
    Free of dirt = 5 (Very good)
    Dirt covers 25% = 4 (Good)
    Dirt covers 50% = 3 (Fairly good)
    Dirt covers 75% = 2 (Poor)
    Dirt covers 100% = 1 (Very good)

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2 Condition of clothing

Free of dirt	= 5 (Very good)
Dirt covers 25%	= 4 (Good)
Dirt covers 50%	= 3 (Fairly good)
Dirt covers 75%	= 2 (Poor)
Dirt covers 100%	= 1 (Very good)

3. Condition of face - flies

Free of flies	= 5 (Very good)
1-4 flies	= 4 (Good)
5-9 flies	= 3 (Fairly good)
10-14 flies	= 2 (Poor)
15 flies +	= 1 (Very good)

4. Type of foot protection

Shoes with socks	= 5 (Highly adequate)
Shoes without socks/Sandals or slippers with socks	= 4 (More than adequate)
Sandals or slippers without socks	= 3 (Adequate)
Socks only	= 2 (Less than adequate)
No foot protection	= 1 (Highly inadequate)

5. Protective cover with cloth or veil

Protected	= 5 (Adequate)
Unprotected	= 1 (Inadequate)

TARGET TODDLER:

6. Condition of hands and face

Free of dirt	= 5 (Very good)
Dirt covers 25%	= 4 (Good)
Dirt covers 50%	= 3 (Fairly good)
Dirt covers 75%	= 2 (Poor)
Dirt covers 100%	= 1 (Very good)

7. Condition of clothing

Free of dirt	= 5 (Very good)
Dirt covers 25%	= 4 (Good)
Dirt covers 50%	= 3 (Fairly good)
Dirt covers 75%	= 2 (Poor)
Dirt covers 100%	= 1 (Very good)

8. Condition of face - flies

Free of flies	= 5 (Very good)
1-4 flies	= 4 (Good)
5-9 flies	= 3 (Fairly good)
10-14 flies	= 2 (Poor)
15 flies +	= 1 (Very good)

9. Type of foot protection

Shoes with socks	= 5 (Highly adequate)
Shoes without socks/Sandals or slippers with socks	= 4 (More than adequate)
Sandals or slippers without socks	= 3 (Adequate)
Socks only	= 2 (Less than adequate)
No foot protection	= 1 (Highly inadequate)

SCHOOLER:

10. Condition of hands and face

Free of dirt	= 5 (Very good)
Dirt covers 25%	= 4 (Good)
Dirt covers 50%	= 3 (Fairly good)
Dirt covers 75%	= 2 (Poor)
Dirt covers 100%	= 1 (Very good)

11. Condition of clothing

Free of dirt	= 5 (Very good)
Dirt covers 25%	= 4 (Good)
Dirt covers 50%	= 3 (Fairly good)
Dirt covers 75%	= 2 (Poor)
Dirt covers 100%	= 1 (Very good)

12. Condition of face - flies

Free of flies	= 5 (Very good)
1-4 flies	= 4 (Good)
5-9 flies	= 3 (Fairly good)
10-14 flies	= 2 (Poor)
15 flies +	= 1 (Very good)

13. Type of foot protection

Shoes with socks	= 5 (Highly adequate)
Shoes without socks/Sandals or slippers with socks	= 4 (More than adequate)
Sandals or slippers without socks	= 3 (Adequate)
Socks only	= 2 (Less than adequate)
No foot protection	= 1 (Highly inadequate)

TARGET FEMALE:

14. Condition of hands and face

Free of dirt	= 5 (Very good)
Dirt covers 25%	= 4 (Good)
Dirt covers 50%	= 3 (Fairly good)
Dirt covers 75%	= 2 (Poor)
Dirt covers 100%	= 1 (Very good)

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15. Condition of clothing
    - Free of dirt = 5 (Very good)
    - Dirt covers 25% = 4 (Good)
    - Dirt covers 50% = 3 (Fairly good)
    - Dirt covers 75% = 2 (Poor)
    - Dirt covers 100% = 1 (Very good)

16. Condition of face - flies
    - Free of flies = 5 (Very good)
    - 1-4 flies = 4 (Good)
    - 5-9 flies = 3 (Fairly good)
    - 10-14 flies = 2 (Poor)
    - 15 flies + = 1 (Very good)

17. Type of foot protection
    - Shoes with socks = 5 (Highly adequate)
    - Shoes without socks/Sandals or slippers with socks = 4 (More than adequate)
    - Sandals or slippers without socks = 3 (Adequate)
    - Socks only = 2 (Less than adequate)
    - No foot protection = 1 (Highly inadequate)

TARGET MALE:

18. Condition of hands and face
    - Free of dirt = 5 (Very good)
    - Dirt covers 25% = 4 (Good)
    - Dirt covers 50% = 3 (Fairly good)
    - Dirt covers 75% = 2 (Poor)
    - Dirt covers 100% = 1 (Very good)

19. Condition of clothing
    - Free of dirt = 5 (Very good)
    - Dirt covers 25% = 4 (Good)
    - Dirt covers 50% = 3 (Fairly good)
    - Dirt covers 75% = 2 (Poor)
    - Dirt covers 100% = 1 (Very good)

20. Condition of face - flies
    - Free of flies = 5 (Very good)
    - 1-4 flies = 4 (Good)
    - 5-9 flies = 3 (Fairly good)
    - 10-14 flies = 2 (Poor)
    - 15 flies + = 1 (Very good)

21. Type of foot protection
    - Shoes with socks = 5 (Highly adequate)
    - Shoes without socks/Sandals or slippers with socks = 4 (More than adequate)
    - Sandals or slippers without socks = 3 (Adequate)
    - Socks only = 2 (Less than adequate)
    - No foot protection = 1 (Highly inadequate)

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4. Social Standing and Economic Situation

a. Scales for Scoring Social Standing and Economic Situation

Two preliminary three-tiered ordinal scales have been developed to rank respondents' SES. One, the household assets scale is a good indicator of economic rank but is also sensitive to social standing. The other, a demographic scale is based on the formal educational level and primary occupation of the target male. These are good indices of social standing with strong economic overtones. Another scale is being developed to better rank agricultural households, on the basis of farm assets. All scales are based on data obtained from 190 core households. Household SES can be evaluated singularly or compositely on these scales.

The household assets scale ranges from 0-3 points (low) to 7-9 points (high) with 4-6 points as intermediate. Refer to Table 20 for this scale's conceptual design. The score is calculated by totaling the number of relevant household assets present in a respondent's house.

The demographic scale ranges from one point (low) to three points (high) with two points as the intermediate level. The demographic score is calculated by adding the numerical value assigned each of the two indices - male education and occupation - and then dividing by two.

Table 20

CONCEPTUAL DESIGN FOR RANKING HOUSEHOLD ASSETS
ECONOMIC INDICATORS I

HOUSEHOLD ASSETS	HOUSEHOLD RANK BASED ON PRESENCE OF ASSETS*		
	LOW	INTERMEDIATE	HIGH
Television (black and white or color)	1	1	1
Butane stove	1	1	1
Electricity	1	1	1
Clay brick house	0	1	1
Washing machine	0	1	1
Radio cassette	0	1	1
Carpet	0	0	1
Reception room	0	0	1
Refrigerator	0	0	1
TOTAL	0-3 points	4-6 points	7-9 points

*One ("1") point indicates asset is present in house; zero ("0") points indicates asset is not present in house.

The "economic indicators II - farm assets" scale is still being developed.

Demographic Indicators:

1. Occupation of target male
   - Administrator/manager, public sector
   - Business owner/merchant, private sector
   - Landlord, farm cultivator, agricultural
   - Landlord & tenant farm cultivator, agricultural
   - Professional, public sector
   - Professional, private sector
   - Skilled craftsman/merchant, private sector
   - Skilled technician, public sector
   - Skilled technician, private sector

   - Business sales manager, private sector
   - Secretary/clerk, public sector
   - Secretary/clerk, private sector
   - Shop salesman
   - Small merchant/shop owner, private sector

   - Hired agricultural laborer, non-technical
   - Hired laborer, livestock care
   - Non-technical helper (e.g. porter), public sector
   - Non-technical helper, private sector
   - Tenant farm cultivator

2. Number of years of formal education - target male:
   - $\geq$ 9 years of formal education = 3 (HIGH)
   - 6-8 years of formal education = 2 (INTERMEDIATE)
   - $<$6 years of formal education = 1 (LOW)

Economic Indicators I - Household Assets:

3. Number of household assets indices present in house.

Black and white TV	= 1
Butane stove	= 1
Electricity	= 1
Clay brick house	= 1
Washing machine	= 1
Radio cassette	= 1
Carpet	= 1
Reception room	= 1
Refrigerator	= 1

Economic Indicators II - Farm Assets:
(FOR AGRICULTURAL HOUSEHOLDS ONLY)

Scale to be developed.

5. Time Allocation/Activity
   a. Computer Coding

Activity Record antecedent event and product/outcome data have been categorized and code numbers have been assigned for computer entry.

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b. Data analysis

Time use data collected in 29 Kalama case study households yield preliminary results on typical activities performed by the target male, female, schooler and toddler during a composite ten hour day. Time use data on core households are not ready for interpretation at the time of writing this report.

Activity data collected by both observation and interview procedures. The following results are drawn from observation data as quality control measures indicate that interview data are not reliable.

Trained fieldworkers collected a total of ten hours of observation data per target individual - from either 8:00 am to 6:00 pm or from 9:00 am to 7:00 pm - divided into five two-hour observation periods on five different observation days. This is equivalent to the data collection procedure scheduled for each core household every three months.

Case study time allocation data suggest that the principal activities of target males (n=8), schoolers (n=11) and toddlers (n=10) are regenerative activities such as resting/napping, "socializing" and playing (children only). The target female's activities (n=11), however, are more evenly distributed between food-related activities (e.g. processing and preparing), cleaning and maintenance and regenerative activities).

These results should be interpreted with caution as the sample size for each group of target individuals is quite small. Consequently, we also expect that results obtained from the larger core households data set are likely to be different from those reported here.

6. Additional Analysis of Selected Indices

a. Comparison in Households with Above Average and Low Birth Weight Infants

The following indices were compared in two households with above average birth weight (AABW) infants and two households with low birth weight (LBW) infants:

- kcals/kg/day of target female
- household socioeconomic situation (SES) as indicated by:
  - -years of formal education of target male
  - -presence of special room for receiving guests in home
- individual sanitation and hygiene score of the target female
- household sanitation and hygiene score

The following trends were noted:

i. Pregnant females bearing AABW infants tend to have higher kcal/kg ratios than females bearing LBW infants.

ii. One AABW infant household appeared to have the highest SES of the four households although the other three households were indistinguisable for SES according to variables selected for comparison.

iii. Individual sanitation and hygiene practices of target females with AABW infants were slightly poorer than those of target females with LBW infants.

iv. Sanitation and hygiene practices in households with AABW infants were better than those households with LBW infants.

The extremely small number of households involved in this analysis prohibits the generation of statistically valid comparative statements about the two data sets. However, the results are encouraging and we believe that the trends exhibited for food intake, SES and both individual and household sanitation and hygiene tend to support our expectations.

F. Quality Control Report

Quality Control Procedures - Egypt Project
(For work being performed at the University of Kansas)

A wide variety of quality control procedures have been applied to the data sets shown below in order to ensure accuracy of the data obtained, and to establish and maintain high quality of the data during collection and at every stage following the collection of data.

This document describes the specific quality control procedures applied to the following data sets:

- food intake
- village census/demography
- household assets
- agricultural assets
- SES
- child care-giving
- household hygiene and sanitation
- time allocation/activity

Data from the above data sets were obtained via three methods - direct interviewing of respondents; systematic, semi-unobtrusive observation of target individuals and households; and a combination of interviewing and systematic observation.

1. General Procedures - Prior to Data Collection

Research instruments and protocols were developed to complement the research design, research plan and study hypotheses, and the field staff was selected and trained to accurately implement the research instruments in the field. All instruments were developed in English, translated from English to Arabic by one translator and then back to English by another. The Arabic version of each research instrument was field-tested and modified, based on the results of field-testing, until the designated level of reliability had been achieved. Manuals providing detailed step-by-step procedures with examples were also developed (and translated twice as described above) to accompany each instrument. Quality control procedures applicable to the data collection process were described in each manual.

2. General Procedures - During and After Data Collection

Data collectors are supervised in the field and rotated and paired according to a predetermined schedule. Raw data are reviewed by field supervisors prior to key entry.

Data requiring coding are also coded prior to entry by two independent coders; inter-coder reliability checks are made on 10% of the data, also prior to entry

Each piece of information is key entered twice by two independent trained data entry clerks. Inconsistencies between the two entries are detected by a computer program and resolved by referring to the raw data set. This procedure guarantees a 100% reliability level.

Outliers for each variable are also detected by specially written programs; whenever identified, they are returned to the field for resolution. Range checks are also performed routinely to detect gross errors in the data. Finally comparisons are made of data obtained by fieldworkers (new and old) at different stages in the study.

3. Procedures Applied to Data Obtained by Observation in the Field

a. During Data Collection

1) Paired observation (two independent observers) of identical target individuals and events at pre-determined time intervals to detect error and/or inconsistency.

This procedure yields two quality control measures: 1) level of reliability between observers (number of agreements divided by the total number of possible agreements) and 2) an error term (number of disagreements divided by the total number of possible disagreements). (Refer to Appendix A for example.)

2) Rotating observers to prevent drift and maintain objectivity.

b. After Data Collection

1) Comparing data with similar information obtained through interviewing and from some laboratory analyses

2) Determining further contextual alteration of the instrument due to "translation drift"

3) Assessing coding accuracy by calculating inter-scorer reliability on a predetermined percentage of data (10%)

4) Range checks and checks for outliers

The following instruments have been subjected to these quality control checks when applicable:

- Activity Records
- Narrative Record of Child-Care Activity
- Frequency of Child-Care Activity Record
- Individual and Household Sanitation and Hygiene Instruments (Observationsl Protocol

Table 21 displays the current status of quality control measures for observational data in each of five phases - translating, observing, recording, coding, and key entering.

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Table 21

STATUS OF OBSERVATIONAL DATA QUALITY CONTROL
FOR EACH PHASE OF DATA COLLECTION AND PROCESSING

SOURCE OF OBSERVATIONAL DATA	STATUS OF QUALITY CONTROL IN EACH PHASE OF DATA COLLECTION AND PROCESSING				
	i. Translating	ii. Observing	iii. Recording	iv. Coding	v. Key Entering
Activity/Time Allocation Record	●	●	●	●	●
Individual Sanitation and Hygiene Instrument	●	●	O	N.A.	●
Household Sanitation and Hygiene Instrument (Obs. Protocol)	●	●	O	N.A.	●
Frequency of Child-Care Activity Record	●	●	●	N.A.	●
Narrative Record on Child Care Activity	●	●	●	●	●

Status Legend:
O = Requires quality control/Quality control unavailable
● = Requires quality control/Quality control available

4. Results for Data Obtained by Observation

a. Activity Record:

Results of quality control measures applied to the recording and coding of data obtained in the Activity Record are presented in Table 22. Reliability at both phases are acceptable - 94.7% in recording and 97.4% in coding. Error terms are 5.3% and 2.6% respectively.

Table 22

Quality Control Results for Activity Record Data

PHASE OF DATA COLLECTION AND PROCESSING	TYPE OF QUALITY CONTROL MEASURE					
	LEVEL OF RELIABILITY			ERROR TERM		
	Number of Agreements	Total Number of Possible Agreements	Test Statistic %	Number of Disagreements	Total Number of Possible Disagreements	Test Statistic %
(iii) Recording	19,935	21,060* (n=21)	94.7	1,125	21,060* (n=21)	5.3
(iv) Coding	10,521	10,800* (n=10)	97.4	279	10,800* (n=10)	2.6

*Data for these quality control measures were drawn from case study households due to an insufficient amount of quality control data received for core households.

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b. Individual Sanitation and Hygiene Instrument:

Quality Control procedures were implemented in translating this instrument as well as in the computer entry of this data set. Quality control procedures were also followed in the observation phase of data collection. However, complete quality control data for the recording phase in data collection have not yet arrive at the University of Kansas.

c. Household Sanitation and Hygiene Instrument: (Observational Protocol)

Quality control procedures were implemented in translating this instrument as well as in the computer entry of this data set. Quality control procedures were also followed in the observation phase of data collection. However, complete quality control data for the recording phase of data collection have not yet arrived at the University of Kansas.

d. Frequency of Child-Care Activity Record:

Quality control procedures were implemented in translating this instrument as well as in the computer entry of data. Quality control was also used in the observation phase of data collection. As shown in Table 23, quality control measures implemented in the recording phase of data collection yielded an acceptable reliability level (98.9%) and error term (1.1%) for field worker accuracy.

TABLE 23

Quality Control Results for
Child Care Frequency Data

PHASE OF DATA COLLECTION AND PROCESSING	TYPE OF QUALITY CONTROL MEASURE					
	LEVEL OF RELIABILITY			ERROR TERM		
	Number of Agreements	Total Number of Possible Agreements	Test Statistic %	Number of Disagreements	Total Number of Possible Disagreements	Test Statistic %
(iii) Recording	70,479	71,280 (n=27)	98.9	801	71,280 (n=27)	1.1

e. Narrative Record on Child-Care Activity:

Quality control procedures were implemented in translating this instrument, as well as in the computer entry of data. Quality control procedures were also followed in the observation phase of data collection.

Results of quality control measures applied to the recording and coding of the data are presented in Table 24. Reliability levels for both are acceptable - 82.9% in recording and 94.9% in coding. Error terms are 17.1% and 5.1%, respectively.

TABLE 24

Quality Control Results for Narrative Record
On Child-Care Activity Data

PHASE OF DATA COLLECTION AND PROCESSING	TYPE OF QUALITY CONTROL MEASURE					
	LEVEL OF RELIABILITY			ERROR TERM		
	Number of Agreements	Total Number of Possible Agreements	Test Statistic %	Number of Disagreements	Total Number of Possible Disagreements	Test Statistic %
(iii) Recording	788	950 (n=10)	82.9	162	950 (n=10)	17.1
(iv) Coding	998	1052 (n=10)	94.9	54	1052 (n=10)	5.1

5. Procedures Applied to Data Obtained by Interviewing Respondents
   a. During data collection
      1) Field supervision

   b. After data collection
      2) Crosschecking original data with updated data for accuracy on items most resistant to change in the 3-6 month period between interviews. This procedure yields a level of reliability and an error term.

      3) Comparing interview data with similar information obtained by observation

   c. Range checks, determining means and variances. Checks for outliers.

The following instruments have been subjected to these quality control checks when applicable:

- Frequency of Activity Records
- Household Sanitation and Hygiene (Interview instrument)
- Village census/sociodemographic/household assets/agricultural assets

Table 25 displays the current status of quality control measure for interview data in each of four phases - translating, interviewing, recording, and key entering.

TABLE 25

STATUS OF INTERVIEW DATA QUALITY CONTROL FOR EACH PHASE OF DATA COLLECTION AND PROCESSING

SOURCE OF INTERVIEW DATA	STATUS OF QUALITY CONTROL IN EACH PHASE OF DATA COLLECTION AND PROCESSING			
	i. Translating	ii. Observing	iii. Recording	v. Key Entering
Frequency of Activity Record	●	●	●	●
Food Intake Instruments (I-V)	●	●	●	●
Household Sanitation and Hygiene Instrument (Interview)	●	●	●	●
Socio Demographic Survey Instruments (I-II)	O	●	O	●

Status Legend:
O = Requires quality control/Quality control unavailable
● = Requires quality control/Quality control available

6. Results for Data Obtained by Interview

a. Frequency of Activity Record:

Data obtained on the same respondents at different stages in the study were compared to measure reliability. The results are presented in Table 26 and indicate an unacceptable level of reliability (52.6%) and error term (47.4%). We believe that this is due to respondent factors rather than to interviewer factors since the staff conducting interviews also performed observational tasks.

TABLE 26

Quality Control Results for Frequency of Activity Record Data

PHASE OF DATA COLLECTION AND PROCESSING	TYPE OF QUALITY CONTROL MEASURE					
	LEVEL OF RELIABILITY			ERROR TERM		
	Number of Agreements	Total Number of Possible Agreements	Test Statistic %	Number of Disagreements	Total Number of Possible Disagreements	Test Statistic %
(iii) Recording	10	19 (n=6)	52.6	9	19 (n=6)	47.4

b. Food Intake Instruments:

Refer to Appendix B for protocol designed for quality control checks.

c. Household Sanitation and Hygiene Instrument: (Interview Protocol)

Data obtained on the same respondents at different stages in the study were compared to measure reliability. The results are presented in Table 27 and indicate an unacceptable level of reliability (46.7%) and error term (53.3%). Here again, we believe that this high error term is probably due more to respondent factors than to staff factors.

TABLE 27

Quality Control Results for
Sanitation and Hygiene Data - Interview

PHASE OF DATA COLLECTION AND PROCESSING	TYPE OF QUALITY CONTROL MEASURE					
	LEVEL OF RELIABILITY			ERROR TERM		
	Number of Agreements	Total Number of Possible Agreements	Test Statistic %	Number of Disagreements	Total Number of Possible Disagreements	Test Statistic %
(iii) Recording	14	30 (n=10)	46.7	16	30 (n=30)	53.3

d. Sociodemographic Survey Instrument:

Quality Control procedures were implemented in all initial phases of data collection as well as in computer entry of the data. However, complete quality control data for the recording phase of data collection have not arrived at the University of Kansas.

7. Discussion and Conclusions

Quality control measures yielded consistent levels of reliability and error terms within the two data subsets: observational and interview. Quality control measures applied to the recording phase of observational data collection indicate that:

a. procedures outlined in the training manual are being followed and
b. field workers are using comprable techniques in data collection procedures

Quality control measures applied to the coding phase of observational data collection also indicate that coding technicians are:

a. following procedures outlined in the coding manual and
b. using comprable techniques in coding of raw data

The results imply that observational data are consistently and accurately collected and processed through all phases of research.

Quality control measures applied to the recording phase of interview data collection indicate that the interview method yields inconsistent, unreliable, and most likely inaccurate results.

An explanation for these results can only be speculative at this time because of incomplete data sets. However, inconsistencies between verbal responses in the interview data are no doubt due to the respondents' belief in the power of "arr" (the evil eye). Responses to interviewer's questions can be inaccurate and variable if the respondent fears that the interviewer has "arr".

The evil-eye is viewed as a force so powerful that it has the ability to poison food and stunt growth, among other fates. By not allowing the evil-eye to "see" (either literally or figuratively, through words) particularly vulnerable individuals or items, the respondent protects them from this negative force.

Cultural forces that affect quality of data are probably at work. As more data is collected and additional quality control procedures applied, the actual pattern of data inconsistency will be better understood. The high reliability levels and low error terms for observational data suggest that date collected through this method are less vulnerable to the cultural constraints impinging upon interview data collection processes.

G. Data Management/Data Analysis

Bev Beaton performed the following data management and data analysis activities:

1. Supervised keypunching activities of Connie Thelander and Brenda Walker.

2. Examined Illness Subroutine Form and recommended revisions.

3. Developed four Research Schedules:
   i. Research Schedule for Core Households for all Research Activities except Morbidity Recall and Child Care for the period September 1 - December 31, 1984.
   ii. Research Schedule for Core Households for Morbidity Recall for the period September 1 - December 31, 1984.
   iii. Research Schedule for Core Households for Child Care Activities for the period September 1 - December 31, 1984.
   iv. Research Schedule for Core Households for all Research Activities except Morbidity Recall and Child Care for the period January 1 - April 30, 1985.

4. Sent four tapes to Berkeley containing the following Phase II core data:

   a. Tape 1:
      - Individual Food Intake data for Target Individuals - 713 observations

   b. Tape 2:
      - Individual Food Intake - 1,053 observations
      - Anthropometric data for Target individuals - 992 observations
      - Anthropometric data for Non-target individuals - 145 observations
      - Demography data for 521 individuals

- Socio-economic data for 103 households
- Socio-economic data for 521 individuals
- Entry-Change-Exit data for 104 households
- Xo Individual Food Intake data - 174 observations
- Xr Individual Food Intake data - 162 observations
- Behavioral Observations data - 273 observations
- Parasitology data - 668 observations

c. Tape 3:
- Individual Food Intake - 3,292 observations
- Socio-economic data for 103 households

d. Tape 4:
- Morbidity Illness Episodes - 936 observations
- Morbidity Recall data - 14,915 observations

5. Sent two tapes to Egypt containing the following Phase II core data:

a. Tape 1:
- Morbidity Recall - 5,862 observations
- Attachment A - 101 observations
- Attachment B - 206 observations
- Attachment C - 24 observations
- Attachment D - 26 observations
- Attachment E - 20 observations
- Attachment F - 24 observations
- Attachment G - 66 observations
- Attachment H - 6 observations
- Attachment I - 27 observations
- Attachment J - 27 observations
- Attachment K - Form #1 - 50 observations
- Attachment K - Form #2 - 117 observations
- Physical Exam - Form #1 - 285 observations
- Physical Exam - Form #2 - 252 observations
- Demographic - 879 observations
- Parasitology - 816 observations
- Urine Examination - 389 observations
- Medical History - Form #1 - 285 observations
- Socio-economic - 139 observations
- Anthropometric - 1,806 observations
- Entry-Change-Exit - 126 observations
- Behavioral Observations - 273 observations
- Biological Sample - 416 observations
- Toddler Cognitive - 24 observations
- Adult Cognitive - 27 observations
- School Age Child Classroom Observation - 61 observations
- Reproductive History - 66 observations
- Individual Food Intake - 34,810 lines

b. Tape 2:
- Morbidity Recall - 11,139 observations
- Demographic - 521 observations
- Entry-Change-Exit - 104 observations
- Individual Food Intake - 27,704 lines
- Individual Food Intake in Kcals - 2,422 observations

6. Wrote the following programs:

87 - (a.) Frequencies for Household Sanitation and Hygiene data - Interview - 27 observations
(b.) Listing of Household Sanitation and Hygiene data - Interview - 27 observations

88 - Comparison of Xo and Xr Food Intake data for Household Census and Physiologic State of Adult Female

89 - Comparison of Xo and Xr Food Intake data for Household Recipes

90 - Comparison of Xo and Xr Food Intake data for Individual Food Intake

91 - Summary Statistics for Kcals for Xo-Xr Individual Food Intake Data by Member

92 - Paired Comparisons T Test for Individual Kcals: Xo and Xr

93 - Listing of Socio-Demographic Data by Household Subsistence - 149 observations

94 - (a.) Listing of Household Expenditure Patterning data - 16 observations
(b.) Frequencies for Household Expenditure Patterning data - 16 observations

96 - Summary Statistics for Kcals by Member for Case Study Individual Food Intake data

98 - Summary Statistics for Kcals by Individuals for Case Study Individual Food Intake data

99 - Listing of Phase II data set sent on tape to Berkeley

#100 - Correlations for Socio-Demographic Variables

#101 - Percent of Time each Individual Spends on Different Activities for 11 Case Study Households

#102 - Number of Minutes Spent on Each Activity by Sex of Adult Target for 11 Case Study Households

#103 - Number of Minutes Spent on Each Activity by Target for 11 Case Study Households

#104 - Listing of Individual Food Intake data - 713 observations

#105 - Summary Statistics for Kcals by member - Core Individual Food Intake data

#106 - Listing of Parasitology data - 582 observations

#107 - Listing of Parasitology data with Positive Reading - 120 observations

#108 - Paired Comparisons T-test for Individual Kcals, Xo and Xr, for the 7 True Observation/Recall Households

#109 - Paired Comparisons T-test for Individual Kcals, Xo and Xr for all Observation/Recall Households

#110 - Listing of Behavioral Observation data - 272 observations

#111 - Listing of Additional Parasitology data - 234 observations

#112 - Listing of Additional Parasitology data with Positive Reading - 68 observations

#113 - Listing of Biological data - Form #1 - 188 observations

#114 - Listing of Anthropometric data - 1,137 observations

#115 - Listing of Xo/Xr Individual Food Intake data

#116 - Listing of Morbidity Recall data - 11,139 observations

#117 - Paired Comparison T-test for Individual Kcals, Xo and Xr, for all households except the 7 True Observation/Recall Households
#118 - Number of Minutes Spent on Each Activity by Individual for 4 Case Study Households
#119 - Listing of Demographic data - 1,400 observations
#120 - Listing of Target Male's Primary Occupation by Block and HHNO - 199 observations
#121 - Listing of Individual Food Intake data - 1,051 observations
#122 - Listing of Pregnancy Monthly Visit data - 50 observations
#123 - Summary Statistics for Kcals by Member
#124 - Listing of Phase II data sets sent on tape to Berkeley
#125 - Listing of Morbidity Recall Attachment A data - 216 observations
#126 - Listing of Morbidity Recall Attachment B data - 93 observations
#127 - Listing of Morbidity Recall Attachment C data - 22 observations
#128 - Listing of Morbidity Recall Attachment D data - 55 observations
#129 - Listing of Morbidity Recall Attachment E data - 23 observations
#130 - Listing of Morbidity Recall Attachment F data - 21 observations
#131 - Listing of Morbidity Recall Attachment G data - 61 observations
#132 - Listing of Morbidity Recall Attachment H data - 10 observations
#133 - Listing of Morbidity Recall Attachment I data - 97 observations
#134 - Listing of Morbidity Recall Attachment J data - 32 observations
#135 - Listing of Morbidity Recall Attachment K data (Form #2) - 302 observations
#136 - Comparison of Xo and Xr Food Intake data for Individual Food Intake
#137 - Listing of Morbidity Recall Attachment A data 2nd Revision - 62 observations
#138 - Listing of Morbidity Recall Attachment B data 2nd Revision - 21 observations
#139 - Listing of Morbidity Recall Attachment D data 2nd Revision - 19 observations
#140 - Listing of Morbidity Recall Attachment E data 2nd Revision - 8 observations
#141 - Listing of Morbidity Recall Attachment F data 2nd Revision - 2 observations
#142 - Listing of Morbidity Recall Attachment G data 2nd Revision - 25 observations
#143 - Listing of Morbidity Recall Attachment H data 2nd Revision - 2 observations
#144 - Listing of Morbidity Recall Attachment I data 2nd Revision - 30 observations

#145 - Listing of Morbidity Recall Attachment J data 2nd Revision - 8 observations
#146 - Listing of Morbidity Recall Attachment K data (Form #3) - 143 observations
#147 - Mean Frequency/Year for Each food Consumed by the Month of Data Collection
#148 - Listing of Reproductive History data - 52 observations
#149 - Listing of Child Behavior Rating data - 25 observations
#150 - Listing of Schooler Classroom Observation data - 52 observations
#151 - Listing of Toddler Cognitive data - 29 observations
#152 - Listing of School Child Cognitive data - 20 observations
#153 - Listing of Adult Cognitive data - 37 observations
#154 - Listing of Behavioral Observation data - 367 observations
#155 - Listing of Lactation/Infant Feeding History data - 2nd revision - 42 observations
#156 - Listing of Lactation/Infant Feeding data for Target Infants (8 days and Monthly) - 3 observations
#157 - Listing of Hematology data - 400 observations
#158 - Listing of Urine Exam data - 348 observations
#159 - Listing of Identification of Pregnancy data - 34 observations
#160 - Listing of Identification of Pregnancy data - 2nd revision - 12 observations
#161 - Listing of Data from All Activities for Households with a Target Pregnancy
#162 - Listing of Phase II data set sent on tape to Berkeley
#163 - Listing of Individual Food Intake data - 870 observations
#164 - Listing of Morbidity Illness Episodes - 936 observations
#165 - Listing of Phase II data sets sent on tape to Berkeley
#166 - Table for Average Kcals/Month for each individual
#167 - (a.) Listing of Frequency of Activity Record data for Core Households - 62 observations
(b.) Frequencies for Activity Record data for Core Households - 62 observations
#168 - (a.) Listing of Individual Sanitation and Hygiene data - Observational Protocol - 163 observations
(b.) Frequencies for Individual Sanitation and Hygiene data - Observational Protocol - 163 observations
#169 - (a.) Listing of Household Sanitation and Hygiene data - Observational Protocol - 164 observations
(b.) Frequencies for Household Sanitation and Hygiene data - Observational Protocol - 164 observations
#170 - (a.) Listing of Household Sanitation and Hygiene data - Interview - 170 observations
(b.) Frequencies for Household Sanitation and Hygiene data Interview - 170 observations
#171 - Summary Statistics for Kcals by Member Using Updated Kcal values

#172 - (a.) Frequencies for the Number of Times an Activity was Performed during a Specified Time Period
(b.) Summary Statistics for the Average Time an Activity/Period/Frequency occurred
#173 - Listing of Data Relating to Children's Low and Above Average Birth Weights - 4 observations
#174 - Child Care Narrative data
#175 - (a.) Listing of Immunology data - Cell Mediated Immunity - 81 observations
(b.) Listing of Immunology data - Humoral Immunity - 105 observations
(c.) Listing of Immunology data - Complement - 106 observations
(d.) Listing of Immunology data - Serum Proteins - 106 observations

Connie Thelander and Brenda Walker assisted Bev Beaton in data management and analysis. Connie Thelander's activities follow:

1. Keypunched and verified the following case study data:
   - Activity Record (13,524 lines; 1,068,396 bytes)
   - Significant Life Events (7 lines; 7 forms; 364 bytes)
   - Role Expectation and Role Classification, Part I (36 lines; 9 forms; 2,844 bytes)

2. Keypunched the following case study data:
   - Activity Record (29,258 lines; 2,311,461 bytes)

3. Keypunched and verified the following data on core households:
   - Xo/Xr Food Intake, Form I (938 lines; 140 forms; 21,574 bytes)
   - Xo/Xr Food Intake, Form III (1,918 lines; 140 forms; 47,950 bytes)
   - Xo/Xr Food Intake, Form IV (7,506 lines; 84 forms; 225,180 bytes)
   - Food Intake, Form I (8,125 lines; 1,009 forms; 195,000 bytes)
   - Food Intake, Form IV (73,510 lines; 810 forms; 1,758,167 bytes)
   - Food Intake, Form V (121 lines; 11 forms; 8,712 bytes)
   - Parasitology (934 lines; 106 forms; 36,710 bytes)
   - Behavioral Observation (1,960 lines; 494 forms; 143,080 bytes)
   - Biological Samples (254 lines; 65 forms; 6,858 bytes)
   - Anthropometry (1,925 lines; 1,140 forms; 136,675 bytes)
   - Morbidity Recall (12,755 lines; 1,570 forms; 306,120 bytes)
   - Morbidity Recall Attachment A (609 lines; 267 forms; 44,891 bytes)
   - Morbidity Recall Attachment B (241 lines; 105 forms; 16,941 bytes)
   - Morbidity Recall Attachment C (44 lines; 22 forms; 3,256 bytes)
   - Morbidity Recall Attachment D (138 lines; 64 forms; 5,112 bytes)
   - Morbidity Recall Attachment E (61 lines; 30 forms; 3,047 bytes)
   - Morbidity Recall Attachment F (46 lines; 23 forms; 2,196 bytes)
   - Morbidity Recall Attachment G (195 lines; 84 forms; 13,576 bytes)
   - Morbidity Recall Attachment H (24 lines; 12 forms; 1,336 bytes)
   - Morbidity Recall Attachment I (246 lines; 119 forms; 15,210 bytes)
   - Morbidity Recall Attachment J (80 lines; 40 forms; 2,736 bytes)
   - Morbidity Recall Attachment K (452 lines; 452 forms; 27,212 bytes)
   - Demography (604 lines; 83 forms; 21,744 bytes)
   - Socio-Demography (384 lines; 43 forms; 27,264 bytes)

- Physical Exam (1,764 lines; 114 forms; 132,300 bytes)
- Medical History (1,039 lines; 121 forms; 75,847 bytes)
- Pregnancy Monthly Visit (73 lines; 37 forms; 5,110 bytes)
- Schooler Cognitive Test (21 lines; 21 forms; 1,512 bytes)
- Toddler Cognitive Test (29 lines; 29 forms; 1,943 bytes)
- Adult Cognitive Test (37 lines; 37 forms; 2,627 bytes)
- Schooler Classroom Observation (108 lines; 54 forms; 6,048 bytes)
- Teachers' Ratings (28 lines; 28 forms; 756 bytes)
- Urine Exam (467 lines; 116 forms; 11,208 bytes)
- Hematology (503 lines; 95 forms; 10,563 bytes)
- Reproduction/Lactation History (104 lines; 55 forms; 7,280 bytes)
- Lactation Infant Feeding History (266 lines; 42 forms; 19,418 bytes)
- Lactation Infant Feeding History 8 days and monthly (6 lines; 3 forms; 414 bytes)
- Cell Mediated Immunity (81 lines; 81 forms; 2,916 bytes)
- Humoral Immunity (105 lines; 105 forms; 4,620 bytes)
- Immunology Complement (106 lines; 106 forms; 3,074 bytes)
- Biochemical Indicators of Nutritional State (106 lines; 106 forms; 4,064 bytes)
- Child-Care Frequency (7,720 lines; 618 forms; 169,840 bytes)
- Individual Sanitation and Hygiene (163 lines; 163 forms; 7,824 bytes)
- Household Sanitation and Hygiene, Obs. Protocol (328 lines; 164 forms; 20,336 bytes)
- Household Sanitation and Hygiene, Int. Protocol (510 lines; 170 forms; 13,860 bytes)
- Child-Care Narrative (977 lines; 73,520 bytes)
- Frequency of Activity (102 lines; 28 forms; 6,732 bytes)
- Demography Update (576 lines; 70 forms; 16,128 bytes)
- Socio-Demography Update (1,190 lines; 70 forms; 84,490 bytes)

4. Recorded data that arrived 9/5/84 on Data Flow Report.

5. Responded to memo from Berkeley (12/17/84) outlining the proposed agenda for the Nutrition CRSP PI's meeting in Cairo (January 5-10, 1985)

6. Assisted with the creation of variables list to accompany data tape to Egypt.

7. Wrote the following programs:
   #83 (a) Listing of Patterns of Intrafamily Food Distribution data - 9 observations
   (b) Frequencies for Patterns of Intrafamily Food Distribution data - 9 observations
   #84 (a) Listing of Food Storage data - 17 observations
   (b) Frequencies of Food Storage data - 17 observations
   #85 (a) Listing of Infant and Child Feeding Pattern data - 15 observations
   (b) Frequencies for Infant and Child Feeding Pattern data - 15 observations

#86 (a) Listing of Presence or Absence of Safety Hazards and Protection of Children from Danger data - 14 observations
(b) Frequencies for Presence or Absence of Safety Hazards and Protection of Children from Danger data - 14 observations
#95 (a) Listing of Human Animal Association data - 13 observations
(b) Frequencies for Human Animal Association data - 13 observations
#97 (a) Listing of Waste Disposal data - 9 observations
(b) Frequencies for Waste Disposal data - 9 observations

Brenda Walker keypunched the following data:

- Xo/Xr Food Intake, Form I (558 lines; 84 forms; 14,282 bytes)
- Xo/Xr Food Intake, Form III (1,151 lines; 84 forms; 31,121 bytes)
- Xo/Xr Food Intake, Form IV (7,469 lines; 84 forms; 226,449 bytes)
- Food Intake, Form I (6,421 lines; 820 forms; 154,104 bytes)
- Food Intake, Form II (4,852 lines; 146 forms; 11,596 bytes)
- Food Intake, Form IV (64,269 lines; 724 forms; 678,207 bytes)
- Food Intake, Form V (121 lines; 11 forms; 2,904 bytes)
- Parasitology (934 lines; 116 forms; 36,710 bytes)
- Anthropometry (1,860 lines; 1,102 forms; 138,060 bytes)
- Morbidity Recall (9,811 lines; 1,202 forms; 235,464 bytes)
- Morbidity Recall Attachment A (876 lines; 399 forms; 63,948)
- Morbidity Recall Attachment B (637 lines; 165 forms; 26,487 bytes)
- Morbidity Recall Attachment C (78 lines; 39 forms; 5,772 bytes)
- Morbidity Recall Attachment D (193 lines; 90 forms; 6,982 bytes)
- Morbidity Recall Attachment E (97 lines; 48 forms; 4,627 bytes)
- Morbidity Recall Attachment F (78 lines; 39 forms; 3,732 bytes)
- Morbidity Recall Attachment G (195 lines; 84 forms; 13,576 bytes)
- Morbidity Recall Attachment H (24 lines; 12 forms; 1,336 bytes)
- Morbidity Recall Attachment I (246 lines; 119 forms; 15,210 bytes)
- Morbidity Recall Attachment J (80 lines; 49 forms; 2,736 bytes)
- Morbidity Recall Attachment K (452 lines; 452 forms; 57,212 bytes)
- Demography (604 lines; 83 forms; 21,744 bytes)
- Socio Demography (384 lines; 43 forms; 27,264 bytes)
- Physical Exam (1,764 lines; 186 forms; 137,592 bytes)
- Pregnancy Monthly Visit (73 lines; 37 forms; 5,110 bytes)
- Schooler Cognitive Test (21 lines; 21 forms; 1,512 bytes)
- Toddler Cognitive Test (29 lines; 29 forms; 1,943 bytes)
- Adult Cognitive Test (37 lines; 37 forms; 2,627 bytes)
- Schooler Classroom Observation (108 lines; 54 forms; 6,048 bytes)
- Teachers' Ratings (28 lines; 28 forms; 756 bytes)
- Urine Exam (849 lines; 192 forms; 25,342 bytes)
- Hematology (575 lines; 115 forms; 21,275 bytes)
- Pregnancy ID (46 lines; 46 forms; 1,978 bytes)
- Reproduction/Lactation History (104 lines; 55 forms; 6,048 bytes)
- Lactation Infant Feeding History (266 lines; 42 forms; 19,418 bytes)
- Lactation Infant Feeding History 8 days and monthly (6 lines; 3 forms; 414 bytes)
- Cell Mediated Immunity (81 lines; 81 forms; 2,916 bytes)
- Humoral Immunity (105 lines; 105 forms; 4,620 bytes)
- Immunology Complement (106 lines; 106 forms; 3,074 bytes)

- Biochemical Indicators of Nutritional State (106 lines; 106 forms; 4,664 bytes)
- Child Care Frequency (7,720 lines; 618 forms; 169,840 bytes)
- Individual Sanitation and Hygiene (98 lines; 98 forms; 4,606 bytes)
- Frequency of Activity (45 lines; 15 forms; 2,970 bytes)

H. Administration

Dr. Jerome assumed Egypt project representative role on December 1, 1984 and acted in that capacity during November, 1984 for Dr. Avanelle Kirksey. Her activities included receiving and coordinating PI responses to ME and SCB initiatives and responding to these initiatives.

Dr. Jerome also continued overall project management and supervision of project personnel.

II. CRSP INVOLVEMENT

A. Interproject Activities

Refer to Section I.A - Travel.

III. PLANS FOR NEXT QUARTER

Dr. Jerome will be in Egypt from March 19 - April 4, 1985 to function as U.S. Representative assisting the Egyptian PI in managing the Nutrition CRSP project. She will: 1) supervise field research on food intake, time allocation, village survey, child-care, sanitation and hygiene and social and economic status; 2) assist in data processing and management activities locally and 3) facilitate data flow to the United States.

Dr. Jerome also anticipates traveling to Mexico on April 26th to participate in the External Evaluation Panel meeting.

Other planned activities include: 1) refining scales for determining social standing/economic condition, effectiveness of child-care activities, individual sanitation and hygiene score and household sanitation and hygiene score and 2) applying these scales to the data.

Dr. Jerome and colleagues at Kansas plan to continue their collaborative activities with Egyptian colleagues, and to concentrate on analytic activities pertaining to the functions for which they are responsible.

Kansas will also continue to manage, process, summarize and analyze Phase II core research data as they become available.

APPENDIX A

Fieldworkers' Schedule For Observations In Activity Study

APPENDIX A

FIELDWORKERS' SCHEDULE FOR OBSERVATIONS IN ACTIVITY STUDY

The attached work schedule (Exhibit A) for fieldworkers is an example of the types of schedules which will be used in Egypt study. This one was designed for observing the target individuals in the Activity Study.

Operating Principles

1. Select non-core households with target individuals.
2. Assign two observers in each respondent household - one regular, and one rotating Quality Control fieldworker - for continuous inter-observer reliability checks for approximately 25 percent of the time.
3. Assign each observer three households per working day i.e. six hours of observation per day in non-consecutive two-hour blocks. For example, observers will be given assignments for 6:00 - 8:00 am, 10:00 - 12:00 noon, and 2:00 - 4:00 pm.
4. Schedule fieldworkers one day off each week.
5. Fieldworkers will observe a target individual on six different days including a Saturday (first day of the week), Friday (weekend day and holiday) and any other four days.
6. Each target individual will be observed a total of 12 hours in six non-consecutive two-hour blocks on six different days to cover 6:00 am to 6:00 pm.
7. Observe only one target individual in each target household per day.

Pairing of Fieldworkers for Quality Control

Based on the above principles, four fieldworkers will be needed to obtain complete data on the four targets during a 13-week period. A fifth worker will assist on a stand-by basis whenever a worker cannot fulfill his/her assignment. There are 24 possible combinations for pairing the four field workers. These are:

DAY	OBSERVER PAIRS FOR QUALITY CONTROL			
I.	1-2 & 3-4	2-1 & 3-4	1-3 & 2-4	2-3 & 1-4
II.	4-1 & 2-3	2-4 & 1-3	4-1 & 3-2	3-4 & 2-1
III.	3-2 & 1-4	3-2 & 4-1	4-2 & 1-3	4-3 & 2-1
IV.	2-4 & 3-1	4-2 & 3-1	3-1 & 2-4	
V.	2-3 & 4-1	1-2 & 4-3	4-3 & 1-2	
VI.	1-3 & 4-2	3-4 & 1-2	3-1 & 4-2	
VII.	1-4 & 2-3	2-1 & 4-3	1-4 & 3-2	

EGYPT NUTRITION CRSP

EXHIBIT A

FIELDWORKERS' SCHEDULE: ACTIVITY STUDY

Weekly Schedule for the week beginning __/__/__ and ending __/__/__	Day I	Day II	Day III	Day IV	Day V	Day VI	Day VII
	6 - 8 am, 8 - 10, 10 - 12, 12 - 2 pm, 2 - 4, 4 - 6	6 - 8 am, 8 - 10, 10 - 12, 12 - 2 pm, 2 - 4, 4 - 6	6 - 8 am, 8 - 10, 10 - 12, 12 - 2 pm, 2 - 4, 4 - 6	6 - 8 am, 8 - 10, 10 - 12, 12 - 2 pm, 2 - 4, 4 - 6	6 - 8 am, 8 - 10, 10 - 12, 12 - 2 pm, 2 - 4, 4 - 6	6 - 8 am, 8 - 10, 10 - 12, 12 - 2 pm, 2 - 4, 4 - 6	6 - 8 am, 8 - 10, 10 - 12, 12 - 2 pm, 2 - 4, 4 - 6
FIELDWORKER # 1	Q.C. with FW #2 Block 1 HHNO 26 *Toddler Block 1 HHNO 51 *Toddler	Block 5 HHNO 80 *Toddler Block 5 HHNO 4 *Toddler Block 4 HHNO 59 *Toddler	Day Off			Q.C. with FW #3	Q.C. with FW #4
FIELDWORKER # 2	Block 1 HHNO 72 *Toddler Block 2 HHNO 77 *Toddler Block 3 HHNO 88 *Toddler	Q.C. with FW #3 Block 7 HHNO 5 *Toddler Block 6 HHNO 1050 *Toddler		Day Off			Q.C. with FW #3
FIELDWORKER # 3	Q.C. with FW #4 Block 3 HHNO 101 *Toddler Block 3 HHNO 138 *Toddler	Block 7 HHNO 94 *Toddler Block 7 HHNO 120 *Toddler Block 8 HHNO 71 *Toddler	Q.C. with FW #2	Q.C. with FW #1	Day Off		
FIELDWORKER # 4	Block 3 HHNO 161 *Toddler Block 3 HHNO 180 *Toddler Block 3 HHNO 1159 *Toddler	Q.C. with FW #1 Block 5 HHNO 110 *Toddler Block 5 HHNO 147 *Toddler			Q.C. with FW #1	Day Off	

*Toddler given as an example. Time slots to be filled in for other targets.

Clarification of Exhibit A - Work Assignments

On Day I, at time period 6:00 - 8:00 am, Fieldworkers (FWs) 1 and 2, and 3 and 4 will work in pairs. Blocks and Household Numbers to which FWs have been assigned are also shown.

On Day II, time period 8:00 - 10:00 am, FWs 4 and 1, and FWs 2 and 3 will work in pairs.

On Day III, FW 1 has not been scheduled to work. FWs 3 and 2 will work in pairs from 10:00 - 12:00 noon.

On Day IV, FW 2 has not been scheduled to work. FWs 3 and 1 will work in pairs from 12:00 noon to 2:00 pm.

The process continues until all seven combinations in the first column have been used. Now move to the next column of possible combinations and start over with the time period 8:00 - 10:00 am. Thus, on Day I FWs 2 and 1 and 3 and 4 will work in pairs observing another target individual during the 8:00 - 10:00 am time period. Note that the roles of FWs 2 and 1 have been switched. This assures that no FW will always work in the QC position.

TABLE 1

SUMMARY OF ACTIVITY PROTOCOL*

TARGET SUBJECT	FREQUENCY	METHOD
TARGET MALE	One time - total 10 hours	Activity Record
	1 hour/month - total 4 hours	Inter-observer quality control
TARGET FEMALE	One time - total 10 hours	Activity Record
	1 hour/month - total 4 hours	Inter-observer quality control
TARGET SCHOOL-AGE CHILD (7-9 yrs)	One time - total 10 hours	Activity Record
	1 hour/month - total 4 hours	Inter-observer quality control
TARGET TODDLER (18-30 mo.)	One time - total 10 hours	Activity Record
	1 hour/month - total 4 hours	Inter-observer quality control

*To be completed on 30 households

APPENDIX B

Procedure For Continuation Of Validation Trials, Food Intake

APPENDIX B

Memorandum to: Dr. Osman Galal
Copy to: Dr. Norge Jerome
Dr. Nel Kirksey
Dr. Gail Harrison
Dr. Wafaa Moussa

From: George Beaton

Re: Advice on Procedure for Continuation of Validation Trials, Food Intake

This memo is written to confirm the arrangements discussed this afternoon ~~for continuation~~ of the food intake validation work.

1. The 5 new validation trials involving comparison of the on-going 24 hour recall method, observation by a trained family member, and the repeated short recall look promising. There are too few to draw a major conclusion. Two major limitations of the present procedure, both apparently unavoidable, are that the selected households are likely to be very different from the typical households, and in two cases the individual doing the recording was also the person who reported food intake in the recall procedure.

2. Given that observation of intakes is almost impossible under conditions that would satisfy normal validation criteria, an alternative procedure was proposed. This will involve:

   (a) continuation of the present 3 method test until about 15 households have been studied. The households for this study will be selected on the basis of the presence of a suitable observer/recorder. They will be drawn from the study (core) households.

   The primary purpose of this will be to validate the short recall method against observed intake. Care should be taken to avoid having the same household member serve as both observer and reporter for the recall intake. Care should be taken also to ensure that the person reporting recalled intake does not have access to the records of intake to aid her memory. (NB This paparagraph has been added at the time of typing)

   (b) Initiation of a new validation study in which food intake data is collected by the short recall method as well as the regular 24 hour recall procedure. In this special study:

      i) households must be drawn at random from the study (core) households. If a household refuses to participate, the reason for refusal must be recorded and a substitute household must be drawn at random .

      ii) the two recall procedures must be administered by two different dietitians. That is, in any one household two

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different dietitians should be involved. It would be desirable that most or all dietitians of the project be involved in the study and that, if feasible, the same pairs of dietitians should not always work together nor should one dietitian always apply the short or regular recall method. The dietitians must collect, record, transcribe and process the data independently of one another, without cross comparison or discussion of the recalls.

iii) It is suggested that at least 50 different households be examined in this way and, if possible, the process be continued through the balance of the project or until about 100 households have participated.

The initial 50 should be drawn by random numbers and the study carried out as rapidly as feasible. The remaining 50 might be examined as, for example, every 10th, 20th or 30th household-dietary interview. (The random number allocation for the first 50 can be generated fairly easily through a function on the micro computers in the Institute. The procedure for generating random numbers should be described in the manuals.)

iv) Data (computed energy intakes) should be sent to Toronto as rapidly as possible. This might be in blocks of 10 households (i.e. send data as soon as 10 sets are available, when the next 10 are available, etc.)

v) A listing of all households <u>selected</u> for study should be sent together with a statement of the reason for each refusal. Each completed record should carry codes to identify the household, the individuals studied, the individual responding, and the dietitian collecting data (two dietitians will be involved). <u>All computed intakes</u> , even for households where complete information could not be collected, should be sent. If it is known that data are incomplete, this should be marked on the data set that is sent to Toronto.

I will analyze the validation data in Toronto as they are received and will send results back to Egypt as rapidly as I am able.

Of course the Egypt project is free to analyze data and to send the results to me. I would welcome such analysis to complement my own, particularly if there is any difference in interpretation from my own analyses.

Although not mentioned in our conversations, I would offer the Egypt project my services, without acknowledgment in publication, to draft a report of the food intake validation trials in a form that might be used as a part of the final report of the project or as an independent methodological publication.

(This is a copy, with several minor changes and one major change as noted, of a handwritten memorandum left in Cairo on January 11 with Dr. Kriksey.)

January 13, 1985

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ATTACHMENT D

SIX-MONTH REPORT
PURDUE UNIVERSITY

Six-Month Report
October 1, 1984 to March 31, 1985

Purdue University
Egypt Project, Nutrition CRSP

USAID Contract #DAN-1309-G-SS-1070-00
Nutrition Intake and Function

Avanelle Kirksey, Principal Investigator

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I. INTRODUCTION

Some of the major thrusts in the project during the past six months have been 1) examination of ways to encourage the continued participation of households in the study and to limit the number of refusals 2) recruitment and training of additional data collectors for several of the research activities 3) attempts to reduce the quantity of missing data in all research areas 4) attempts to solve some of the problems concerned with measurement of resting metabolic rate 5) initiation of data entry in Egypt for most research areas 6) emphasis on data quality control procedures; and 7) completion of the second parasitology survey.

II. TRAVEL

Dr. Kirksey attended the SCB meeting in Berkeley, September 26-October 1, 1984. She was in Egypt from October 20, 1984 to November 21 and December 15 to January 30, 1985 to assist in project management. Also she participated in the interproject data analysis meeting in Cairo January 5-10, 1985. She traveled to Berkeley February 24-March 1 for the SCB meeting.

Mr. Frank Peters, UCLA graduate in Kinesiology, traveled to Egypt October 21, 1985 to spend 4 to 6 months there to assist in the collection of RMR data.

Dr. D.W. Thomas, Institutional Council member from Purdue University, traveled to Berkeley February 27-30, 1985 for the IC meetings.

Dr. Virgil Anderson, Professor of Statistics, Purdue University, traveled to Berkeley February 26-March 1 to attend the meeting of the Data Analysis Group.

Dr. Sayed Gaafar, Professor of Parasitology and Veterinary Pathology, Purdue University, traveled to Egypt January 25-February 15, 1985 to complete the second 6 month screening of target village households for parasitic infection.

Dr. Theodore Wachs, Professor of Psychology, Purdue University, traveled to Egypt March 15-April 3, 1985 to establish procedures for handling errors in the data, establish reliability of recently trained psychologists and to begin training in the Fagan Memory measurement of infants.

III. NEGOTIATIONS WITH COUNTERPART INSTITUTIONS

A revised budget proposal for periods IV, V and VI (October 1, 1984-August 31, 1987) was submitted by Purdue University to Management Entity in February 1985. However, significant monetary deletions were necessary and are now being made in the budgets at Arizona, Kansas and Purdue to conform to the recommendations of the Institutional Council made at Berkeley March 1, 1985. Thus final negotiations are pending concerning the scientific, data management and analyses budgets for the Egypt project.

IV. RECRUITMENT OF STAFF FOR THE PROJECT

Dr. Virgil Anderson and Dr. George McCabe, Professors of Statistics at Purdue University, have agreed to share responsibility in assisting the Egypt project in statistical analyses of data.

V. RESEARCH ACTIVITIES

A. Cognition and Behavior

Activities in this area included testing and observation of subjects at all ages enrolled in the project. In the past 6 months 110 toddlers have been assessed; 108 school age children, 69 adult females and 37 adult males. Testing on infants has only recently begun.

Progress of activities was hampered considerably when 5 out of the 7 psychologists responsible for cognitive testing were lost to the project. These losses were unrelated to factors inherent in the project, i.e. some psychologists left to get married or left for new jobs. However, the loss meant recruitment and training of a new group of psychologists. This loss was compounded when Dr. Yunis became seriously ill and had to curtail his activities for the project for some time. Unfortunately, his illness came just as he was starting to train a new team of psychologists, which resulted in an even longer delay in getting examiners out into the field. The major problem resulting from these losses was the loss of data on toddlers, who should have been tested at specific ages when psychologists were not available to do the testing. Given that a new group of psychologists are retrained, data can be obtained on these children as they reach the older ages at which they are due to be assessed. This will mean only a loss of data points rather than a complete loss of subjects. The other major problem has been the reluctance of adult males to be tested. Since these individuals can be tested at any time during the duration of the project, hopefully this reluctance may be overcome and the sample size increased in this group.

Protocols for data cleaning by computer were completed for all psychology data sets. A preliminary run on a back sample of the data was quite successful in identifying data errors which are now being corrected. Until these data have been cleaned and corrected any preliminary analysis of these data cannot be undertaken. Reliability data on observation protocols continue to be monitored and continue to be satisfactory. Initial reliability data on testing has come in recently and, based on an initial analysis, appear to be within acceptable ranges.

Activities also included a meeting between Dr. Wachs and Dr. Sigman (Kenya Project) to discuss coordination of data analyses strategies. This was done while Dr. Wachs was in Los Angeles on other business and involved no cost to the project. Activities planned over the next 6 months include continued assessment of subjects in the project, cross-validation of in-country reliability figures by Dr. Wachs, training of project psychologists on the Fagan memory procedure so that this measure can be used with infants as they reach the 6 months cut-off date and finalizing data analysis strategies.

B. Hematology

Figure 1 shows preliminary data for the measurements of hemoglobin, hematocrit and ferritin of approximately 250 target individuals in the Egyptian households. The lowest values for hemoglobin, hematocrit and ferritin were observed for the toddler. The mean value for hemoglobin and ferritin of toddlers approached a level indicative of deficiency. Adult males had the highest mean hematological values compared to values for adult females, toddlers or schoolers. Guidelines

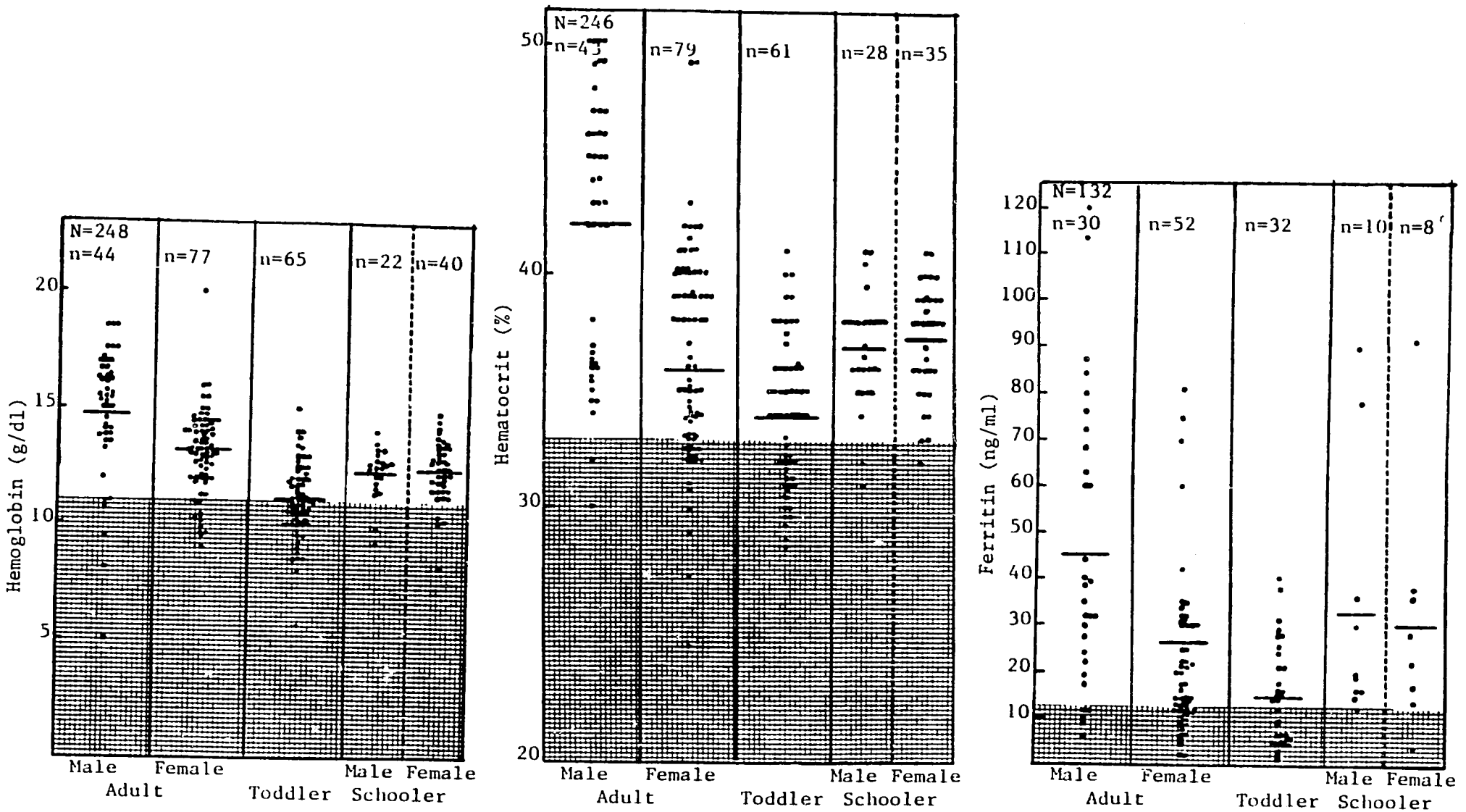

Figure 1. Hematological measurements of target individuals in 88 Egyptian households
The criteria for acceptable/deficient values from the International Nutritional Anemia Consultative Group (Guidelines for the Eradication of Iron Deficiency Anemia. The Nutrition Foundation, 888 Seventeenth St., NW, Washington, D.C. 20006. 1981).

of the International Nutritional Anemia Consultative Group were used as criteria to examine the hematological data for this population. Table 1 shows the incidence of low values for hemoglobin, hematocrit and ferritin in the target population. These data indicated that the toddler was the target individual most vulnerable to iron deficiency anemia followed by the adult female, while the incidence of anemia was lowest among the adult male and school age child. Also, adult females and female children (schooler) showed a higher incidence of low values for ferritin compared to values for their male counterparts. Quality control procedures for hemoglobin and ferritin have been instituted and initial results have been sent to Management Entity. Interproject quality control assessment and comparisons of ferritin measurements are underway.

Table 1. Incidence of Low Values for Hemoglobin, Hematocrit and Ferritin Among Target Individuals in Kalama

Target	Hemoglobin		Hematocrit		Ferritin	
	N	<11g/dl	N	<33%	N	<12ng/ml
			% of target individuals			
Adult Male	44	13.6	43	4.7	30	16.7
Adult Female	77	13.0	79	11.0	52	36.5
Toddler	65	52.3	61	19.6	32	50.0
Schooler:Male	22	4.5	28	3.5	10	10.0
Female	40	5.0	35	5.7	8	25.0

C. Parasitology

The second phase of screening for parasitic infections in the population of the village of Kalama was conducted in February 1985 under the supervision of Dr. Sayed Gaafar, Professor of Parasitology, Purdue University. Previous work performed by Dr. Gaafar and Egyptian colleagues during the summer of 1984 revealed a high incidence of parasitic infection among core families in the project. The second survey provided data on the prevalence of parasitic infections during the winter. Data from these two investigations provide a good profile of the intestinal and urinary parasitic infections in the population at different seasons in the year. Differences in living conditions and habits of the population during the summer and winter periods in Kalama are not drastically different; however, the milder temperature and increased humidity in winter may be conducive to an increase in certain parasites whereas the hot and dry conditions in the summer may be lethal to others.

Previous experience in obtaining urine and stool samples from the villagers and processing them at the Nutrition Institute facilitated the second screening procedures. Much of the equipment used during the summer screening was still available; additional expendable supplies and chemicals were taken to Egypt by Dr. Gaafar. There were trained personnel and adequate equipment and laboratory space to properly perform the necessary procedures. Stool and urine containers were sent to Kalama daily and samples were brought back on the same day to the Nutrition Institute for processing and examination.

A total of 167 Kalama families who participate in the project were offered containers to provide urine and stool samples for parasitic examination. Of these families, 136 accepted and 31 refused to cooperate or indicated reasons

for not being able to participate. Of those families examined, 116 or 85.3% were found to have one or more members infected with one or more parasites (Table 2).

Table 2: Number of Households examined for Parasites

Block No.	Offered	Refused	Examined	Positive
1	22	4	18	13
2	18	6	12	9
3	28	3	25	23
4	6	1	5	5
5	3	1	2	2
6	11	4	7	6
7	16	2	14	12
8	11	1	10	11
9	9	1	8	7
10	12	1	11	8
11	14	2	12	8
12	17	5	12	12
TOTAL	167	31	136	116

During this period a total of 690 urine samples and 664 stool samples were examined from the twelve blocks in the village. The highest number of cooperating families was from Block 3 (25 families) and the lowest was from Block 5 (2 families) (Table 2). Forty-two individuals (6.1%) were infected with parasites of the urinary system. Although Enterobius vermicularis is not a parasite of the urinary systenm, presence of the eggs in urine indicated a lack of sanitation which may contribute to the prevalence of other disease conditions. E. vermicularis incidence was greater during the winter examination than during the summer which may indicate further lack of personal hygiene during the winter. Twenty-six cases (3.4%) of Schistosoma haematobium were observed and this was slightly less than the incidence observed during the summer.

The incidence of gastrointestinal parasitic infection was much greater during the winter than summer. A total of 402 individuals or 60.5% of 664 individuals examined had one or more parasites (Table 3). By far the most prevalent infection was that of Entamoeba histolytica (36%) followed by Hymenolepis nana (17%). There were also significant infections with Enterobius vermicularis, Giardia lamblia and Ascaris lumbricoides. Also, there were infections with S. mansoni and H. diminuta.

Dr. Gaafar indicated that the infection rate of 60.5% of the individuals examined was quite significant and should be regarded as an important factor in evaluating the marginal nutritional status of individuals. Chronic infection with E. histolytica could have a major effect on the ability of any individual to utilize ingested nutrients. E. histolytica causes ulceration of the intestine and possible development of abscesses in the liver. Both of these lesions would affect nutritional status. Although the presence of

Table 3: Parasites found in individuals of various families

Bl. No.	No. Fam.	No. Exam Ur.	No. Exam St.	Total +ve	+ve Ur.	+ve St.	Parasites in urine S. hem.	Parasites in urine E. verm.	Parasites in urine Others	Parasites in stool S. man.	Parasites in stool A. duod.	Parasites in stool A. lumb.	Parasites in stool E. hist.	Parasites in stool G. lumb.	Parasites in stool S. ster.	Parasites in stool T. trich.	Parasites in stool H. nana.	Parasites in stool E. verm.	Parasites in stool Other*
1	18	101	99	39	6	40	5	1	-	1	-	6	16	2	-	-	10	5	-
2	12	55	55	17	1	21	-	1	-	2	-	1	6	3	-	-	6	2	1
3	25	135	133	72	9	87	6	3	-	6	-	9	34	10	1	-	15	11	1
4	5	32	26	15	2	16	2	-	-	3	-	-	8	2	-	-	1	2	-
5	2	12	9	7	-	9	-	-	-	1	-	1	2	1	-	-	4	-	-
6	7	31	28	15	3	15	3	-	-	-	-	1	3	-	-	-	5	6	-
7	14	60	56	32	1	37	-	1	-	1	-	10	16	1	-	-	7	2	-
8	10	60	60	41	3	52	2	1	-	8	-	3	19	8	-	1	5	8	-
9	8	45	37	28	5	31	3	2	-	5	-	1	11	7	-	-	4	3	-
10	11	59	55	30	1	36	1	-	-	2	-	3	10	9	-	-	6	6	-
11	12	42	45	25	6	24	4	2	-	3	-	1	8	3	-	-	4	3	2
12	12	58	61	30	5	34	-	5	-	3	-	3	14	6	-	-	3	5	-
TOTAL	136	690	664	351	42	402	26	14	-	34	-	39	147	49	1	1	70	53	4

Ur. = urine
St. = stools

S. hem. = *Schistosoma haematobium*
E. Verm = *Enterobius vermicularis*
S. Man. = *Schistosoma mansoni*
A. duod. = *Ancylostoma duodenale*
A. lumb. = *Ascaris lumbricoides*
G. lamb. = *Giardia lamblia*
S. ster. = *Strongyloides stercoralis*
T. trich. = *Trichuris trichuria*
H. nana = *Hymenolepis nana*

* *Hymenolepis diminuta*

Hymenolepis nana and H. diminuta in the intestine of well-nourished individuals, may be minimal, their presence in those marginally malnourished may be significant. The intermediate host which can be grain beetles may also reduce the nutritional value of grain.

About 10% of the population examined was infected with Ascaris lumbricoides most of which was observed in young individuals. The effect of ascariasis on the nutrition of children is well documented. Giardia lamblia was found in more than 12% of those infected with parasites and in over 7% of the total population examined. Since this parasite causes periodical diarrhea and is transmitted easily through water and food contamination, there is a likelihood of infection in more individuals. Also, it is likely a contributing factor to malnutrition in those infected. Obstruction of portal circulation and development of egg granulomas in the liver of those infected with Schistosoma mansoni could well be another factor affecting the nutritional status of individuals infected. The incidence of this parasitic infection was about 8.5%.

The number and percentage of parasitic infections found in this investigation represented only the minimum of the real incidence. Possibly the incidence was higher than was detected due to the time-lag which occurred between the collection and examination of urine and stool specimens. This time-lag allowed time for some larvae to hatch eggs. Infected individuals and families have received treatment in order to: (A) give the people who are cooperating in the project assurance that they are being assisted and compensated for their efforts and (B) provide information for the project concerning the nutritional status of the individuals when the parasites are removed. A third and last examination for parasites will be performed next winter. A method for faster examination of samples, before larvae hatch eggs, could be devised by the assignment of a car during the 2-3 week period when the examinations are in progress.

D. Reproduction and Lactation

1. Description of Households

Description of households of pregnant subjects is shown in Table 4. Most were of a nuclear (48%) or extended family, type 1 (44%) with a household size of 4-5 (37%) or 6-7 (37%) individuals. Most households (60%) were non-agricultural and in 92% of the households both the husband and wife were born in Kalama. All households were Moslem. More than 75% of the women and 45% of the males did not read or write or have any formal education. Almost 90% of the women were classified as homemakers/housewives/mothers.

2. Reproduction History of Target Females

Reproduction history of approximately 100 females is shown in Table 5. Almost two-thirds of the women were married between the ages of 14 and 17 years. Approximately 20% were married before 14 years of age. Most (57%) had a marriage duration of 5-14 years; 16% were married less than 5 years. More than 10% were first pregnant at 14 years of age or less, 41% were first pregnant between 15 and 17 years of age. Mean number of pregnancies was 4.2 and ranged from 1 to >10. The mean number of living children was 3.4. Most of the women surveyed reported normal deliveries. Eighty percent of the women reported no stillbirths and one or less abortions. Approximately 10% reported that a delivery required the use of forceps or Caesarean section.

Most women (94%) did not take vitamin/mineral supplements. Among the 6 women who took supplements, 6 took B-complex and 3 iron supplements. Sixty-two

Table 4. Description of Households of Lead Females (Pregnant)

	Frequency No.	Frequency %	
Household Composition Type			
Single individual, living alone	0	0	
Nuclear	38	48	
Extended family, Type 1	35	44	N=79
Extended family, Type 2	6	8	
Polygamous	0	0	
Household Size			
≤3	3	3	
4-5	29	37	
6-7	29	37	N=79
8-9	10	13	
≥10	8	10	
Household Subsistence Type			
Agricultural	15	19	
Non-agricultural	48	60	
Combined agricultural + non-agricultural	5	6	N=71
Combined non-agricultural + agricultural	2	3	
Mixed agricultural + non-agricultural	1	1	
Birthplace			
Female not born in Kalama but husband born in Kalama	3	4	
Female born in Kalama but husband not born in Kalama	3	4	N=80
Both husband and wife born in Kalama	74	92	
Religion			
Moslem	81	100	
Other	0	0	N=81

	Female No.	Female %	Male No.	Male %
Literacy				
Does not read/write	62	79	36	45
Reads only	5	6	4	5
Reads and writes	11	14	39	49
Difficult to find out/refused	0	0	1	1
	N=78		N=80	
Years of Education				
0	61	76	35	44
1-6	18	23	31	38
7-9	0	0	4	5
10-12	1	1	6	8
13-16	0	0	4	5
	N=80		N=80	

	Frequency No.	Frequency %	
Occupation of Females			
Homemaker/housewife/mother	78	87	
Homemaker + hired labor	3	3	
Homemaker + homebased agricultural crafts	4	5	
Homemaker + professional	1	1	N=88
Homemaker + peddler/street vendor	1	1	
Tenant farm cultivator + homebased crafts	1	1	
Occupation of Males			
Agricultural (1-9)	26	28	
Non-agricultural, Public Sector (10-14)	36	38	
Non-agricultural, Private Sector (15-26)	29	31	N=94
Other Non-agricultural (27-28)	2	2	
Unclassified occupation (no income producer)	1	1	

Table 5. Reproduction History of Lead Females

		Frequency Distribution (%)	
Age at first marriage (yr)	<10	8	
	10-11	1	
Mean 15.78 yr	12-13	9	
Range 9-25	14-15	26	N=99
	16-17	32	
	18-19	16	
	20-21	1	
	≥22	6	
Number of marriages	1	87	
	2	7	N=95
	4	1	
Duration of marriage (yr)	<5	16	
	5-9	34	
Mean 12.96	10-14	23	N=95
Range 0-25	15-19	10	
	≥20	12	
Age when first pregnant (yr)	≤14	10	
	15	12	
Mean 17.12	16	13	
	17	16	N=87
	18	16	
	19	9	
	20-21	6	
	≥22	5	
Number of pregnancies	1	5	
	2	12	
Mean 4.25	3	15	
	4	15	
	5	9	
	6	7	N=83
	7	7	
	8-9	7	
	>10	6	
Number of living children	0	1	
	1-2	31	
Mean 3.4	3-4	37	N=90
	5-6	17	
	7-9	2	
	10-11	2	
Number of dead children	0	42	
	1	22	
	2	15	
	3	8	N=92
	4	1	
	5-6	3	
	7	1	

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		Frequency Distribution (%)	
Number of abortions	0	59	
	1	21	
	2	7	
	3	5	N=94
	4	1	
	5	1	
Number of normal deliveries	1	10	
	2	14	
	3	16	
	4	13	N=91
	5	12	
	6	8	
	7-9	13	
	≥10	5	
Number of stillbirths	0	81	
	1	9	
	2	2	N=93
	4	1	
Number of deliveries with forceps	0	77	
	1	1	N=89
	2	10	
	5	1	
Number of deliveries by Caesarean	0	78	
	1	2	N=90
	2	10	
Birth control measures:present	IUD	7	
	Pill	3	
	None	62	N=90
	No answer	17	
	Local	1	
Age at menarche (yr)	10	1	
	11	3	
	12	27	
	13	26	
	14	15	N=84
	15	6	
	16	4	
	17	1	
	Unknown	1	
Pregnancy status	Pregnant	53	
	Non-pregnant	30	N=94
	No answer	11	
Lactation status	Lactating	40	
	Not lactating	50	N=90
Number of pregnant women lactating		14	
	No answer	1	N=15

		Frequency Distribution (%)	
Female smoking habits	Yes	1 cigarette (4 mo. pregnant)	
	No	92 cigarettes	N=93
Male smoking habits	Yes	50 cigarettes (31 had pregnant wives)	
		14 pipe (3 had pregnant wives)	
	No	36	N=100
Vitamin supplement		6	N=6
	(All 6 take B-complex; 3 of these take Fe)		

percent of the women did not use birth control measures. Only 3% of those who used birth control measures used oral contraceptives. Only one woman among 93 women surveyed smoked cigarettes; however two-thirds of their husbands smoked cigarettes or pipes.

3. Weight Gain in Pregnancy

Data are very preliminary for maternal weight gains in pregnancy. Maternal weight gains for the last 6 months of pregnancy are shown for two subjects who delivered low birthweight infants and for five subjects who delivered normal weight infants (Figure 2). Gains were less than 5 kg for the two women who delivered low birthweight infants. The pattern of gain of these women during the last 6 months of pregnancy is shown in Figure 3. One of the women (subject #1) showed a loss of weight until the last month of pregnancy when a marked gain in weight was observed. Food intake data for two women who delivered low birthweight infants indicated low energy intakes, 1562 and 1413 average Kcal/day for 8-10 days of data collection.

4. Weight and Gestational Age of Infants

Most newborns were identified by project personnel within 24-48h after delivery due to the system developed by Dr. Nargis Bassily to follow daily the pregnant women who are expected to deliver during a particular month. By the end of February 1985, 80 women enrolled in the project had delivered and birthweights of their infants were obtained (Table 6). Fourteen birthweights (15% of the expected sample) were not obtained due to late notification of project personnel of the delivery and to refusals of the families to cooperate. The lowest mean birthweight, the largest number of low birthweight infants (<2500g) and infants of earliest gestational age were observed in Block 11 of Kalama when compared to data from all other blocks in the village (Table 6). Possible reasons for these findings are currently under investagation.

Frequency distribution of birthweights (Figure 4) and mean weights at birth, 8 days and monthly (Figure 5) are shown for 60-61 infants born between July and December 1984. Seven newborns (11% of the sample) were classified as low birthweight. Frequency distribution of gestational age, assessed by the Dubowitz score, is shown for 47 of these infants in Figure 6. Seventeen of the

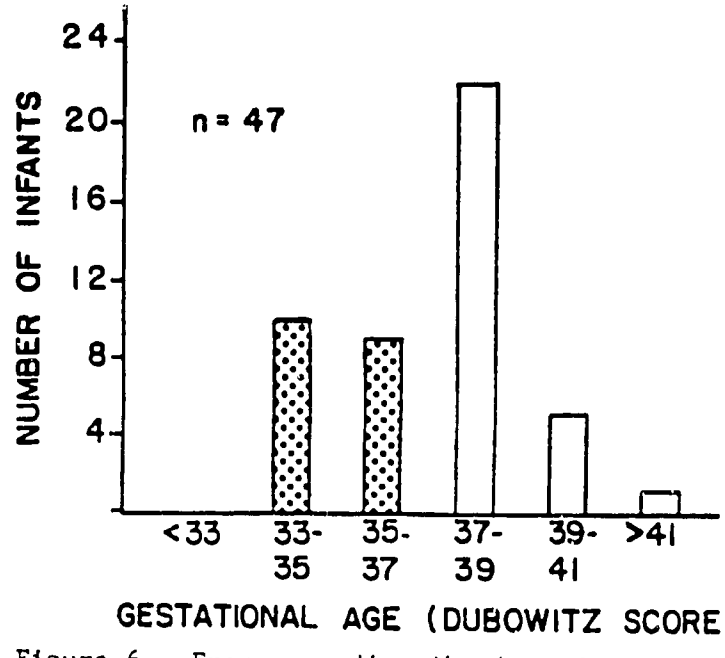

Figure 6. Frequency distribution of infants by gestational age assessed by Dubowitz score.

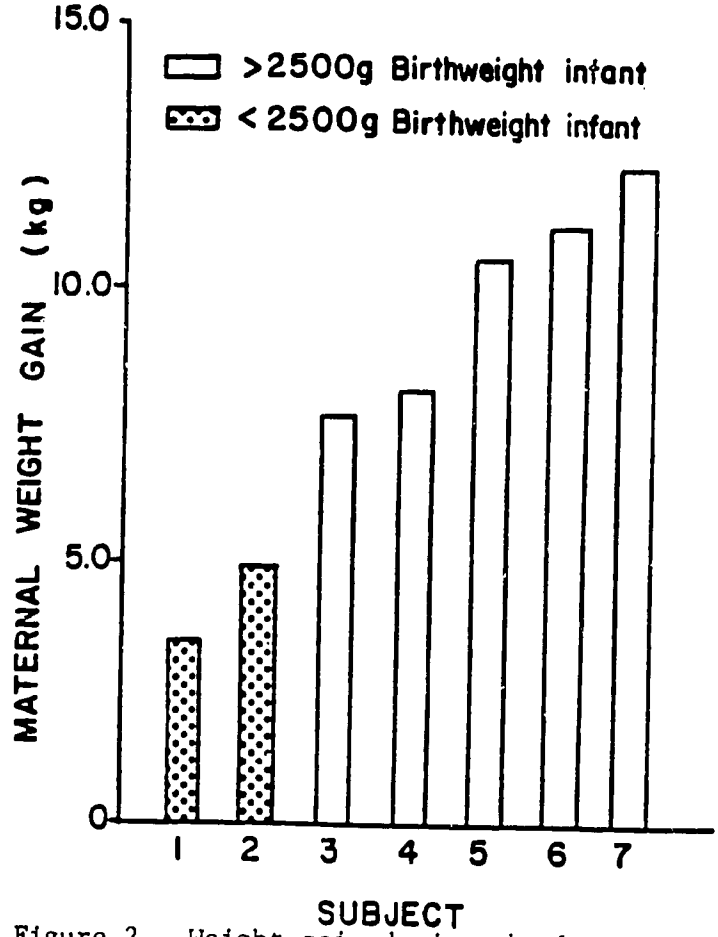

Figure 2. Weight gain during the last six months of pregnancy for five women who delivered normal weight infants (>2500g) and two who delivered low birthweight infants (<2500g).

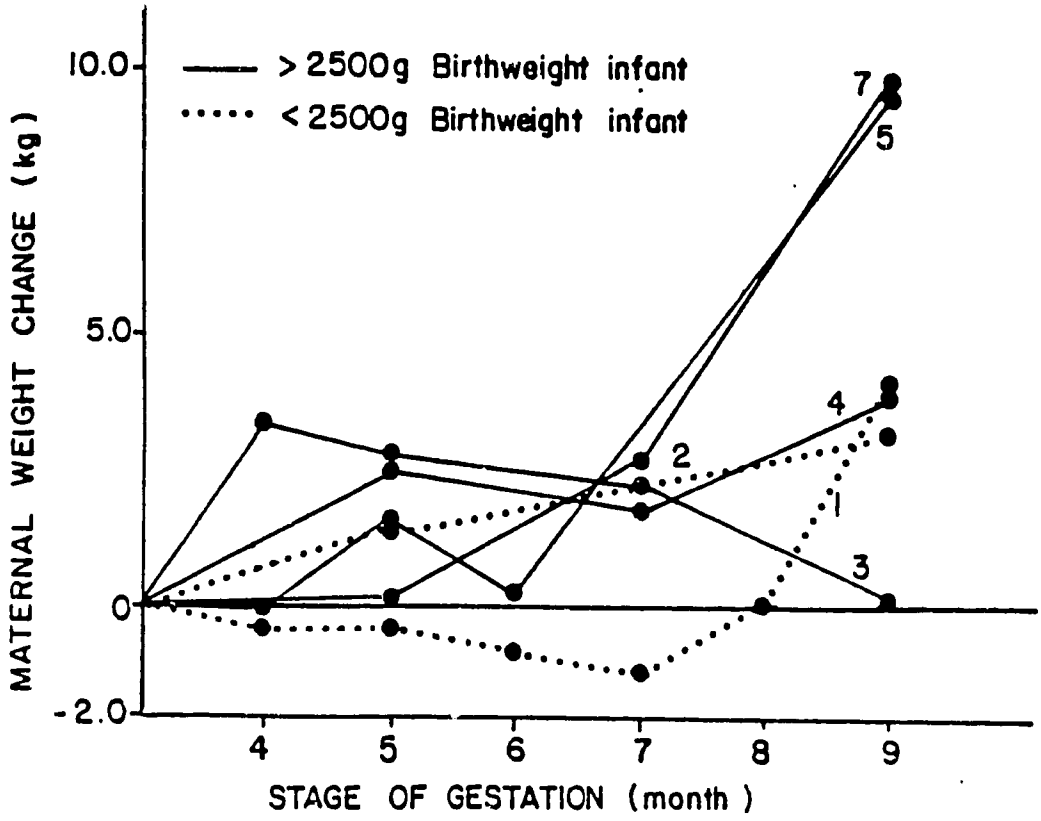

Figure 3. Pattern of weight change during the last six months of pregnancy for four women who delivered normal weight infants (>2500g) and two who delivered low birthweight infants (<2500g).

Table 6. Birthweight and Gestational Age of Infants Classified by Household Location in the Village of Kalama

Block No. of Household	Birthweight		Gestational Age[1]	
	N	g	N	wk
1	7	3302±392[2]	6	38.4±1.20[2]
2	6	3062±506	4	37.0±1.70
3	10	3155±685	6	36.4±2.60
4	-	-	-	-
5	5	3212±688	3	38.7±0.30
6	6	3207±331	4	38.5±1.15
7	7	3195±215	7	36.3±1.80
8	8	3313±394	3	35.5±2.50
9	7	3170±223	4	38.2±0.60
10	8	3256±336	2	37.0±0.00
11	8	2723±275	3	35.0±1.80
12	8	3101±610	4	38.4±1.25
Total	80	3142±452	46	37.2±1.90

[1]Dubowitz score

[2]Mean ±SD

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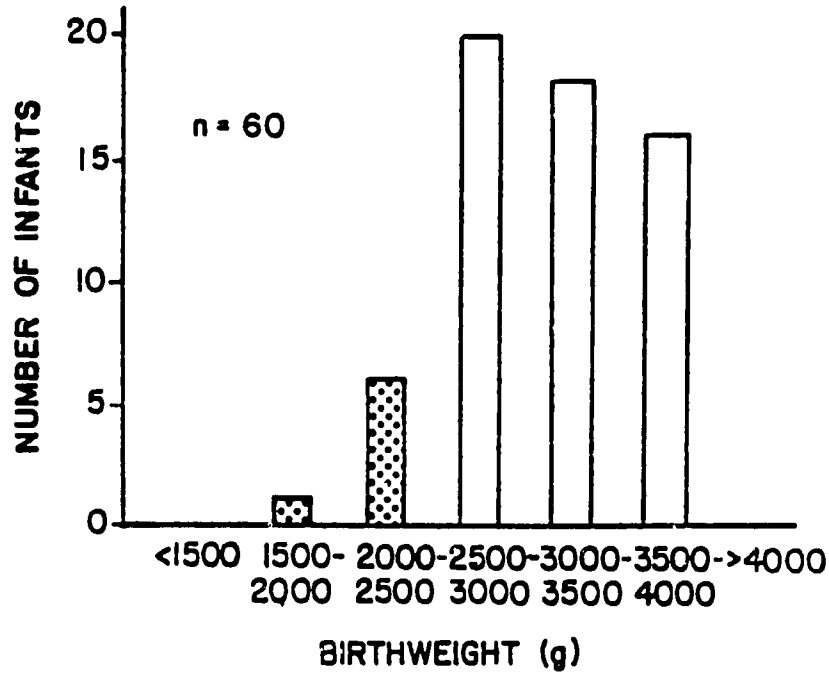

Figure 4. Frequency distribution of infants by birthweight.

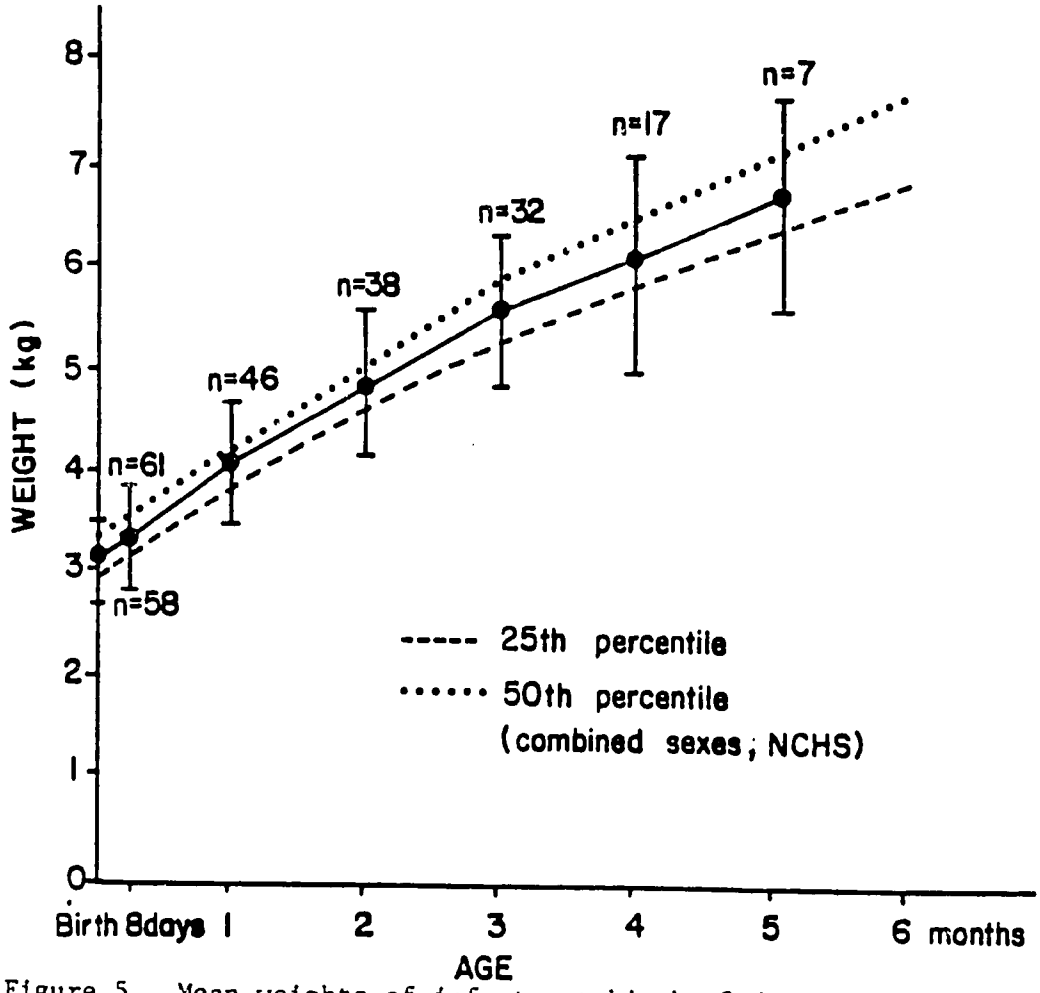

Figure 5. Mean weights of infants at birth, 8 days and monthly compared to the 25th and 50th percentile norms of the National Center for Health Statistics (NCHS).

newborns were rated as less than 37 weeks gestational age and this constituted 37% of the infants examined. Hypotonia appeared to characterize many of the infants who received low Dubowitz scores. A breakdown of the Dubowitz score by clinical and neurological measures indicated seven infants with low neurological scores and six with low clinical scores (Table 7). Three of these infants were rated low both neurologically and clinically. One of the mothers of an infant, rated low clinically, was found to have anemia (Hb=7.1 g/dl).

Mean monthly weights of infants were between the 25th and 50th percentile of the NCHS standards (Figure 5). The distribution curve for birthweight was skewed slightly to the left (Figure 7). Variation in individual weights was greater at 8 days than at birth. This variation in individual weights continued monthly until the last age of measurement at 5 months. At this age the sample size was only seven infants. The pattern of weight gains for five individual infants (Figure 8) shows marked differences in individual rates of growth. Also,

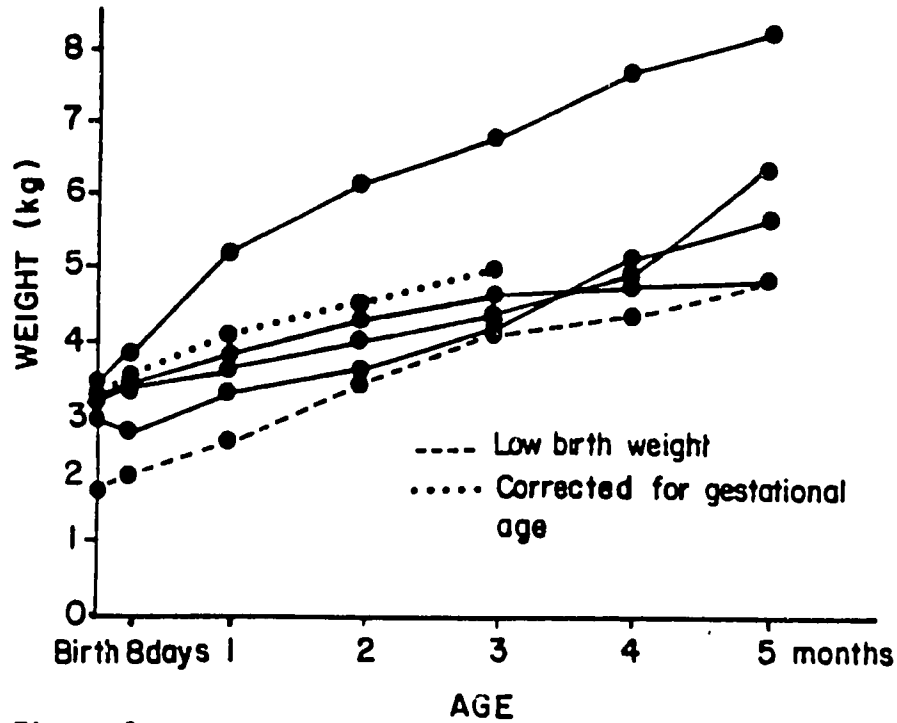

Figure 8. Pattern of weight increases for four individual infants at birth, 8 days and monthly to five months of age. Data are shown for one low birthweight infant before and after correction for gestational age.

correction for the gestational age of a low birthweight infant increased the growth rate plotted for this infant.

5. Lactation/Infant Feeding History

Preliminary results of the history of infant feeding practices of 88 mothers in Kalama are shown in Table 8. Breastfeeding was initiated by all of the mothers during the first 3 days after delivery; the largest percentage of mothers (44%) breastfed first on day 3. However, 34% initiated breastfeeding on day 1. The duration of breastfeeding was for 12 months or longer for more than 95% of the mothers; among these mothers 49% breastfed for 18 months and 28% for 24 months or longer.

Table 7. Dubowitz Evaluation of Newborn Infants

Block	HH	Birth Date	Infant ID	Dubowitz Score[1] Clinical	Neurological	Total	Gestational Age (wks)
7	1167	7/7/84	505	230	160*	390	35.0
3	52	12/7/84	505	120*	180*	300	32.5
3	1037	14/7/84	510	230	160*	390	35.0
12	30	21/7/84	506	190*	240	430	36.5
7	111	22/7/84	503	140*	200*	340	33.5
11	134	29/7/84	515	100*	200*	300	32.5
1	99	1/8/84	507	280	290	570	39.5
8	79	8/8/84	507	240	160*	400	35.5
3	143	9/8/84	513	250	178*	428	36.0
12	175	15/8/84	509	280	270	550	39.0
7	184	19/8/84	508	225	235	460	36.5
5	30	22/8/84	506	230	260	490	37.5
7	21	29/8/84	507	240	250	490	37.5
2[2]	29	4/9/84	508	200*	290	490	37.5
1	59	4/9/84	509	280	250	530	38.5
1	51	8/9/84	504	250	240	490	37.5
6	30	8/9/84	510	230	250	480	37.5
11	143	8/9/84	511	250	210	460	36.5
5	69	10/9/84	507	290	250	540	39.0
9	125	15/9/84	509	270	280	550	39.0
5	131	17/9/84	507	270	250	520	38.5
11	76	19/9/84	506	200*	240	440	36.5
5	49	16/10/84	508	270	260	530	38.5

[1]Maximal total score is 700; 350 for clinical and 350 for neurological

[2]Maternal Hb (g/dl) = 7.1 Hct (%) = 23.0 Ferritin (ng/ml) = 6.5

*Low scores

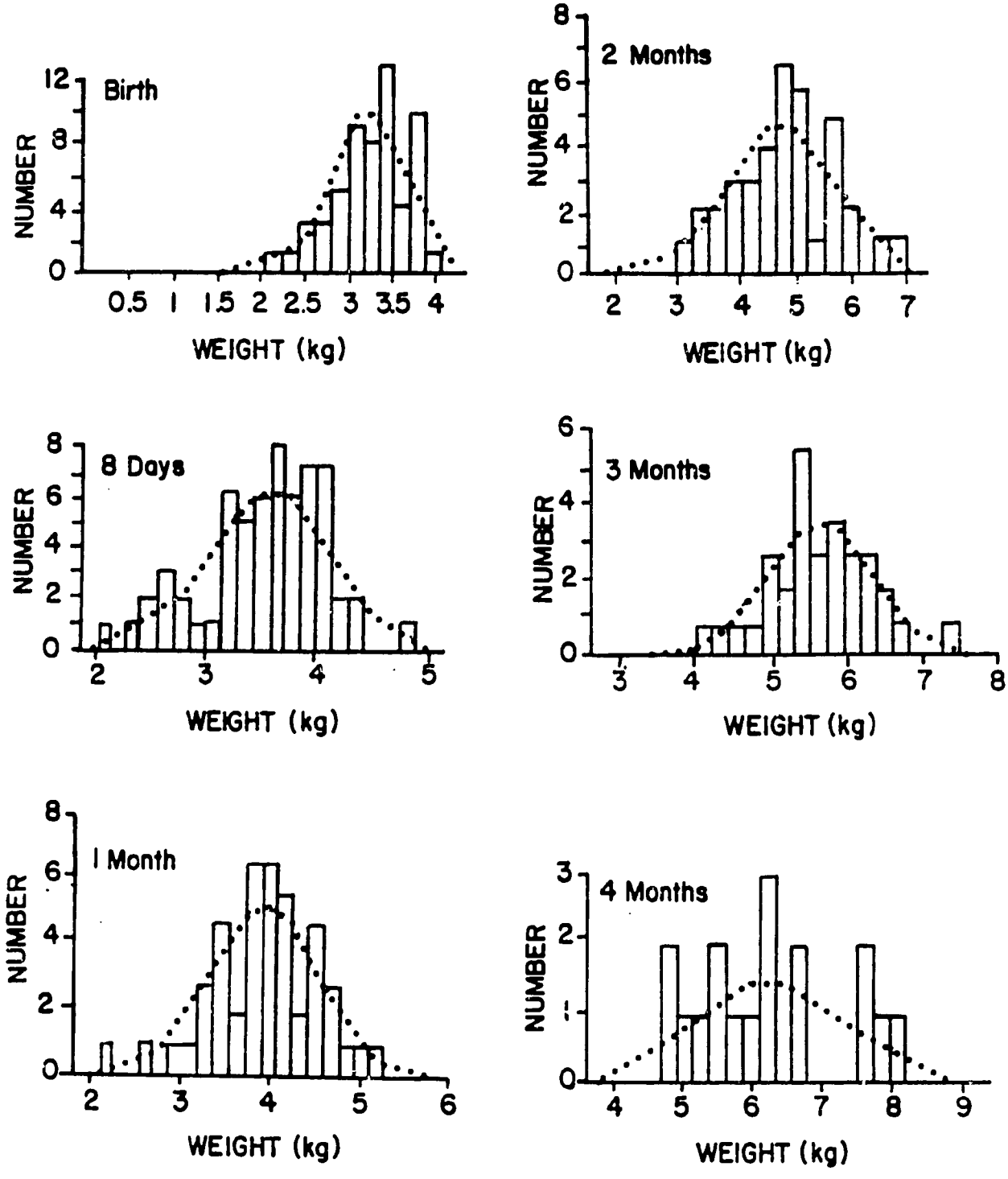

Figure 7. Frequency distribution of weights of infants at birth, 8 days and monthly to five months of age. Few infants had reached 4 or 5 months of age.

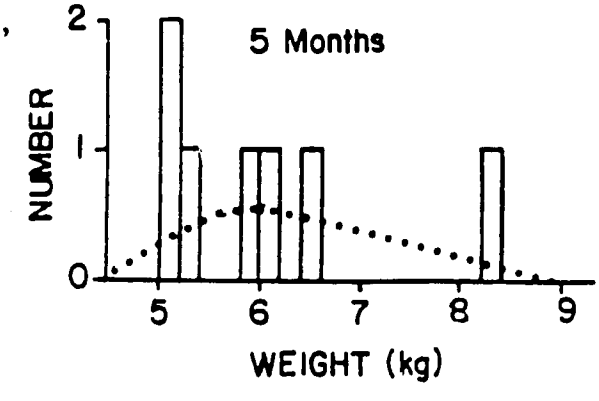

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Table 8. Infant Feeding Practices of Eighty-eight Women Surveyed in Kalama, Egypt

		No. of Subjects	% of Subjects
Breastfeeding		88	100
Initiation of breastfeeding:			
Days after birth	1	30	34
	2	19	22
	3	39	44
Duration of breastfeeding:			
Months	5	3	3.4
	7	1	1.1
	8	1	1.1
	12	5	5.7
	14	1	1.1
	15	7	8.0
	18	43	49.0
	21	1	1.1
	24	24	27.0
	36	1	1.1
Age of introduction of supplementary foods:			
Months	2-3	17	19
	4-5	20	23
	6-7	27	31
	8-9	10	11
	12	18	20

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Sugar and water as well as sugary concoctions (commonly sugar, water and anise) were introduced by some mothers as early as the first or second day after birth and by most mothers before the infant was one month of age. Also, rice water, tea and lemon juice were beverages commonly fed to infants from an early age. In addition to lemon juice, other citrus fruits were introduced to infants at 3 to 6 months of age by 30% of the mothers and by 30% of the mothers at 6 to 9 months of age. However, approximately 20% of the mothers did not introduce citrus fruits until 18 months of age.

The age of introduction of food supplements is summarized in Table 8. Approximately 73% of the mothers introduced supplementary foods to their infants by 6 months of age. Rice, potato, biscuits and macaroni were among the first foods introduced. Approximately 50% of the mothers introduced these foods by 6 to 9 months of age. However approximately 20% of the mothers did not introduce any food supplements until the infant was 12 months of age.

E. Measurement of Resting Metabolic Rate (RMR)

Dr. Gerald Gardner, Professor of Kinesiology at UCLA, has continued to serve as consultant to the Egypt project in RMR measurements as well as to the Kenya project. Also, he recruited Mr. Frank Peters, a recent graduate in Kinesiology at UCLA, to spend the past 6 months (October 1984 to April 1985) in Egypt training Egyptian personnel in the performance of RMR measurements and in the care of the RMR equipment. In particular, the large back-log of RMR measurements has been reduced considerably. A total of 650 RMR measurements had been performed to February 1, 1985.

Dr. Gardner visited the field site for four days in February 1985 and reviewed the RMR data with Mr. Peters. A determination was made of data which fell outside acceptable limits and should therefore be discarded and retests made. Also, values for computer range checks were established. Mr. Peters has trained two of the young physicians, who were assigned recently to the Nutrition CRSP project, perform RMR measurements. Dr. Gardner observed the work of the physicians and expressed confidence that they are well-trained and dedicated to the project and that they can continue to perform the RMR measurements accurately after Mr. Peters returns to the U.S.

Dr. Gardner recommended that inflatable face masks and some replacement parts for the RMR equipment be purchased. Subsequently these were ordered, received and sent to the field site. Quality control testing for RMR measurements has been instituted. Comparative RMR tests performed on the same individuals in Egypt, Kenya and UCLA have shown differences no greater than 7%. For RMR measures, differences <10% are considered acceptable. Hence, these results suggest that the RMR procedures and the data being collected in the Egypt and Kenya projects are comparable. Finally when the CRSP research terminates, the project expects to leave in Egypt a piece of equipment which offers considerable potential for future research in work physiology as well as Egyptian personnel trained in the use of the equipment.

Water Quality Assessment

Drs. Fahmy Sediqu and Reda El-Sherbini, microbiologists at the Nutrition Institute initiated water sampling in August 1984 of all major sources of water in the village: canal, public pump, private pump and tap water. In addition, drinking water samples were collected from 104 different households (Table 9). Most samples were collected from household containers which were usually

Table 9. Number and Percent of Positive Coliforms and E. coli in Drinking Water Obtained From 104 Households in Kalama

Source of Water	No. of Households Sampled	Positive Coliforms		Positive E. coli	
		No. of Households	% of Households Sampled	No. of Households	% of Households Sampled
Public pump	51	47	92.2	27	52.9
Private pump	19	16	84.2	11	57.9
Public tap	4	3	75.0	0	0
Private tap	22	18	81.8	8	36.4
Reservoir	4	3	75.0	0	0
Canal	4	4	100.0	4	100.0
TOTAL	104	91	87.5	50	48.1

covered. A few samples were taken from refrigerators. Temperature of the samples at the time of collection ranged from 15 to 23°C. In addition to the samples taken from households 20 samples were taken directly from public pumps located at different blocks in the village. Seventeen of these samples were contaminated with coliforms and twelve with E. coli. Among 104 households from which water samples were obtained 87.5% had positive coliforms and 48.1% had positive E. coli determined from the bacteriological examination (Table 9). As would be expected, in all cases water from the canal contained an unacceptable number of positive coliforms and E. coli (Table 10). Approximately one fourth of the water samples from public pumps had unacceptable levels of both positive coliforms and E. coli. Although the sample numbers were small, water from the reservoir and public tap were least contaminated with positive coliforms and E. coli.

Table 10. Frequency Distribution of Most Probable Number (MPN) of Positive Coliforms and E. coli in Drinking Water Obtained From 104 Households in Kalama

Source of Water	Positive Coliforms	Frequency Distribution of Coliforms MPN/100ml drinking water 1-<10	10-<100	>100*
		No. of Households		
Public pump	47	28	8	11
Private pump	16	11	3	2
Public tap	3	2	1	0
Private tap	18	8	8	2
Reservoir	3	3	0	0
Canal	4	0	0	4
TOTAL	91	52	20	19

	Positive E. coli	Frequency Distribution of E. coli MPN/100ml drinking water 1-<10	10-<100	>100*
		No. of Households		
Public pump	27	16	5	6
Private pump	11	8	2	1
Public tap	0	0	0	0
Private tap	8	4	2	2
Reservoir	0	0	0	0
Canal	4	0	0	4
TOTAL	50	28	9	13

*Unacceptable values

Laboratory Quality Control

The laboratory notebooks for Egypt Nutrition CRSP retain records by subject ID's and dates on which laboratory routines were performed. All assays are done with duplicate samples, and if sample permits, with triplicate. At least 20% of the hemoglobin measurements are duplicate dilutions. For quality control purposes, a random 10% sample is reported to Management Entity (M.E.) over a 3-month period with the unaveraged raw measurements shown. With each assay, hemoglobin and ferritin controls (high, medium and low concentrations) are included as reference standards. If values are not within the acceptable range of the reference standards, the assay is repeated when sample volumes permit. Otherwise the original values are reported with a note that the laboratory was "out of control". Also reference standards are monitored longitudinally to check for any systematic drift.

As a part of quality control, a pooled serum sample is measured with a routine assay at least once monthly on a double blind basis. The pooled serum sample used in Egypt has been provided for to the Kenya laboratory for interproject laboratory quality control. In addition external reference standards from the same source will be used routinely by all laboratories to establish values for measurements in each laboratory.

The Egypt project have reported the results of laboratory control studies for hemoglobin and ferritin assays to M.E. These studies involve replications of commercial controls containing high, medium and low concentrations of the test substance. The first results sent to M.E. are as follows:

Assay	Mean	SD	CV	Laboratory Error Term if Duplicate Assays Performed
Hemoglobin	7.9	0.1	1.2%	1.2%
	11.5	0.2	1.8%	1.8%
	15.9	0.3	1.9%	1.9%
Serum Ferritin	10.4	2.1	20.0%	14.0%
	59.9	12.9	21.0%	15.0%
	225.0	32.5	14.5%	10.0%

For hemoglobin, 9 replicates of each of the samples; each replication was performed in duplicate.
For ferritin 7 replicates of each of the samples.

Out of range values for hemoglobin and ferritin values are described in the Egypt project laboratory manual.

Quality Control for RMR Measurements

As a quality control procedure, periodic replicate meausrements of RMR are made of one or more individuals who routinely assist with the measurements. Also 10% of the tests performed on target individuals are replicated. These analyses indicated that variability estimates for intra-individual were $\leq$10% and inter-individual were $\leq$15%. In addition travelers from Egypt to Kenya have been measured with RMR equipment at each field site as a part of interproject quality control. These measurements have varied $\leq$7% indicating good agreement for the Egypt and Kenya RMR measurements.

VI. INTERPROJECT ACTIVITIES

Dr. Kirksey participated in the SCB meetings in Berkeley, September 26-October 1, 1984 and February 24-March 1, 1985. Also she participated in the interproject data analysis meeting in Cairo, January 5-10, 1985. Representatives from Management Entity (Drs. Horan and Beaton) and from the Kenya (Drs. Neumann, Bwibo, Carter and Coulson) and Mexico projects (Dr. Allen) attended the Cairo meeting. Dr. Virgil Anderson, Professor of Statistics at Purdue, attended the data analysis meeting of project statisticians and M.E. statisticians at Berkeley, February 26-30, 1985. Dr. Gerald Gardner, Professor of Kinesiology, UCLA, visited both the Kenya and the Egypt projects in January-February, 1985 and assisted in the development of quality control procedures for RMR measurements.

VII. CURRENT STATUS AND PLANS FOR THE NEXT PERIOD

Plans for the next 6 months:

1. a joint meeting of SCB and EEP Mexico in April to discuss the current status of the project and progress in all research activities with a particular emphasis on data analyses strategies.
2. continued collaboration with Egyptian colleagues in the collection of data with emphasis on the maintenance of quality control.
3. development of data analysis protocols in the areas of pregnancy outcome and infant growth; cognitive development and behavior; and resting metabolic rate.
4. Dr. Kirksey will travel to Egypt in October-November as resident U.S. PI to assist in project management.