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CMANI-AMERICAN JOINT COMMISSION
FOR ECONOMIC AND TECHNICAL COOPERATION
REPORT OF THE CHILD HEALTH TEAM

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TECHNOLOGIES FOR PRIMARY HEALTH CARE (PRITECH) PROJECT

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10 January-9 February 1986

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EXECUTIVE SUMMARY

The health status of Omani children has been remarkably improved during the past fifteen years. There are a wealth of programs that provide high-quality service to the children of Oman. At least 70% of the children are immunized against measles by age one. Deaths from dehydration are rare. More and more children are born in hospitals. Health-care facilities are readily available to most Omanis. Few countries can boast of the accomplishments that the Sultanate has made!

Further improvement will take place with the current programs, but more slowly than in the past. More rapid improvement can be brought about without major funding or reallocation of resources. The recommendations of the Child Health Team emphasize:

- * building upon the advances, not creating new programs
- * setting targets
- * building on the current Health Information System, not starting over
- * a concept of primary health care using the excellent health-care delivery system that is in place
- * training of Omani health workers to become trainers

The seven recommendations that follow are presented in a priority order based on particular criteria: focus responsibility, know what the health situation is, know where the Sultanate wants to go, track progress and strengthen existing programs.

RECOMMENDATION 1: ESTABLISH A CENTRAL COORDINATOR

The rapid improvement of health status and growth of services can lead to problems in the future. All parts of the Ministry of Health are involved in the provision of services to mothers and children. There is no central coordination of those services. There is no single office that assures that all the programs in the different Directorates are reaching all the mothers and children. The informal system has worked well during the past several years, but with more children surviving the fatal infectious diseases, there will be greater need for coordination between the preventive and curative services.

All members of the team believe that if a child-health program is to prosper there needs to be established within the Ministry an Office/person responsible for the health of mothers and children. This Office need not have operating responsibility for on-going programs, but should have the authority to assure that necessary activities that are not currently the specific responsibility of any program do not get neglected. The Office should be responsible for monitoring the Goals and Targets described below and take action when they are not being met. The coordinator for this Office should be a qualified obstetrician or pediatrician.

Specifically the coordinator should be responsible to the Minister of Health for:

- 1) Setting goals and targets for child health
- 2) Monitoring progress towards those goals
- 3) Recommending corrective action when the targets are not being met and assuring that such action takes place
- 4) Determining training needs of health workers to meet goals and targets for child health
- 5) Setting policies and standards of operation for child health programs
- 6) Implementation of growth monitoring
- 7) Coordination of child- and maternal- health activities with external groups

RECOMMENDATION 2: DETERMINE INFANT SURVIVAL RATE

It is essential that the apparent decline in infant mortality be documented with statistical validity immediately, for two purposes:

- o To provide the basis for planning for the next five years, since different programs are needed for a country with an IMR of 60 than for a country with an IMR of 100.
- o To demonstrate how effective Ministry of Health programs have been.

A simple method of determining child survival has been developed. This technique estimates mortality under two and five years of age. One month's collection of data from all institutions delivering babies would provide an accurate estimate of current infant and child mortality. Annual repeat surveys would facilitate assessing progress over time.

(Attachment A)

RECOMMENDATION 3: SET GOALS AND ESTABLISH TARGETS

Health services need to have goals before a plan can be developed. To develop a plan without goals is similar to having a map, but not knowing the destination.

The goal for a Maternal and Child Health Program would be the reduction of infant mortality and morbidity. But by how much? To decide on the goal it is convenient to establish targets that can be measured. These targets should be key indicators of health that will determine infant mortality and morbidity. The measures should be in health outcomes, not activities. The percent reduction in measles is an outcome, the number of injections is only an activity.

SUGGESTED TARGETS
Figure 1

	1986	1990
Percentage of mothers with 2 doses tetanus toxoid	_____	_____
Percentage of inpatient deliveries that are less than 2500 grams	_____	_____
Percentage of deliveries with trained attendant	_____	_____
Percentage of 18 month olds under _____ kgs	_____	_____
Percentage of mothers only breastfeeding at 6 months	_____	_____
Hospital admissions for severe dehydration under 5 years of age	_____	_____
Percentage of deliveries in hospital	_____	_____
Percentage of infants receiving DPT3P3 by 6 months	_____	_____
Percent of infants receiving measles vaccine by 12 months	_____	_____
Incidence of measles in OPD records	_____	_____
Percentage of elementary school children with a positive malaria smear.	_____	_____
Percent of children functionally blind at age of school entrance	_____	_____
Percentage of deliveries in which mother starts breastfeeding	_____	_____
Percentage of babies born prior to arrival at hospital	_____	_____
Percentage of 6-year-olds attending school	_____	_____
Percentage of 12-year-old girls attending school	_____	_____

RECOMMENDATION 4: STRENGTHEN THE HEALTH INFORMATION SYSTEM (HIS)

The current reporting system is fulfilling its designed functions in an exemplary fashion. To a certain degree the current level of data handling represents the culmination of the first 15 years of development. Future HIS development will require a reorientation of priorities and the development of a more interactive process of data collection and use. The following suggestions, based on a limited exposure to Oman and the current data system, are put forward for Ministry consideration.

Vital statistics (birth rate, infant mortality rate, death rate) are essential to health system management. Special surveys, done internally or with outside consultation, are needed. Of particular importance is demographic information that will allow better estimates of the denominators.

Epidemiologic capability is needed to analyze and increase use of existing data, to develop a response capability to investigate and control identified health problems, and to monitor progress in meeting health sector objectives needs expansion.

The current collection of information needs to be supplemented by the capability to respond to disease outbreaks and do emergency evaluations. This will require the development of an epidemiologist to provide a field-response capability and disease-analysis abilities for the current unit.

Personnel within the Ministry in Muscat and in the field as well as other government decision-makers need to be kept alert to the progress being made by the Ministry of Health, to significant health events, to new strategies of prevention and control, and to continuing education. For this purpose a monthly epidemiologic bulletin would be highly useful. It could contain statistical summaries and analyses of key health issues, continuing education on priority preventive and curative problem (e.g., prevention of dehydration, diagnosis and treatment of meningitis), reports from Ministry programs, and contributed items from field facilities. Immediate feedback is key to the upgrading of the current information system.

RECOMMENDATION 5: TRAINING OF TRAINERS

The Ministry of Health has a strong program to train health workers, concentrating on developing Omani health professionals. There is a need to provide widespread training to nurses and medical orderlies who have primary contact with mothers and children. At the time of the writing of this report, a course is being organized and conducted for Omani nurses.

This course is to train the nurses to train health workers. The Ministry recognizes that it can not continue to use out-of-country personnel to do training. The current course is a step towards developing a base of Omani nurses with the skills to train others, and to then identify others who in turn can become trainers. The Training of Trainers is emphasizing the elements of the concept of Primary Health Care as the subject matters that the trainers-to-be will use in training nurses and medical orderlies. This course should then be replicated by the participants, and an evaluation of the effectiveness of the training done. Assuming effectiveness, it would be wise to plan for extending the impact of the training into new subject matters such as growth monitoring.

RECOMMENDATION 6: GROWTH MONITORING

The element of a Child Health Program describe above that recurs the most frequently is growth and development. It is also the area that has had the least organized attention. It provides a framework for mothers to understand the care of their babies and helps peripheral health workers identify problems early and take corrective action before severe damage is done to the child. The growth of the child should be recorded on a record to be retained by the mother. This card contains not only growth information but serves as a multiple purpose card to record illnesses and immunizations. The card is only as good as the use to which the health care personnel put it. Therefore, prior to the card's widespread introduction health personnel must be trained in its use. A 7-10-day training course should be developed for nurses who have participated in the original Training of Trainers and for others identified during the previous training sessions. The cycle used for the Training of Trainers can then be restarted.

RECOMMENDATION 7: PROTOCOL DEVELOPMENT

The development of patient protocols for the management of ambulatory Primary Care will strengthen the maternal- and child-health program. The services for ambulatory maternal and child health or primary health care are widely accessible to the people of Oman, and are well utilized, however. There are few written protocols (policies and procedures). Written protocols make it easier to supervise workers and to evaluate their performance. Written protocols are essential to monitor performance of programs as well as of people. Ultimately, written protocols provide better care for the patient.

The Ministry of Health should give consideration to developing such protocols for the use in MCH and PHC, as has been done in several health services. These are best developed by the health staff that will use them, with guidance by a person who has previously developed such protocols.

PROPOSED FIVE-YEAR PLAN FOR CHILD HEALTH

A proposed five-year plan is visually presented as Figure 3a and b. The first year is given in greater detail, since any plan beyond a single Fiscal Year should allow for revisions based upon the first year's experiences.

The Recommendations presented above are all phased in during the first year. Beyond the Child Survival Survey, the timing of many of the actions will depend upon action on the first recommendation.

During the subsequent years the Child Survival Survey and Target Revision are recommended to be repeated annually. The Child Survival survey, after the first year, can become a routine, and will be important for monitoring overall progress in achieving a lowered infant mortality rate. The Targets need to be reviewed annually to detect areas that need redirection or strengthening. Home study in the Principles of Epidemiology should be continued for all medical officers who will be involved in public-health activities.

The monthly Epidemiologic Bulletin should also continue, with an effort being made to have reports from the regions included.

Biennial Training Courses for Trainers should be organized, and by 1988 the Omani trainers who have taken the course should be in a position to do the instructing without external assistance. The field courses on primary-health-care issues should continue to educate orderlies and nurses and in 1988 a new course in Community Sanitation should be developed and presented.

Protocol writing should be routine, until all aspects of primary maternal and child health have been addressed.

By 1988 the demonstrations of the use of growth monitoring in Muttrah and Rustaq should have developed significantly and be ready for expansion. The technique should be introduced on a gradual basis, starting with the well-baby clinics adjacent to hospitals. After this has been successfully accomplished, nationwide use of growth monitoring should be undertaken. At this time, use of the media, as has been done for immunization, would be appropriate, since the health-care staff will be prepared to respond to the public.

SUGGESTED IMPLEMENTATION SCHEDULE FOR FIRST YEAR
Figure 3a.

Activity	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov
Designate Coordinator	*									
Child-Survival Survey										
Develop and Pretest (1)	**									
Train (1)	*									
Field Test and Review		**								
Conduct Survey			****							
Analysis				**						
Set Targets										
Select Targets and Quantify			*****							
Field Review				****						
Finalize					*					
First Review of Progress										
Strengthen HIS										
Recruit Epidemiologist		*-----*								
CDC Training (2)							****			
Start Home Study							*-----*			
Publish First Bulletin									*	*
Training										
Trainers Course (3)	***									
Field Courses		*	*	*	*	*	*			
Evaluation (3)							***			
Develop and Present Growth Monitoring Course (3)								***		
Field Courses									*	*
Protocol Development										
Observational Travel (4)				**						
Methodology Consult (5)					***					
Protocol Writing # 1 (Well-Child Care e.g.)							*****			
Train Field to Use								**		
Implement									*****	
Evaluate										**

- (1) Short-term consultant
- (2) Training in Atlanta, Ga. USA
- (3) Short-term consultant
- (4) Overseas travel
- (5) Short-term consultant

SUGGESTED IMPLEMENTATION SCHEDULE FOR NEXT FOUR YEARS
Figure 3b.

Activity	1987				1988				1989				1990			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
Child-Survival Survey	*				*				*				*			
Review and Revise Targets		*				*				*				*		
Strengthen HIS																
CDC Training (1)		*														
Continue Home Study	*	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Continue Bulletin	*	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Evaluation of HIS (2)						*									*	
Training																
Trainers Course and Evaluation (3)						*									*	
Field Courses in Growth Monitoring	*	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Develop and Present Environmental Sanitation Courses (4)						*	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Protocol Development	*	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Institute Growth-Monitoring Demonstrations at 3-4 sites	*	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Expand to Hospital						*	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Media Campaign										*	---	*				
At Dispensaries (5)											*	-----	-----	-----	-----	-----
Evaluation (5)						*									*	

- (1) Short course at CDC to evaluate first training
- (2) External consultant from CDC
- (3) External consultant/trainer
- (4) External consultant/trainer
- (5) External consultant/epidemiologist/administrator

IMPLEMENTATION OF RECOMMENDATION 2

Develop a simple questionnaire and reporting form.

Pretest questionnaire and reporting form.

Develop a training program to train regional health workers in the method of use.

Conduct training in Muscat for regional medical staff.

Develop field data-collection methodology.

Train Ministry of Health staff in data collection

Time necessary.....1 month

Additional resources needed.....1 short-term
consultant epidemiologist

Hospitals collect data on trial basis

Time necessary.....1 week

Additional resources needed.....none

Analysis trial run for problems and correct such

Time necessary.....1 week

Additional resources needed.....none

Hospitals collect data

Time necessary.....1 month

Additional resources needed.....none

Analysis of data and prepare report

Time necessary.....2 weeks

Additional resources needed.....none

(Attachment A)

IMPLEMENTATION OF RECOMMENDATION 3

Select targets from Figure 1.

No external assistance is needed for this most important exercise. When a senior person is designated as the coordinator of the maternal- and child-health activities that person's first duty should be to determine which goals are to be used and, in conjunction with staff from the various directorates, set targets for achieving those goals.

For a few goals, the current status will not be known with accuracy. Where this is the case, the best possible estimate should be made by the staff, and methods devised to develop the information and monitor the trend.

Time necessary.....2 months

After these targets have been set for the Sultanate, each region should be asked to do the same for their area. This will ensure involvement and understanding of the need for setting goals.

Time necessary.....2 months

Annual reviews of the progress towards the goal should be held at a regularly scheduled meeting, prior to the beginning of a fiscal year, so that reallocation of resources between programs can be done if necessary.

IMPLEMENTATION OF RECOMMENDATION 4

Identify a physician knowledgeable about the health situation in Oman who has had epidemiologic experience and provide short term training at CDC.

CDC conducts an annual (July) course in epidemiology and statistics. The first week of the course on epidemiologic methods is carried out as part of the regular training of CDC Epidemiologists. During the second and third weeks, international problems and exercises are utilized to develop epidemiologic and statistical skills.

Assign that individual to be responsible for developing a response capability to abnormal epidemiologic conditions, for organizing an improved morbidity reporting system, for monitoring progress towards fulfillment of the Targets set for Child Health, and for developing a monthly statistical newsletter with not only data but also narrative interpretations of such data.

Begin utilization of home study courses available from CDC. Course materials are studied at the students own pace. When the student completes the course, attainment of acquired skills is documented through a proctored examination. An example of a course that might be useful for Oman is the Principles of Epidemiology (Physicians at Public Health Units). The Ministry of Health Training Unit would need to evaluate this course for local relevance. (Attachment B)

IMPLEMENTATION OF RECOMMENDATION 5

Prepare course material and develop presentations

Present course in Muscat and visit field to observe implementation.

Time necessary.....6 weeks

External assistance.....short-term consultation by nurse/trainer.

Presentation of three-day courses by Omani trainees

Output360 trained Omani orderlies
(15 trainees/course*6courses*4 trainers)

Evaluate and develop growth-monitoring course

Time necessary.....6 weeks

External assistance.....Subject matter specialist
and nurse/trainer

IMPLEMENTATION OF RECOMMENDATION 6

The key element in growth monitoring is the systematic contact with every mother and child during which contact a child-growth card is initiated, upon which is recorded not only the weight of the child, but also other pertinent facts of its medical history and immunizations. This card must be kept up to date if it is to be of use. The card must be used in a standardized fashion, so if the mother goes from one provider to another, the information will remain constant and useful.

It is not just the recording of the information on the card that is important; it is also the communication of that information and its meaning to the mother, and the provision to the mother of advice on prevention of health problems that the monitoring anticipates.

Along with the training of health personnel, it is necessary to develop methodology of implementation. The projects in Muttrah and Rustaq can be used for this purpose, but there is a real need to document the methods that are being used there. In these projects, attempts should be made through medical orderlies to enter into village discussions about growth monitoring rather than depending upon one-on-one consultation by the doctor/nurse. This gives further impetus to the need for training.

Training should include the following:

Training of the Trainers

- 1) Health and Community Participation
- 2) Child Health as a Community Concern
- 3) Use of Growth Charts and Monitoring
- 4) How to Calibrate Scales and Weigh
- 5) Planning, Programming and Evaluation
- 6) Breastfeeding, Weaning, ORT
- 7) Training the Orderly in Monitoring

Training of the Orderly

- 1) Malnutrition
- 2) Food, Health and Growth
- 3) Use of Scales and Charts
- 4) Interpreting the Growth Chart
- 5) Educating the Mother
- 6) Breastfeeding, Weaning and ORT

Education of the Mother

- 1) Role of Mother in Child's Health
- 2) Food, Health and Growth
- 3) Weight as Indicator of Health
- 4) Breastfeeding, Weaning and ORT

(Attachment C)

IMPLEMENTATION OF RECOMMENDATION 7

The training of senior staff members in the techniques of protocol writing. This should be done in overseas institutions that have already adopted protocols.

Time needed.....2-4 weeks
Resource needed.....Short-term overseas training

Protocol development by senior Omani staff with in-country consultation by a person experienced in protocol development, not necessarily in the subject matter.

Priority in selecting subjects for protocols to use those of importance in primary MCH.

Time necessary (Omani senior staff).....Ongoing
External resource.....4 weeks of short term consultant
Output.....4 protocols/year
(Well-child care
Prenatal care
Febrile disease care, as examples)

(Attachment D)

CHILD HEALTH REPORT

1. INTRODUCTION

A. Members of group

David J. Sencer. MD, MPH, Management Sciences for Health
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B. Terms of reference

The scope of work for the team was to assist in the drafting of recommendations for a five year child health plan. It was to build upon the already significant Omani accomplishments and emphasize methods by which existing resources could be better used. Achievable goals with milestones were to be emphasized. In addition, specific advice on growth monitoring was to be included, particularly the feasibility of using it in Oman. Specific attention was to be paid to the program of ORT, examining its impact upon the health of Omani children. Finally, through Dr. Foster, considerations of collaboration with CDC were to be explored.

C. Itinerary

Health services at all levels were observed during the team's stay in Oman. Tertiary care facilities in the Capital and Salalah, district hospitals in Nizwa, Sur and Rustaq; health centers in Wadi b.b. Hassan and Wadi b.b. Ali, dispensaries in the Dhofar, the Rural Health Service in Salalah, and prenatal clinics in Rustaq, Muttrah and Sur--these sites were visited by the team.

2. CHILD HEALTH SERVICES IN OMAN

A. Ministerial Organization

This report will not duplicate the many excellent descriptions of the Ministry of Health that exist, but rather try to identify within the Central Ministry key areas concerned with Maternal and Child Health.

- 1) Directorate of Statistics, Planning and Follow-up
Responsible for the collection and analysis of all data submitted from the other Directorates.
Responsible for planning and evaluation activities.

2) Directorate of Preventive Medicine

MCH Centers

National Health Programs

Expanded Program of Immunization

National Tuberculosis Control Program

Program for the Prevention of Blindness

Diarrheal Control Program

Malaria Control Program

School Health Section

Health Education Section

Public Health Compounds

Provide immunizations

Provide prenatal services occasionally

Provide school health inspections

Mobile Services

Provide immunization on house-to-house basis

Provide malaria treatment to water impoundments

Provide field screening for trachoma

3) Directorate of Curative Services

Hospitals (which now include Health Centers)

Provide immunizations

Provide basic mother/child treatment

Provide obstetrical service

Provide prenatal service

Dispensaries

Provide immunizations

Provide primary treatment for children/mothers

Provide some prenatal service

Provide some community health education

Rural Health Services

Provide immunizations

Provide primary treatment for children/mothers

Provide some prenatal advise

Provide some community health education

The above might be interpreted as duplication of effort. The team believes, however, that the ready availability of preventive services is a good, cost-effective use of resources.

The rapid improvement and proliferation of services can, however, lead to problems in the future. As can be seen, all parts of the Ministry of Health are involved in the provision of services to mothers and children. There is, however, no central coordination of those services, no single office that assures that all the programs in the different Directorates are reaching all the mothers and children. This informal system has worked well during the past several years, but with more children surviving the fatal infectious diseases, there will be greater need for coordination between the preventive and curative services.

While the Terms of Reference for the Child Health Team of the Joint Commission do not include responsibility for organizational recommendations, all members of the team believe that if a child health program is to prosper there needs to be established within the Ministry an Office responsible for the health of mothers and children. This becomes of greater importance with the formation of the National Committee on Child Care. The Ministry of Health now has a preeminent role on that Committee and if it is to fulfill its responsibilities, there needs to be a senior obstetrician or pediatrician responsible for implementation of all child-care activities.

B. OPERATIONAL DESCRIPTIONS OF KEY PROGRAMS FOR MCH

1) National Health Programs

a) Expanded Program of Immunization

EPI strategies are outlined in a simple comprehensive manual of operating procedures (SOPs). 1986 targets are for 80% coverage in under ones, 80% coverage in under-sixes, and 100% coverage of pregnant women. Vaccines are being delivered at all fixed facilities (preventive and curative) on a daily basis and by mobile preventive teams.

Current immunization schedule calls for BCG at birth, DPT and polio at 3, 5, and 7 months, measles at 9 months and TT to pregnant and fertile-age women. A change to the WHO-recommended and epidemiologically more relevant child-immunization schedule of BCG and Polio at birth, DPT and Polio at 6, 10, and 14 weeks (alternatively 2, 3, and 4 months) and measles at 9 months is projected for early 1986. Schedule also calls for boosters at 19 months (DPT and polio), 6 years (DT), and 12 years (TT).

Immunization data are recorded on patient held cards, facility record books, monthly reports, and a variety of other places. It is estimated that 30,800 children at age one are immunized against measles.

Estimates of the under-one target population range from 50,000 to 100,000. Using data from the 1983 EPI-coverage survey, the EPI under-one target population for 1986 is estimated at 60,000. This would give an estimate of 70% coverage for measles at age 1 year.

Data on disease incidence are available from two sources, routine and reporting from the curative services and from 12 sentinel inpatient facilities. All of these reports indicate a major reduction in measles.

Field staff were knowledgeable about and committed to immunization. At each level (preventive, curative, mobile), specific individuals had been trained in and were responsible for immunization. Vaccines are available daily at preventive and curative services. All patients coming to curative services are screened for immunization. All requiring immunization, except those requiring hospitalization, are immunized. Prenatal care routinely includes the administration of TT. Cold chain as observed in the field was excellent. (Attachment E)

b) Control of Diarrheal Disease

Significant advances have been noted in the control of diarrheal diseases. It is noteworthy that all of the recommendations in the 1984 Report by WHO have been acted upon.

All health workers interviewed by the team knew how to instruct mothers in the use of ORT. Interviews in the rural areas indicated that there is a high degree of knowledge by mothers of the appropriate use of ORT. Results of the ORT survey currently being processed should confirm this impression.

As in the EPI, a Working Plan exists and is used. The Annual Report shows that there is more than adequate management of acute diarrheal diseases through the network of hospitals, dispensaries, public-health compounds and health units in the country.

The guidelines of the World Health Organization are followed, and a "Manual for the Prevention and Treatment of Acute Diarrhea" has been prepared and is used. The recommended WHO/UNICEF sachets of Oral Rehydration Salts are widely distributed and successfully used. Training activities involving physicians, nurses, auxiliary personnel, medical orderlies, and, to a lesser extent, mothers have been undertaken and continue. The reduction in diarrheal-disease mortality was significantly in excess

of the original target set. This reduction is apparent from the mortality records examined in hospitals and reported above. (Attachment E)

3. STATUS OF CHILD HEALTH IN OMAN

A. Mortality

The health of Omani children is undoubtedly far better than the most current statistics would indicate. Infant mortality rates are considered the most sensitive index of the over-all status of health. Although other key indicators exist, child survival is the most significant, since priorities differ with the level of mortality. At levels over 80 deaths per 1000 live births, infectious disease are the number one priority. As infant mortality drops below 60, prenatal and perinatal care take on priority. Thus documentation of current mortality is essential for planning, for setting priorities, and for the monitoring of progress.

The Sultanate of Oman has obviously made spectacular gains in the past five years in improving child survival as reflected in observations by all members of the team. The published figures for the Sultanate indicate that the IMR was 115 in 1983. The team would estimate that the IMR is now actually closer to 60! A truly remarkable accomplishment!

This estimate is based upon examination by team members of the patterns of death in five hospitals. This review indicates that children are not dying of preventable infectious disease at a high rate, that measles and dehydration rates are low in hospital records, and that few cases of obvious malnutrition were observed.

CAUSE OF MORTALITY IN 249 UNDER SIX HOSPITAL DEATHS 1985

Cause	Number	Percent
Prematurity	69	27.7
Neonatal Asphyxia	12	4.8
Congenital Defects	25	10.0
Birth Injuries	2	0.8
Bronchopneumonia	42	16.9
Measles	10	4.0
Gastroenteritis	20	8.0
Infection Other	26	10.4
Malnutrition with		
Gastroenteritis	9	3.6
Bronchopneumonia	7	2.8
Septicemia	4	1.6
Accidents	4	1.6
Malignancy	1	0.4
Other	11	4.4

Although the estimated IMR could be further calculated from the results of the survey done by the Control of Diarrheal Disease Program, neither of these estimates is of statistical validity, and should not be used for planning without substantiation by another method described below.

B. Morbidity

1) Immunizable diseases

Of the six diseases preventable by immunization three contribute significantly to child morbidity: neonatal tetanus, measles, and pertussis. Poliomyelitis with its acute and long-term disability is also a major concern. In a review of 176 under-five deaths in four hospitals, neonatal tetanus was the cause of two deaths, 1.1%, and measles was responsible for 9 deaths, 5.1%. In children in the measles risk group, 8 months to five years, measles was responsible for 9 of 46 deaths, 19.6%.

2) Diarrheal Disease

One will not expect a great reduction in the actual occurrence of diarrheal disease, until there is great improvement in local sanitation and abundant clean drinking water. Therefore, the morbidity that one measures in determining the effectiveness of a diarrheal control program is the reduction in severe dehydration. Our team studied the records of hospitals, clinics and other health establishments, all of which showed a very low case fatality in outpatient and hospitalized cases throughout the regions visited. In Nizwa where data were kept in a manner that allowed a review, there were 22,788 cases of diarrheal disease recorded, only 14 children sick enough to be referred for care elsewhere, and but 2 deaths during 9 months of 1985.

A considerable reduction in the number of deaths due to diarrhea was evident in the records of 1985, as compared with the figures given in the the 1984 "Annual Statistical Report" (Directorate of Statistics, Planning and Follow-up, 1984).

One important consideration is that diarrheal diseases no longer occupy first or second place as a cause of death among children under five, yielding to respiratory diseases, immaturity and perinatal problems, more typical of transitional societies. Another important consideration is the decline in severe malnutrition and related

complications, which in all probability must have been related to the reduction in diarrhea morbidity.

3) Nutrition

There is no systematic scientifically valid collection of morbidity information related to nutritional status that has scientific validity. To undertake such a survey would be exceedingly costly and contribute little to the planning process for child health. There will be useful data on breastfeeding and weaning in the survey currently being processed. There is no widespread serious malnutrition (one child seen that was severely malnourished also had measles, and yet lived only twenty minutes from Qaboos Hospital in Salalah). Physicians all stated that they thought that malnutrition contributed to overall illness. The changing economy with the ready availability of foods can be a mixed blessing. It brings good foods to the people, but it also introduces non-nutritious foods and commercial weaning powders. Mothers and health care-workers who fail to understand the importance of breastfeeding as a means to prevent illness all contribute to a problem of unknown magnitude.

4. ELEMENTS OF A CHILD HEALTH PROGRAM

A healthy child begins before it is born. Therefore a child-health program has to include service not just to children and pregnant women but to young people before they conceive.

Figure 2 is a schematic plan of a child-health plan that would be appropriate to Oman with its health system, services and disease situation. A child-health program can be organized and managed according to the physiological age of the persons served and the type of service needed. In general the ages are adolescents, prenatal, natal, postnatal, infancy, toddlers and school age. The services are educational, curative and preventive.

This schema becomes important in deciding what skills need to be developed for different services and where the services are rendered.

Of the activities that recur frequently, ORT, immunization, malaria, blindness and growth monitoring--all are well advanced in Oman except growth monitoring. Therefore, before widespread community programs are developed on growth monitoring, it becomes important to have the health services well trained. The training programs recommended take this into account. (Attachment F)

SCHEMATIC CHILD HEALTH PLAN
Figure 2.

AGE	----->	A D O L E S	P R E N A T A L	N A T A L	P O S T N A T A L	I N F A N T	T O D D L E R	S C H O O L A G E
<u>ACTIVITY</u>								
<u>Educational</u>								
Personal hygiene		xx						xx
Parenting		xx						xx
Pregnancy nutrition			xx					xx
Pregnancy danger signs			xx					
Breastfeeding			xx	xx				
Weaning				xx	xx			
ORT				xx	xx	xx	xx	
Growth monitoring				xx	xx	xx	xx	
Accident prevention						xx	xx	
<u>Examination</u>								
Vision		xx				xx	xx	xx
Growth monitoring					xx	xx	xx	
OB/GYN			xx	xx	xx			
<u>Immunization and therapy</u>								
EPI recommendations		xx	xx		xx	xx	xx	xx
Malaria		xx	xx					xx
Eyes		xx					xx	xx

5. ELEMENTS OF PRIMARY HEALTH CARE

- * Maternal and child health services
- * Control of locally endemic disease
- * Optimal nutrition
- * Basic treatment services
- * Environmental sanitation
- * Safe drinking water
- * Community motivation
- * Upgrading and expanding community health workers

There is a great deal of literature about how these elements of PHC should be implemented. In many countries local untrained village persons have been recruited and provided basic training in the elements of primary health care. They take the place of trained nurses and doctors in screening for minor illness, providing immunization, and doing community education. It is the general recommendation of the team that the current system of providing peripheral basic services is good and should not be changed for the sake of making it conform with systems elsewhere. The health status of the Omani people has been so drastically improved in a short period of time that it has surpassed other changes in the social scheme, e.g., education and community development. The current health care system is doing such a good job that it should be able to continue to aid in the improvement of health status without additional staff or facilities. This can be accomplished by training and improved management as discussed in this report.

6. RECOMMENDATIONS FOR STRENGTHENING CURRENT PROGRAM

A. Infant Mortality Assessment

It is essential that the apparent decline in infant mortality be documented with statistical validity immediately for two purposes:

- * To provide the basis for planning for the next five years;

- * To demonstrate how effective the Ministry of Health programs have been.

A simple technique estimates mortality under two and under five and can be simply derived from two questions asked of all mothers delivering at health facilities. Mothers are asked as to the current status (alive or dead) of their last live birth and the one preceding that. This technique is especially well suited to Oman where an estimated 70-80 % of deliveries occur in or on the way to health facilities. Statistically valid estimates would require data on at least one thousand previous births. With current inpatient deliveries in Oman averaging 3000 births per month, a one month collection of data from all institutions delivering

babies would provide an accurate estimate of current child mortality. Annual repeat surveys would facilitate assessing progress over time.

The Ministry of Health should consider implementing the described survey as soon as possible. A plan of action follows:

A simple questionnaire and reporting form would need to be developed, pretested and evaluated. Pretesting should be carried out by staff expected to conduct the study during its field implementation. Once pretesting, revision, and confirmatory pretesting, if necessary, is carried out, a national mortality assessment could be carried out in three months (one month training, one month implementation, and one month data analysis). As noted in the report, basic data can be hand tabulated.

External resources necessary:

A short-term consultant (1 month) to:

- 1) Develop an instrument to collect data from each health facility that has obstetrical beds. The instrument shall be developed in colloquial Omani. It shall be simple enough for an Omani health worker to determine from each woman who delivers a live baby, if her preceding delivered baby is alive and if the one preceding that is alive.
- 2) Develop a training program to train regional health workers (5-15) in the survey's rationale use.
- 3) Conduct training in Muscat for regional medical staff.
- 4) Develop transmittal letter for the Ministry directing all facilities to participate and instructing them about how they are to participate. Develop logistics of assuring that all facilities have the instrument and that the regional trainees follow through with their respective facilities.
- 5) Develop field data-collection methodology.
- 6) Train Ministry of Health staff in data collection
- 7) Monitor first week's activity

Following those activities led by a consultant the Ministry could implement the survey the next month.

B. Health Information System (HIS)

The current reporting system is fulfilling its designed functions in an exemplary fashion. To a certain degree the current level of data handling represents the culmination of the first 15 years of development. Future HIS development will require a reorientation of priorities and the development of a more interactive

process of data collection and use. The following suggestions, based on a limited exposure to Oman's data system, are put forward for Ministry consideration.

1. Vital statistics (birth rate, infant mortality rate, death rate) are essential to health system management. Special surveys, done internally or with outside consultation, are needed.

2. Epidemiologic capability needs expansion to analyze and increase use of existing data, to develop a response capability to investigate and control identified health problems, and to monitor progress in meeting health sector objectives needs expansion.

3. The current collection of information needs to be supplemented by the capability to respond to disease outbreaks and do emergency evaluations. This will require the development of an epidemiologist to provide a field response capability and disease-analysis abilities to the current unit.

4. Personnel within the Ministry in Muscat and in the field as well as other government decision makers need to be kept alert to the progress being made by the Ministry of Health, to significant health events, to new strategies of prevention and control, and to continuing education. For this purpose a monthly epidemiologic bulletin would be highly useful. It could contain statistical summaries and analyses of key health issues, continuing education on priority preventive and curative problems (e.g., prevention of dehydration, diagnosis and treatment of meningitis), reports from Ministry programs, and contributed items from field facilities. Immediate feedback is key to the upgrading of the current information system.

C. Strengthen Capabilities of Omani Staff by Training

1) Training of trainers

The Ministry of Health has a strong program to train health workers. This should and does concentrate on developing Omani health professionals to provide the leadership necessary. At the same time there is a need to provide widespread training to nurses and medical orderlies who have primary contact with mothers and children. At the time of the writing of this report a course is being organized and conducted for Omani nurses. This course is to train the nurses to train health workers. The Ministry recognizes that it can not continue to use out-of-country personnel to do the training; this is the first step towards developing a base of Omani nurses with the skills to train others, and then to identify others who in turn can become trainers.

The training of trainers is emphasizing elements of Primary Health Care as subject matters that the trainers-to-be will cover in training nurses and medical orderlies. This course should then be replicated by the participants, and an evaluation of the effectiveness of the training done. Assuming effectiveness, it would be wise to plan for extending the impact of the training into new subject matters such as growth monitoring.

2) Training in use of growth monitoring

The element of a Child Health Program described above that recurs the most frequently is growth and development. It is also the area that has had the least organized attention. It provides a framework for mothers to understand the care of their babies and helps peripheral health workers identify problems early and take corrective action before severe damage is done to the child. The growth of the child should be recorded on a record to be retained by the mother. This card contains not only growth information but serves as a multiple purpose card to record illnesses and immunizations. The card is only as good as the use to which the health care personnel put it.

This card must be kept up to date if it is to be of use. The card must be used in a standardized fashion, so if the mother goes from one provider to another, the information will remain constant and useful.

It is not just the recording of the information on the card that is important; it is also the communication of that information and its meaning to the mother, and the provision to the mother of advice on prevention of health problems that the monitoring anticipates.

Along with the training of health personnel, it is necessary to develop a methodology of implementation. The projects in Muttrah and Rustaq can be used for this purpose, but there is a real need to document the methods that are being used there. In these projects, attempts should be made through medical orderlies to enter into village discussions about growth monitoring rather than depending upon one-on-one consultation by the doctor/nurse. This gives further impetus to the need for training. Therefore, prior to the widespread introduction of growth monitoring health personnel must be trained in its use. A 7-10 day training course should be developed for the nurses who have participated in the original Training of Trainers and for others identified during the previous training sessions. The cycle used for the Training of Trainers can then be restarted. Details of the material for the course are attached.

D. PROTOCOL DEVELOPMENT

The services for ambulatory maternal and child health or primary health care are widely accessible to the people of Oman, and are well utilized. Immunizations are available in all static curative services, as well as in public health compounds and mobile teams. The oral rehydration has been well accepted by the people. Efforts are being started to utilize growth charts. Antenatal clinics exist. A few post-partum clinics are in existence. The operation of these are, however, largely at the discretion of the medical officer in charge of the facility. However, there are few written policies and procedures. Written policies and procedures make it easier to supervise workers, and to evaluate their performance. Written policies and procedures are essential to monitor performance of programs as well as of people. Ultimately, written protocols provide better care for the patient.

Many health services are developing and using so-called "protocols". The Ministry of Health should give consideration to developing such protocols for the use in MCH and PHC. These are best developed by the health staff that will use them, with guidance by a person who has previously developed such protocols.

If the Ministry should decide to do so, training of representatives of the senior staff in the techniques of protocol writing would be the first step. Priority should be given to protocols dealing with the activities outlined in the elements of a child health program. This would be followed by in-service training of the junior staff in their use. This could best be accomplished by short-term training or observation by senior Omani staff in a country where these have been successfully introduced, followed by in-country consultation by a person skilled in protocol writing (2 - 4 weeks), with continued in-service training of the junior medical staff in the use of protocols. (New York City is a possible resource, since the municipal hospitals there have adopted such protocols to use with the large numbers of expatriate junior medical staff employed in those hospitals. If the Ministry of Health is interested in following this suggestion, the team leader will gather examples of protocols and provide them to the Ministry.)

E. The Expanded Program of Immunization

Although an EPI program review is not scheduled until early 1987, a single 30-cluster national coverage survey early in 1986 is recommended. Such a survey should include appropriate proportions of settled and nomadic populations. This type of survey is simpler than the excellent survey done on diarrheal disease, since fewer people are needed in the sample. It is recommended that the EPI undertake this since information gathered can also be used in monitoring the goals set for MCH (see below). (Dr. Foster's other recommendations should be considered by the Ministry in collaboration with WHO.)

F. Nutrition

Rather than starting with a recommendation to do something, the first recommendation regarding nutrition would be not to do a survey. The single most important activity would be to begin to introduce growth monitoring as a concept. The training necessary for this has been described above. The demonstration project at Rustaq and the program in Muttrah should be followed carefully to identify activities that should be changed, and to develop methods of translating these programs to other parts of the country. (Attachment F)

7. DEVELOPMENT OF GOALS FOR PLAN

A. Establish Goals

Before a plan can be developed, health services need to have goals. To develop a plan without goals is similar to having a map, but not knowing your destination.

The goal for a Maternal and Child Health Program would be the reduction of infant mortality and morbidity. But by how much? To decide on the goal it is convenient to establish targets that can be measured. These targets should be key indicators of health that will determine infant mortality and morbidity. The measures should be in health outcomes, not activities. The percent reduction in measles is an outcome, the number of injections is only an activity. Goals and targets should be publicly stated and must be explained to and understood by health workers. Having goals and targets keeps one on the map and prevents needless detours. Goals and targets help prevent certain programs from continuing too long, and identify programs that may be ineffectual. No health service can afford either of these situations to develop.

A list of suggested targets follows as Figure 1.

SUGGESTED TARGETS
Figure 1

	1986	1990
Percentage of mothers with 2 doses tetanus toxoid	_____	_____
Percentage of inpatient deliveries that are less than 2500 grams	_____	_____
Percentage of deliveries with trained attendant	_____	_____
Percentage of 18 month olds > _____gms	_____	_____
Percentage of mothers only breastfeeding at 6 months	_____	_____
Hospital admissions for severe dehydration under 5 years of age	_____	_____
Percentage of deliveries in hospital	_____	_____
Percentage of infants receiving DPT3P3 by 6 months	_____	_____
Percent of infants receiving measles vaccine by 12 months	_____	_____
Incidence of measles OPD records	_____	_____
Percentage of elementary-school children with a positive malaria smear.	_____	_____
Percent of children functionally blind at age of school entrance	_____	_____
Percentage of deliveries in which mother starts breastfeeding	_____	_____
Percentage of babies born prior to arrival at hospital	_____	_____
Percentage of 6-year-olds attending school	_____	_____
Percentage of 12-year-old girls attending school	_____	_____

No external assistance is needed for this project. If a Coordinator for the Maternal and Child Health Program is designated, he in cooperation with the Primary Care Committee should determine which goals are to be used and set targets for achieving the goals.

For a few goals, the current status will not be known with accuracy. Where this is the case, the best possible estimate should be arrived at by the staff, and methods devised to develop the information and monitor the trend. After these targets have been set for the Sultanate, each region should be asked to do the same for their area. This will ensure their involvement and their understanding of the need for setting goals.

Annual reviews of the progress towards the goals should be held at a regularly scheduled meeting, prior to the beginning of a calendar/budget year, so that reallocation of resources between programs can be done if necessary.

10. SUMMARY

The health status of Omani children has been remarkably improved over the past five years. Further improvement will take place with the current programs that operate. That improvement can be speeded markedly without major expense or change in method of operation. The salient recommendations to accomplish this are:

- * Establish a central responsible position for MCH
- * Determine infant survival rate
- * Set goals
- * Strengthen Health Information System
- * Establish outcome targets
- * Train Omani nurses in methods of training so that they may train others to be trainers and train nurses and medical orderlies in concepts of Primary Health Care, particularly growth monitoring
- * Gradually institute growth monitoring as a tool to coordinate maternal and child care
- * Develop protocols for the management of ambulatory Primary Care

These recommendations which appear throughout the report are brought together with an implementation plan for improving child health in the Executive Summary.

ATTACHMENT A

PROPOSAL FOR RAPID APPRAISAL OF CHILD MORTALITY IN OMAN
Stanley O. Foster, MD, Centers for Disease Control

His Excellency the Sultan of Oman and his government are committed to the health of Omani children. The official launching of the National Child Health Plan on January 15, 1986, demonstrates the priority being placed on child health. Effective implementation of this plan requires a current understanding of the status of child health. Such data are needed to establish current levels of health, to provide a basis for establishing targets, and to provide a reference point for measuring progress.

The most commonly used indicator of child health is infant mortality. Determination of this indicator requires a system of birth and death registration, prospective community surveys, or population based demographic surveys. Such techniques, although needed and desirable, are not currently available in Oman. Recently Brass and Macrae have developed a simplified technique in which estimates of mortality under two and under five can be simply derived from two questions asked of all mothers delivering at health facilities or seen during the first few months of life e.g., during BCG immunization. Specifically mothers are asked as to the current status (alive or dead) of their last and next-to-last live births. This technique is especially well suited to Oman where an estimated 70-80 % of deliveries occur in or on the way to health facilities. A summary of the methodology is enclosed.

Statistically valid estimates would require data on at least one thousand previous births. With current inpatient deliveries in Oman averaging 3000 births per month, a one-month collection of data from all institutions delivering babies would provide an accurate estimate of current child mortality. Annual repeat surveys would facilitate assessing progress over time.

Should the Ministry of Health decide to carry out the rapid appraisal, a simple questionnaire and reporting form would need to be developed, pretested and evaluated. Pretesting should be carried out by staff who are expected to conduct the study during its field implementation. Once pretesting, revision, and confirmatory pretesting, if necessary, is carried out, a national mortality assessment could be carried out in three months (one month training, one month implementation, and one month data analysis). As noted in the report basic data can be hand-tabulated.

DRAFT FORM FOR RAPID APPRAISAL OF CHILD MORTALITY IN OMAN

Facility _____ Date Started _____ Date Finished _____

Date	Mother ID	Mother Age	Last Birth	Previous Birth
			Alive	Dead
			Alive	Dead
Totals				

Calculations at National Level

 UNDER-TWO MORTALITY PER 1000 LIVE BIRTHS

Last Births Alive _____
 + Last Births Dead _____
 = Total Last Births _____

Under-2 mortality equals Dead divided by Total times 1000

 UNDER-FIVE MORTALITY PER 1000 LIVE BIRTHS

Previous Births Alive _____
 + Previous Births Dead _____
 = Total Previous Births _____

Under-5 mortality equals Dead divided by Total times 1000

ATTACHMENT B

CENTERS FOR DISEASE CONTROL, ATLANTA, GEORGIA USA
BACKGROUND INFORMATION
Stanley O. Foster, MD, Centers for Disease Control

The Centers for Disease Control is the United States Government Agency responsible in coordination with state and local authorities for disease surveillance (epidemiology, laboratory diagnosis, and control), training in epidemiology and disease control, and reference-laboratory support. Thirty-two CDC laboratories have been designated as WHO Reference Centers. Located in Atlanta, Georgia, with other major facilities in Cincinnati, Ohio, Morgantown, West Virginia, and Fort Collins, Colorado, CDC has expanded beyond its original infectious-disease mandate to serve as the national focus for disease prevention. Its breadth of mission can be briefly summarized by its major organizational units.

Epidemiology Program Office--Epidemiology training, national and international epidemic investigation and control, Morbidity and Mortality Weekly Report (MMWR)

Laboratory Program Office--Laboratory training, laboratory quality control, laboratory-service planning, and evaluation

International Health Program Office--Coordination of international health activities, technical cooperation in child-survival activities

Center for Infectious Disease--Disease epidemiology, laboratory diagnosis, disease control, laboratory-reference services, laboratory research

Center for Preventive Services--Support to state health departments in disease prevention and control including immunization, sexually transmitted diseases, and tuberculosis

National Center for Occupational Health--Occupational health, occupational safety, risk assessment, and prevention

Center for Environmental Health--Environmental hazards, perinatal mortality, chronic diseases

Center for Health Promotion--Disease prevention including reproductive health, nutrition, and health education

Center for Professional Development and Training--Training development, implementation, and evaluation

CDC is a domestic agency. Its international activities are carried out under the sponsorship of the Department of State, USAID, WHO, and UNICEF. Annually CDC participates in 300 international consultations. About 800 internationals visit CDC for short- or long-term training.

POTENTIAL OPTIONS FOR SULTANATE OF OMAN MINISTRY OF HEALTH
COOPERATION WITH THE CENTERS FOR DISEASE CONTROL, ATLANTA USA

CDC provides a broad range of training and technical cooperation services. Listed below are examples of the types of services that cooperating countries have utilized.

TRAINING AT CDC

Appendix I summarizes scheduled CDC training courses for 1986. As enrollments are limited, early application is recommended.

TRAINING IN OMAN

Subject to the availability of resources, CDC conducts many of the listed courses in other countries. Examples of courses given internationally include: Hospital Infection Control and Enteric Disease Diagnosis.

HOME STUDY COURSES

CDC has developed a series of Home Study Courses (Appendix II). Although these courses have a domestic orientation, many countries have found them useful for, local training. Course materials are studied at the students own pace. When the student completes the course, attainment of acquired skills is documented through a proctored examination. Examples of courses that might be useful for Oman include: Principles of Epidemiology (Physicians at Public Health Units), Vector-borne Disease Control (Malaria Units). The Ministry of Health Training Unit would need to evaluate these courses re local relevance.

SECTOR ANALYSIS RE TRAINING NEEDS AND TRAINING

CDC frequently works with states and other countries to identify training needs and to develop training programs to meet those needs. Areas of potential interest for Oman might include Laboratory Services and Occupational Health.

EPIDEMIOLOGY TRAINING

CDC conducts an annual (July) course in epidemiology and statistics. The first week of the course on epidemiologic methods is carried out as part of the regular training of CDC Epidemiologists. During the second and third weeks international problems and exercises are utilized to develop epidemiologic and statistical skills. CDC also works with countries to develop their own epidemiology training programs.

TECHNICAL CONSULTATION

CDC provides epidemiologic consultation through the Department of State (USAID) or UN Agencies. These consultations cover a wide

range of emergency disease problems, eg., Malathione poisoning in Pakistan, cholera in Mali, meningitis in Nepal; or locally identified health problems, eg., hospital infections, resistant malaria, perinatal mortality.

HEALTH INFORMATION SYSTEM DEVELOPMENT

CDC is currently working with several countries to strengthen their Health Information Systems. Types of assistance include an analysis of information needs, the review of current systems of data collection and use, the design of epidemiologic services, assistance in the development of analytic methodologies, and the training of personnel.

Brief Description

Pediatric Protocol System

Over the past five years, the New York City Health and Hospitals Corporation, working the Fund for the City of New York, has installed the pediatric protocol system in five municipal hospitals, Kings County, Metropolitan, Coney Island, Queens and North Central Bronx/Montefiore. The experience at these sites has been positive, with strong medical staff acceptance and clear evidence of improvements in the process of health care delivery. On July 1985 the Board of Directors of the Health and Hospitals Corporation (HHC) approved the expansion of the pediatric protocol system to the six remaining hospitals.

The pediatric protocol system is designed to improve the quality and management of pediatric ambulatory care through two types of activities. First, it assists physicians in defining standards of recommended practice based upon the scientific literature, expert consensus, and their own view of what constitutes good care in their settings. These self-defined standards are then used as a baseline for quality assurance activities, supervisory review and continuing medical education. Second, the protocol system provides physicians with an extensive data base and management information system with which to track how care is being delivered.

The three major components of the pediatric protocol system are: guidelines specifying recommended care for most of the acute care problems managed in a pediatric ambulatory care settings; structured patient charts; and a computerized management information system which captures most of the data from the charts and which generates regular reports assessing physician practice in relation to the guidelines and profiling population and utilization patterns.

Work leading to the implementation of the pediatric protocol system at a hospital occurs in three phases. The development phase chiefly involves working with medical staff to adapt the guidelines and computer algorithms to suit the needs of the individual hospital; unless each hospital's staff feel the system meets their own needs, they will not use it effectively.

Next comes the implementation phase in which project staff: a) work with hospital clinical leadership in training physicians and nurses to use the system in the clinical care process; b) work with administrative staff to address operational problems (e.g., retrieval of charts or lab slips); and c) set up the computerized auditing and reporting systems.

Finally, a follow-up phase of technical assistance is provided by project staff to assure successful integration of the program into the life of the service. It takes an average of 18 months to complete installation of the system at each hospital.

The experience at five municipal hospitals has demonstrated that the pediatric protocol system addresses a number of important needs of HHC ambulatory care facilities. HHC clinics and emergency rooms are busy, often resource-starved settings serving a predominantly poorly and medically needy population. These are large facilities whose scale and complexity require better operating systems and information.

Supervising pediatricians use the system's guidelines and monthly management reports to identify issues for follow-up and to guide feedback and continuing medical education. For attending pediatricians, the system offers increased involvement in setting standards for good care and gives them access to a large and rich data base for teaching and clinical research. To residents, the system offers clearly delineated standards and expectations and the prospect of greater feedback.

The pediatric protocol system also addresses financial and administrative needs. By improving documentation in the medical record, it reduces the number of potential third-party rejections of claims and audit disallowances. By profiling patient population and utilization patterns, the system's management reports help to identify opportunities for improved allocation of scarce resources.

The expansion of the pediatric protocol system to the sixth remaining hospitals will continue to be a joint effort by the staff of the Health and Hospitals Corporation and the Fund for the City of New York. Commencing with site seven, staff from the HHC Division of Medical and Professional Affairs will assume the primary responsibility for project development and management. The project will continue to work with the Health Protocol Project Advisory Committee, established in 1982 by HHC and the Fund to assist in the project's direction. The Committee's membership includes representation from HHC staff, and Fund's Board, and other medical and lay experts.

Description of How The Pediatric Protocol System Operations

I. System Components

The major components of the pediatric protocol system are

- 1) protocol guidelines specifying recommended care for acute care problems managed in a pediatric ambulatory care setting
- 2) a structured encounter form in a modified checklist format for recording information about patients
- 3) a full-time coordinator at each hospital
- 4) a computerized management information system which captures most of the data from the encounter forms ;and generates regular reports for each hospital describing how care is being delivered.

The protocol guidelines describe standard management for the following acute-care problems of children seen in the emergency areas and clinic: otitis media (middle ear infection), pharyngitis, simple upper respiratory infection, pneumonia, acute fever of unknow origin, gastroenteritis, urinary tract infection, wheezing (asthma and bronchiolitis), croup and seizure.

The original protocol guidelines were developed through extensive consultation with local and national experts and with physicians at the site. They are updated periodically based upon the most recent scientific literature and expert consensus. Physicians at each hospital have adapted the guidelines and structured encounter form to reflect their own standards and operating systems. Thus guidelines and encounter forms differ somewhat among sites.

Since the guidelines cover only common elements, they state that cases with special circumstances require different management; the physician who follows a different course explains why.

The structured encounter form is organized in modified checklist form. It becomes the pediatric ambulatory record used for all types of ambulatory acute care visits, not just for the problems covered by the guidelines. Thus physicians do not have to make a special effort to remember to use the encounter form.

Each participating hospital employs a full-time coordinator who is responsible for the day-to-day operation of the system. The coordinator, typically a nurse with experience at the hospital, tallies the previous day's encounter forms (charts), and identifies any cases that need immediate review by a supervising pediatrician. She takes samples for each diagnosis included in the project's computer database, and supervises coders who transfer information from the encounter forms to code sheets for computer entry. The coordinator also sees that clinical and administrative tasks essential to the smooth operation of the system are done--for instance, checking to see that lab results are obtained quickly and noted in patients' charts. The coordinator's other activities vary somewhat by hospital, but always include orientation of new residents and other providers to the use of the guidelines and encounter form.

The management information system (MIS) provides five monthly reports to medical staff at each hospital describing practice in relation to their own standards for care. The logic of the protocol guidelines has been programmed into the computer, and data from the charts are analyzed to produce management reports that compare actual practice, as documented in the charts, with the guidelines. The monthly management reports are generated by the end of the third week of the month following the month in which the visits they monitor took place. Project staff often review the reports with supervising pediatricians, highlighting trends and areas of potential concern, especially during the first year of operation. Supervising pediatricians at the sites use a variety of mechanisms to share the information in the reports, including group sessions (rounds or conferences) and one-on-one discussions with physicians.

II. Data Collection & MIS Structure

After sorting the previous day's encounter forms by primary diagnosis and shift, the coordinator tallies all cases, and then randomly samples the charts according to the project's explicit written instructions. In cases where more than one diagnosis exists, the site coordinator has been trained in the same set of priorities used by the computer programs to decide what the primary diagnosis should be.

We attempt to collect 100% of the charts of admitted patients with guideline diagnoses. This necessitates that the site coordinator or coder visit each pediatric ward and code these charts every work day. Once the sample has been drawn, coders transfer the information from the encounter forms to keypunchable forms (code sheets). Coders work under the supervision of the site coordinator, (who also does some coding at times), and use a detailed codebook. The codebook lists every item to be coded from the patient chart, its possible values and how to code them on the code sheet.

The management information system (MIS)* of the pediatric protocol project comprises a series of computer programs geared to the production of five monthly management reports. The programs perform rigorous and extensive data checks and also incorporate a machine-interpretable version of nine pediatric ambulatory care guidelines (upper respiratory infection, pharyngitis, otitis media, pneumonia, asthma, bronchiolitis, gastroenteritis, urinary tract infection, and acute fever of unknown origin).

For each diagnosis, the MIS compares data from the structured patient chart with the pediatric ambulatory care guideline at five critical points or nodes in the patient management process:

- 1) diagnosis
- 2) work-up
- 3) treatment
- 4) disposition
- 5) follow-up

The extent to which the physician adhered to the guidelines at each node can thus be gauged. The reports show aggregate data for each problem covered in the guidelines, as well as case-by-case data for selected problems. Other MIS reports describe doctors' use of tests, medications, hospital admissions and follow-up contacts with patients and record key characteristics of the patient population.

A final consideration is secondary diagnoses. Provisions have been built into the medical logic module of the MIS for the handling of secondary diagnoses. This ensures that disagreement at a node won't occur because of appropriate actions taken by the physician to deal with the secondary diagnosis. To take an example: a six year old child has a diagnosis of suspected pneumonia and otitis media. The pneumonia is suspected to be bacterial. The physician treats the child with a prescription of ampicillin. According to the pneumonia guideline, this prescription would be considered inappropriate because children over four years of age are supposed to get penicillin. However, ampicillin is an antibiotic of choice for otitis media and will also deal with the bacterial pneumonia. Therefore, the physician appropriately prescribed ampicillin. The medical logic module handles all relevant combinations of the eight diagnoses in this manner for each node.

*The MIS is written in the Statistical Analysis System (SAS) and is currently housed on the Fund for the City of New York's computer, a Formation 4000 super-mini which provides full IBM compatibility. The computer supports the full range of System 370 software and uses VM/CMS as its primary operating system with VSI and the batch system under CMS.

A

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III. Clinical Setting

A visit to a pediatric emergency room or clinic that has installed the pediatric protocol system begins with the triage staff, often a nurse or nurse practitioner, who takes a brief history and the child's vital signs and records this information on the top of the structured encounter form. This form is used for children presenting with all types of acute problems, not only those covered by the protocol system guidelines.

Providers are oriented to the system by supervising pediatricians and the site coordinator; residents receive refresher orientations from the site coordinator as they begin a rotation. All providers receive a written copy of the guidelines in booklet form for easy reference.

For most patients presenting with a problem covered by the guidelines, the physician follows the appropriate guideline and documents findings and plans on the structured encounter form. In cases where the physician decides not to follow the guidelines in all areas, that decision is explained on the form as well.

Parent education pamphlets have been designed for each of the problems covered by the guidelines and to provide general instructions about how to use the hospital effectively. There are typically distributed by the nursing staff as the patient is discharged, as part of patient education and counselling work.

TABLE 1
 MEAN COST PER VISIT: ADHERENT VS. NON-ADHERENT CASES
 (LAB TESTS & X-RAYS ONLY)
 (Predicted Values)

	ADHERENT CASES	NON-ADHERENT CASES
Asthma	\$2.21	\$5.73
Otitis Media	0.19	0.96
Gastroenteritis	0.02	2.35

To our knowledge this analysis represents the first study that measures the effects of protocol systems used by physicians on the cost of care. Our findings on cost join evidence from several other studies that protocol systems used by non-physician providers lower the average costs of ambulatory care by reducing utilization of x-rays and lab tests (21, 22, 24, 25, 26).

C. Health Outcomes for Asthma Patients

We chose asthma as the illness most suitable for an analysis of the protocol system's impact on short-term health outcomes. As the only chronic disease covered by the system, asthma is more appropriate for an outcome study than are self-limited conditions. It is one of the most frequent causes of acute care visits to hospital emergency rooms and clinics. There is considerable evidence and experience indicating that asthma responds to appropriate clinical management.

EXECUTIVE SUMMARY

Evaluation of the Impact of the Pediatric Protocol System:

Report on Phase One

June 1985

Prepared by the Fund for the City of New York

For the Board of Directors

New York City Health & Hospitals Corporation

The pediatric protocol system is a system for quality assurance designed principally to improve the quality of pediatric ambulatory care, as well as medical education and clinic management activities. Currently in operation in four municipal hospitals in New York City, the system's major components are protocol guidelines specifying recommended care for many of the acute care problems managed in a pediatric ambulatory care setting; a standard patient chart; a full-time coordinator at each hospital; and a computerized management information system. The purpose of this summary is to present in condensed form the major findings of Phase One of the evaluation of the pediatric protocol system's impact on physician behavior, the cost of care, and short-term health outcomes.

The study used retrospective data from four hospitals and analyzed changes over time, by comparing a baseline time period before implementation with periods after the system went into use (called protocol periods), and by comparing early with later protocol periods. We focused on three of the nine illnesses included in the protocol system's

computer database--asthma, otitis media (middle ear infection) and gastroenteritis.

We analyzed Metropolitan Hospital's experience extensively, using multiple regression techniques to control for the effects of a variety of external variables. These external variables included patient age, payor class, workload, visit location, and level of physician training. In addition, we excluded from the analysis all patients with underlying disease or very high fever. The analysis was based on a total sample of 1,535 cases of asthma, 4,935 cases of otitis media, and 2,942 cases of gastroenteritis. We conducted a limited analysis for the other three sites of the protocol system--Kings County, Coney Island, and Queens Hospitals. At these sites, the number of cases was smaller than for the Metropolitan analysis but nevertheless large enough to give us an acceptable level of statistical precision.

All statistical tests referred to below were conducted at the 95% confidence level.

I. Findings from the Metropolitan Hospital Analysis

A. Physician Behavior

We analyzed two components of physician behavior in the Metropolitan analysis--documentation of medical records and adherence to protocols.

Documentation

The Findings for documentation on the whole support the hypothesis that the pediatric protocol system improves documentation of medical records over time. Documentation for two of the diagnoses--asthma and otitis media--showed substantial improvements in the protocol periods over the baseline, with otitis media showing continued improvement throughout all the protocol periods and asthma showing improvement through the second protocol period. Documentation for gastroenteritis showed a slight negative effect which ameliorated over time. (See Figures 1, 2, & 3.)

FIGURE 1

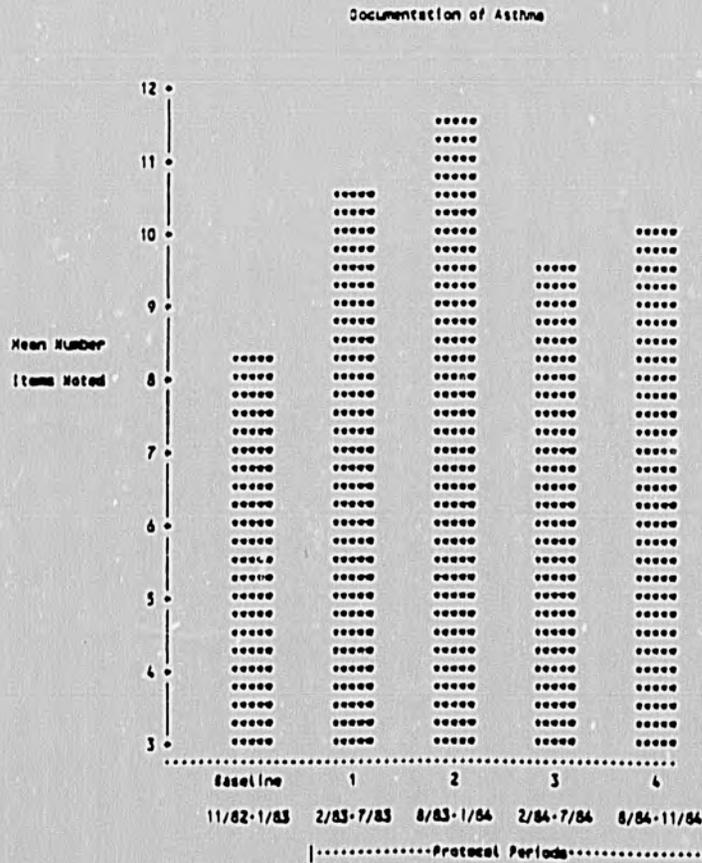


FIGURE 2

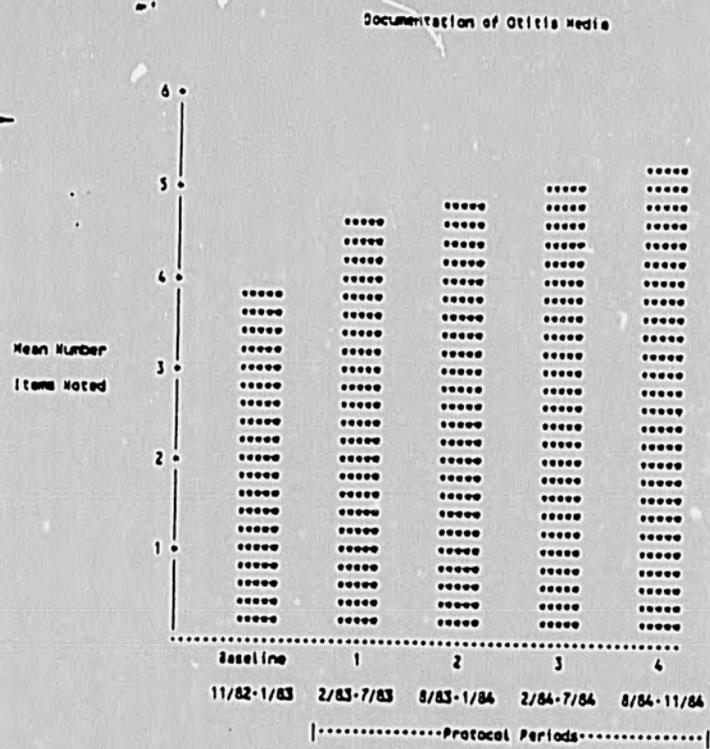
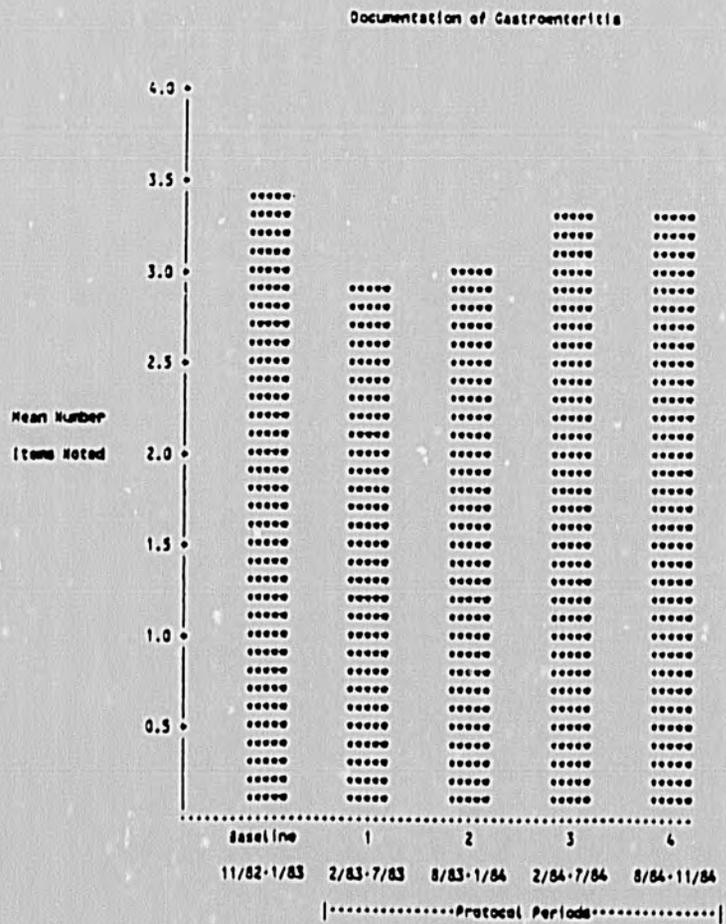


FIGURE 3



A preliminary study of physician use of structured charts at Kings County Hospital in 1978-79 found gains in documentation (35). Our findings are also consistent with documentation gains found in studies of protocol systems used by non-physician providers (21, 22).

Adherence to Protocol Guidelines

The findings concerning physician adherence to the protocols indicate that the use of the pediatric protocol system had a positive effect. When the first period of protocol system use is compared with later periods, two of the diagnoses, otitis media and gastroenteritis, exhibited clear-cut improvements over time in adherence (see Figures 4 & 5).

FIGURE 4

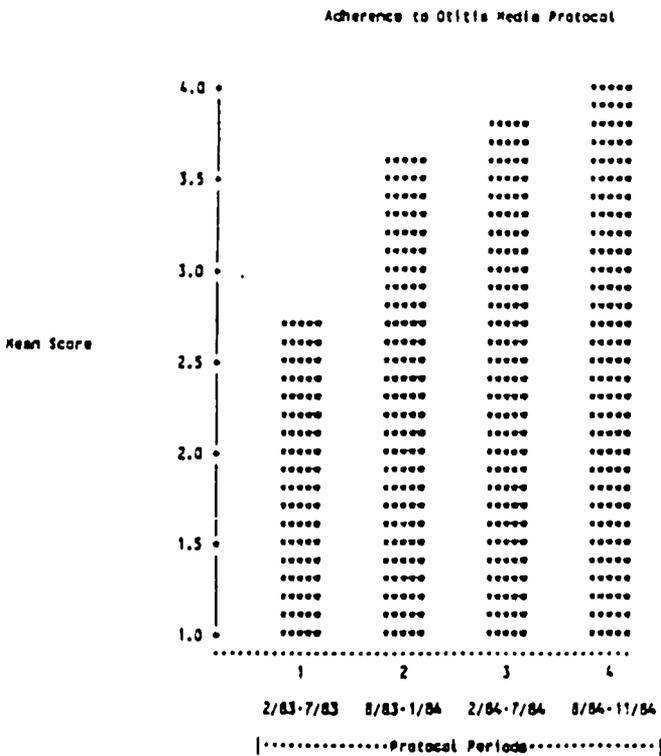
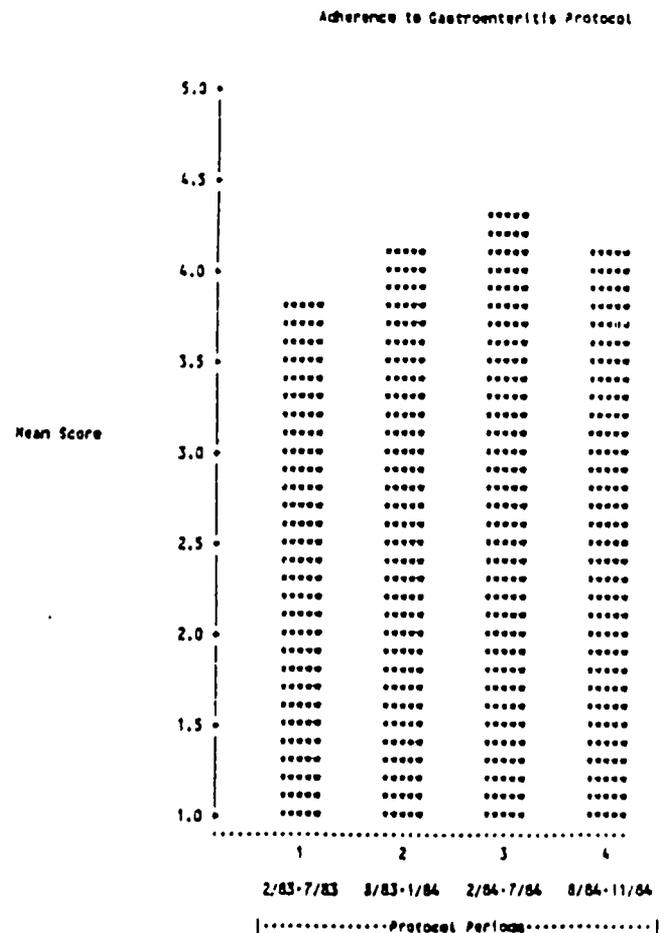


FIGURE 5



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The third diagnosis, asthma, showed no change in physician adherence over time, either positive or negative. These findings are consistent with findings from studies of other physician-oriented protocol systems. The pediatric protocol system, like systems in use at Yale, Duke, and the University of Indiana, changes physician behavior in the direction of greater adherence to protocols, in this instance for otitis media and gastroenteritis. As studies of these systems also found, there is a pattern of differential response, with variation in adherence by protocol (in this study, the finding of no change in adherence to the asthma protocol), along with fluctuation in adherence over time (9, 11, 12).

B. Cost of Care: Two-Part Analysis

We conducted a two-part analysis of cost effects at Metropolitan--an analysis of changes in average cost per visit over time, and a comparison of average cost in visits where physicians had adhered to the guidelines versus those visits where the physicians had not. The findings concerning changes over time are presented first.

Average cost was computed for each visit as the sum of the unit costs for x-rays and laboratory tests ordered. For the analysis of changes in average cost over time, all visits both adherent and non-adherent, were used to compute average cost. We found no change in the average cost of treating gastroenteritis. For otitis media and asthma, we found a nearly significant trend ($p < .08$) that was similar for both illnesses: an initial increase in average cost between the baseline and first protocol periods, followed by decreases in later protocol periods (see Figures 6 & 7).

FIGURE 6

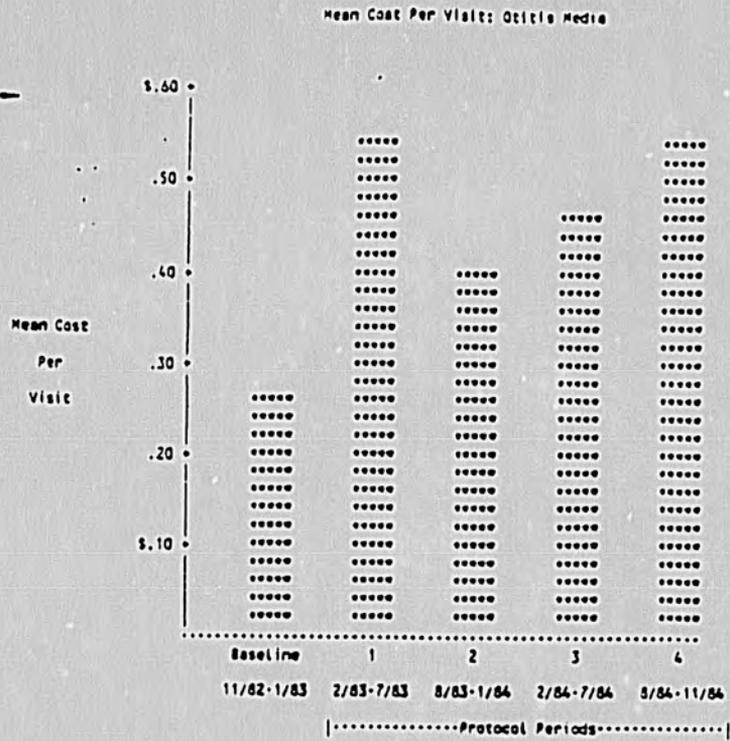
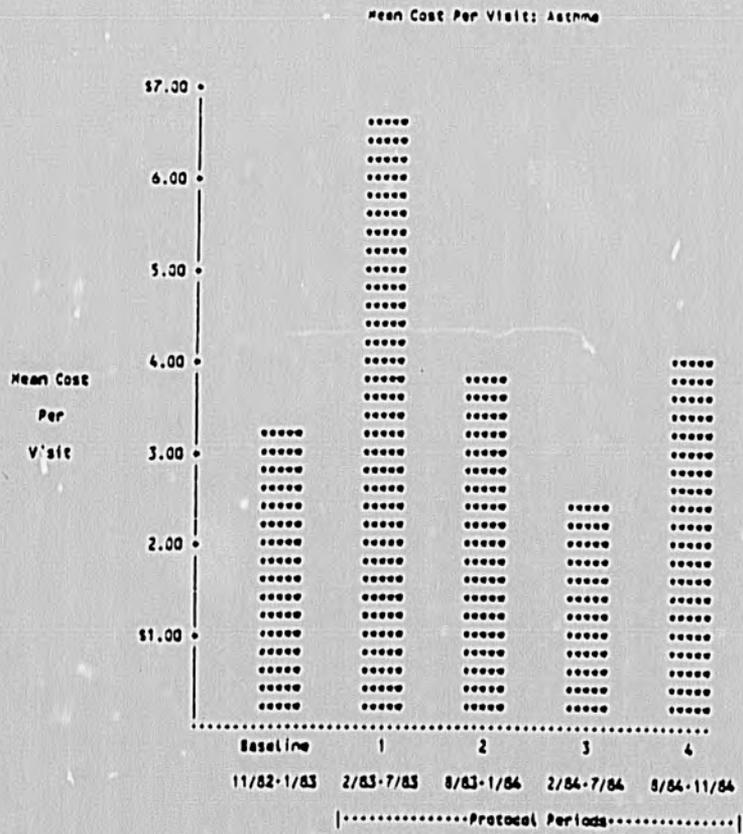


FIGURE 7



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The Phase One analysis of short-term health outcomes at Metropolitan was of necessity restricted to outcomes that could be measured during the course of an acute care visit for asthma (as recorded in the medical record). We found that adherence to the asthma protocol was significantly correlated with improvements in patients' clinical status as assessed using the Wood-Downes clinical scoring system for evaluation of acute asthma attacks.

II. Limited Analysis of Kings County, Coney Island, & Queens Hospitals

We conducted a limited examination of the effects of the protocol system on documentation, adherence to protocols, and average cost at Kings County, Coney Island, and Queens Hospitals. Our findings were largely consistent with those obtained for Metropolitan Hospital, in particular findings on improved documentation and the sharply lower average cost of adherent visits. This limited analysis had a number of constraints, in that it was not possible to employ the stringent statistical controls used in the Metropolitan analysis, and there were a variety of differences among the sites and their databases. Nonetheless, the fact that we found direct support for a number of the findings obtained for Metropolitan, and no contradictory evidence, increases our confidence in the Metropolitan findings.

III. Phase Two of the Evaluation Study

The research design for Phase Two of the evaluation of the impact of the pediatric protocol system is similar to the design for Phase One, with several key enhancements. The Phase Two study will analyze experience with the protocol system at two new sites -- North Central Bronx Hospital (NCB), a municipal hospital, and Montefiore Hospital, the first voluntary hospital to install the protocol system. The opportunity to assess a voluntary hospital's experience will contribute important new knowledge. Since the protocol system will not go into operation at NCB and Montefiore until September 1985, we have been able to design a prospective analysis, structuring the database for these two sites in advance to meet the analytic requirements of the evaluation research design.

Conducting a prospective analysis will also enable us to expand the database and the analysis, chiefly in the areas of cost and health outcomes. We will be able to add pharmacy items, an important component of cost in pediatric ambulatory care, to the analysis of the average cost of care. And the Phase Two cost analysis will assess the marginal cost effects of the protocol system, by measuring what levels of marginal decreases in utilization must be reached in order to achieve reductions in the variable and fixed costs of ancillary services delivery.

The Phase Two study will also greatly expand the analysis of short term health outcomes for asthma patients. Additional data sources will include expanded measures of pulmonary function on the acute care encounter form and post-visit telephone interviews with patients/parents.

This study was supported by grants from the Health Services Improvement Fund, Inc. of Blue Cross/Blue Shield of Greater New York, the Robert Wood Johnson Foundation, and the New York Community Trust. In addition, operating support for the protocol system was provided during the period 1983-85 by the New York City Health & Hospitals Corporation, Morgan Guaranty Trust of New York, the United Hospital Fund, and the Fund for the City of New York.

The fact that documentation improved for both illnesses once the protocol system was installed leads us to suspect that the initial increase in average cost may be an artifact of the increase in documentation. Thus the working hypotheses for the Phase Two analysis of average cost will be: levels of documentation in the baseline period yield underestimates of average cost per visit; the protocol system improves documentation, which in turn creates an initial apparent increase in the average cost per visit; this initial change is followed by cost decreases in delayed response to introduction of the system.

Turning to comparisons between the average cost of adherent and non-adherent visit as shown in Table 1, we find strong evidence that when physicians do adhere fully to the protocols, the typical cost of handling a case drops dramatically (by 60 percent or more) for all three of the illnesses under study. This finding, while impressive in itself, is also encouraging as a portent for the future. Nearly half (48 percent) of all cases for the three illnesses were classified as adherent. As increases in adherence occur, the average cost of care will decrease further.

ATTACHMENT D

EXPANDED PROGRAMME ON IMMUNIZATION AND CHILD SURVIVAL Stanley O. Foster, MD, Centers for Disease Control

INTRODUCTION

At the request of the Ministry of Health and under the sponsorship of the Omani American Joint Commission, current child survival activities in the Sultanate of Oman have been reviewed during January 1986. The purpose of this review is to assess current child survival strategies, to document progress achieved to date, to identify areas for program improvement, and to develop a five year plan for child survival.

As part of this review the Expanded Programme on Immunization (EPI) was examined in terms of its strategy, its operation as evidenced by programme records, and its performance as observed during field visits.

Of the six diseases preventable by immunization three contribute significantly to child mortality: neonatal tetanus, measles, and pertussis. Poliomyelitis with its acute and long term disability is also a major concern.

Based on available Omani data and WHO regional data the health cost in Oman of diseases preventable by immunization per 10,000 unimmunized infants would be neonatal tetanus, 100 deaths; measles 200 deaths; pertussis, 100 deaths; and poliomyelitis, 50 disabled children. Data are not sufficient to quantitate childhood tuberculosis or diphtheria.

In a review of 176 under five deaths in four hospitals, neonatal tetanus was the cause of two deaths, 1.1%, and measles was responsible for 9 deaths, 5.1%. In children in the measles risk group, 8 months to five years, measles was responsible for 9 of 46 deaths, 19.6%.

EPI STRATEGY

EPI strategies are outlined in a simple comprehensive manual of operating procedures (SOP's). 1986 targets are for 80% coverage in under ones, 80% coverage in under sixes, and 100% coverage of pregnant women. Vaccines are being delivered at all fixed facilities (preventive and curative) on a daily basis and by mobile preventive teams.

Current immunization schedule calls for BCG at birth, DPT and polio at 3, 5, and 7 months, measles at 9 months and TT to pregnant and fertile aged women. A change to the WHO recommended and epidemiologically more relevant child immunization schedule of BCG and Polio at birth, DPT and Polio at 6, 10, and 14 weeks (alternatively 2, 3, and 4 months) and measles at 9 months is projected for early 1986. Schedule also calls for boosters at 19 months (DPT and POLIO), 6 years (DT), and 12 years (TT).

Immunization data are recorded on patient held immunization cards, facility record books, monthly reports, and centrally computerized summaries. Extrapolating the immunization totals for the first 11 months of 1985 to 12 months, immunizations for 1986 are estimated in Table 1.

TABLE 1
ESTIMATED UNDER ONE IMMUNIZATIONS IN OMAN 1985

Vaccine	11 Month	12 month
BCG	41709	45500
DPT1 P1	41304	45000
DPT2 P2	33468	36500
DPT3 P3	25907	28300
MEASLES	28195	30800

Estimates of the the under one target population range from 50,000 to 100,000. Using data from the 1983 EPI coverage survey, the EPI under one target population for 1986 is estimated at 60,000. Using the 1985 estimated vaccinations and an estimate of proportion of 1-6 vaccinations given to 1-2 year olds, it is possible to estimate current coverage in the 12-23 month population, Table 2.

TABLE 2
ESTIMATED EPI COVERAGE JANUARY 1, 1986

Vaccine	Coverage 1983	Estimated 1986
12-23months		
BCG	71%	78%
DPT1 P1	71%	81%
DPT2 P2	55%	70%
DPT3 P3	40%	60%
Measles	47%	70%
Pregnant Women		
TT 1	3%	48%
TT 2	3%	33%

These estimates indicate a significant increase in coverage and a significant decrease in drop out rates. For DPT3P3 the drop out rate has decreased from 31% to 21%. Although an EPI program review is not scheduled until early 1987, a single 30 cluster national coverage survey early in 1986 is recommended. Such a survey should include appropriate proportions of settled and nomadic populations. Such information will be very useful to the implementation of the National Child Health Plan.

Data on disease incidence is available from two sources, routine outpatient and inpatient reporting from the curative services and from 12 sentinel inpatient facilities. The 1984 EPI Annual Report graphically portrays disease incidences and their downward trends. Hospital data on measles and pertussis strongly suggest disease reduction, Table 3.

TABLE 3
INPATIENT AND OUTPATIENT REPORTING OF MEASLES AND PERTUSSIS

Year	Measles Inpatient	Measles Outpatient	Pertussis Outpatient
1980		10,630	1,534
1981		40,679	2,236
1982	4,695	16,645	2,745
1983	4,195	9,151	2,605
1984	3,782	9,652	830

FIELD OBSERVATIONS

Field staff were knowledgeable about and committed to immunization. At each level (preventive, curative, mobile) specific individuals had been trained in and were responsible for immunization. Vaccines are available daily at preventive and curative services. All patients coming to curative services are screened for immunization. All requiring immunization, except those requiring hospitalization, are immunized. Prenatal care routinely includes the administration of TT. It was not entirely clear whether women coming to delivery were being checked for TT and immunized post partum if necessary.

Lack of knowledge of target populations is currently limiting the ability of local areas to monitor their own performance. Increased attention to Wilayat planning and data collection is recommended. This would include the preparation of Wilayat maps, the listing of all villages with estimated numbers of houses, the identification of non village areas with estimates of number of family units, and estimates of under one target populations. This data, updated as better information becomes available, will enable the estimation of coverage on a Wilayat basis. Reformatting of national data to facilitate Wilayat monitoring is strongly recommended.

Cold chain as observed in the field was excellent. Cold chain equipment was clean, monitored on a daily basis, well organized, and did not contain non authorized items. Vaccine supplies were adequate to meet all needs. In view of the highly desirable daily availability of vaccines at multiple sites, vaccine usage rates especially for the 20 dose vials were low. Use of smaller dosage vials is recommended. An economic analysis of vaccine cost by vial size is recommended. For some vaccines single unit packaging may be economically advantageous.

All immunizations were administered with a sterile disposable needle and syringe.

Data recording is shifting from a statistical orientation to a patient orientation. In view of the use of multiple sites for vaccine delivery (preventive, curative, mobile), reorientation to a patient focus to enable the identification and immunization of defaulters will require considerable experimentation.

Whereas the routine delivery of vaccine at preventive and curative facilities is functioning effectively and efficiently, the mobile house to house operation as observed is of limited effectiveness with outputs as low as one immunization per person day. The strategy used in Nizwa of three rounds in one area before moving on to the next does not provide optimum protection for the priority disease measles. A reorientation of mobile operations to areas without access, to populations at risk (under twos), and to uncovered populations needs to be considered.

Available surveillance and anecdotal data indicates that immunization is significantly reducing disease morbidity. Measles at Nizwa hospital has decreased from 171 in 1983, to 151 in 1984, to 49 in 1985. Although this may in part reflect a longer term annual cycle, a significant reduction in incidence is probable. An outbreak of measles occurred in the Sur Jalaan area during 1985. Of the 177 cases reported through the sentinel surveillance system, hospital inpatients, vaccination status was available on 125. Of the 27 cases reported as vaccinated, 14 had been vaccinated in the incubation period. Thus of the 125 cases with known vaccination histories, 112 were unprotected. Assuming a measles vaccine coverage of 50%, vaccine efficacy can be estimated at the expected level of 88%. To better facilitate this type of analysis current surveillance form needs to be revised to include date of birth rather than age, date of vaccination, and date of onset of illness. As admission may occur late in illness it is not always possible to determine from admission date the relationship of vaccination to onset of illness. Due to the high communicability of measles, small outbreaks can be expected to continue to occur in vaccinated areas. Investigation of these outbreaks will be needed to verify vaccine efficacy and to identify at risk populations needing vaccination.

Expansion of surveillance to all health facilities is under consideration. Before changing the current system attention should be given to two factors, diagnostic accuracy and comparability. Current system of outpatient diagnosis, although not specific, is sensitive enough to detect major changes in measles and probably pertussis incidence. Expansion of the special EPI surveillance system to outpatients is not recommended. Expansion of the current sentinel surveillance system beyond the current 12 sites should be carefully examined. Current system is adequate to monitor trends in measles. For low frequency diseases, neonatal tetanus and poliomyelitis, expansion of reporting to all inpatient facilities has merit.

The occurrence of measles cases in children under 9 months will frequently result in a challenge to the current measles immunization policy of vaccination at 9 months. Data from the recent outbreak in Sur Jalaan illustrates the problem, Table 4.

TABLE 4
MEASLES CASES BY AGE SUR JALAN 1985

Age	Number of Cases	Percent Distribution
<5 months	4	1.2
5 months	6	1.8
6 months	21	6.4
7 months	15	4.6
8 months	27	8.2
9 months	20	6.1
10 months	18	5.5
11 months	12	3.7
1 year	69	21.0
2 years	30	9.1
3 years	29	8.8
4 years	18	5.5
5 years	14	4.3
>5 years	45	13.7

Hospital based data needs to be interpreted with caution. Younger more severely ill children are more likely to be brought to medical attention. Although nearly 20% of recorded cases in this outbreak occurred prior to 9 months, lowering of the age of vaccination would in the long run lead to a lessening of measles control. Vaccine efficacy in children 6-8 months ranges from 50-75%. Vaccine failures lead to an accumulation of susceptibles in "vaccinated" children, major outbreaks in future years, and a loss of credibility for vaccination. Vaccination under 9 months, is not recommended. The only safe and effective method of reducing measles incidence in infants under 9 months is to increase coverage in the 9-23 month age group. The only possible exception to this 9 month policy would be the inpatient vaccination during measles outbreak periods of 5-9 month inpatients. Such vaccinations should not be recorded as routine immunizations; children so immunized should be vaccinated again at 9 months.

CONCLUSIONS

1. Immunization is an essential component of a national child survival strategy.
2. Immunization as currently being implemented in Oman is strategically sound and technically correct.
3. Systems of logistics, training, delivery, supervision, data collection, and surveillance are in place.
4. Expansion of immunization into curative facilities at which every at risk age child/ women is screened and vaccinated is exemplary and has significantly improved program coverage and effectiveness.
5. EPI staff are aware of areas for program improvement: revised immunization schedule, local area planning and monitoring, outreach programs, data collection, surveillance, and feedback.
6. Broadening of immunization activities to include other priority child survival activities has great potential. The current administrative separation between MCH and EPI needs to be recognized.
7. The EPI/PHC evaluation scheduled for late 1986 early 1987 is very important. Maximum knowledge will be gained if review is carried out in February 1987 at which time calendar year 1986 data will be available. Coverage surveys in each of the 12 regions during January 1987 should be considered. Although there will be a desire to load surveys with lots of questions, surveys should be limited to the most important questions: immunization dates on 12-23 month children, TT status and place of delivery of women who have delivered in the last year, and knowledge/use of ORT.

REFERENCES

1. Sultanate of Oman EPI Annual Report 1984
2. EPI Standard Operating Procedures #1, #2, #3, #4 1985
3. EPI Statistics January - November 1985
4. WHO EPI Project Profile
5. Oman UNICEF Master Plan for Child Growth and Development

CONTROL AND PREVENTION OF DIARRHEAL DISEASES AND MALNUTRITION IN OMAN, WITHIN THE FRAME OF PRIMARY HEALTH CARE

Leonardo Mata

1. Introduction

Prolonged socioeconomic stagnation in the Sultanate of Oman up to 1970, as described in historical records, accounted for the high mortality among infants and young children, particularly due to recurrent infectious diseases and malnutrition. A new era for Oman began in the early 1970's (Europa Public, 1985), and the steady and increasing progress derived from the new leadership is evident to the eyes of visitors, not only in the general happiness and wellbeing of the population, but in the housing boom in urban and rural areas alike and in the strengthening of infrastructure for worship, government, education, commerce and other vital activities.

Several short but substantive meetings with Omani authorities and leaders, visits to several health institutions in Muscat and other cities, and trips to several semi-urban and rural communities, revealed a more favorable situation in contrast with that depicted by international agencies (Grant, 1986), casting doubt on the accuracy of indicators released for this country. The improved living conditions of the various populations visited, and the evident impact of several health interventions now underway, clearly indicate that infant mortality and other indices reported by international agencies do not do justice to Oman. The general impression is that the current childhood mortality must be around 50 or 60 per 1000 live births nationwide, while it is probably less in the more developed areas. If this is proven to be correct by other means, one must conclude that the overall efforts of the Government of Oman and the population at large, to rise the living standards and the quality of life, through application of scientific knowledge, must have resulted in a dramatic decline in suffering, particularly from infectious diseases and malnutrition.

Several factors can be advanced to explain the current favorable situation. One is the significant economic capacity of the nation which has led to substantive improvement in income and in capacity for acquisition of material goods; another, perhaps more important, is the political stability and peace that has characterized the country in the last 15 years; a third factor has been a strong political will to improve prevailing conditions, not only in the material aspect, but also in the spiritual, educational and social issues, without discriminating the poor rural areas; a fourth element has been the application of modern, practical, and relatively inexpensive technologies (in terms of disease and death averted) at the national level; a fifth factor has been the development of a network of hospitals and clinics, and of an excellent system of highways and roads

throughout the entire country; a last, but not least important element, has been the apparent proclivity of the Omanis to accept modern developments, that is, a high level of modernity, which fortunately has not interfered too much with inherent cultural values, particularly Islam.

2. Current Efforts in the Control of Diarrheal Diseases and Malnutrition

Significant advances have been noted in the control of diarrheal diseases as a result of the favorable changes just described, including the specific policies established by His Excellency Dr. Mubarak Bin Saleh Al-Khaduri, Minister of Health with the advise of Dr. Musallam El-Bualy, Pediatric Advisor and Dr. Hector P. Traverso, World Health Organization consultant, well summarized in the working plan for the Sultanate of Oman (Tulloch, 1985). The plan has an accurate description of the environmental conditions and constraints favoring the persistence of high morbidity and mortality rates due to diarrheal diseases, and was very clear in prescribing a series of recommendations for immediate action. The plan also contained a list of specific actions and operations to be executed in the immediate future. Action was rapidly taken; the various recommended and implemented activities were evaluated about one year later; results were released in a report that revealed a successful start, with adequate management of acute diarrheal diseases through the network of hospitals, dispensaries, public health compounds and health units in the country (Traverso, 1985). The guidelines of the World Health Organization were followed, a "Manual for the Prevention and Treatment of Acute Diarrhoea" was prepared (National Control of Diarrhoeal Disease Project, 1985), and the recommended WHO/UNICEF sachets of Oral Rehydration Salts were widely distributed and successfully used. Training activities involving physicians, nurses, auxiliary personnel, medical orderlies, and to a lesser extent, mothers, were executed as programmed. Unexpectedly, diarrheal disease mortality was significantly reduced, in excess of the original target set in Dr. Tulloch's report.

Our team examined the records of several hospitals, clinics and other health establishments, all of which showed a very low case fatality in outpatient and hospitalized cases throughout the regions visited (see Table 1). A considerable reduction in the number of deaths due to diarrhea was evident in the records of 1985, as compared with previous recorded figures, and the "Annual Statistical Report" (Directorate of Statistics, Planning and Follow-up, 1984).

The opinion of doctors, nurses and other health personnel interviewed was that although morbidity remains high, the frequency of severely dehydrated children was drastically decreased. This effect was attributed to the use of oral rehydration therapy (ORT) at the periphery, thus averting some dehydration at the community level, and cutting down on severe cases that otherwise

would have reached hospitals and clinics. Concurrently, survival of severely dehydrated children reaching clinics and hospitals, has increased considerably as a result of profuse use of ORT and intravenous fluid therapy for the few cases that require it. This seemed evident to us in all the facilities visited, see Table 1.

Evidently, usage of intravenous fluid therapy - and its inherent risks - has been sharply reduced, and today represent only a small portion of the total treatment (see Table 1). The medical personnel also indicated that the proportion of tissue invading (inflammatory) diarrheas, is small (about 2-5 % of the cases) and that chronic recurrent diarrhea may be even less. Finally, edematous malnutrition (kwashiorkor) has virtually disappeared, and the prevailing cases are mainly wasted or stunted, and to a lesser extent, marasmatic children. The incidence of this form of malnutrition has also declined considerably.

3. Factors Accounting for the Decreased in Diarrhea Morbidity and Mortality

The main plausible explanation for the significant decline in diarrhea lethality in hospitals and clinics is the rapid and effective application of ORT to a considerable proportion of moderate and severe cases of acute diarrhea. Estimates are that 60 to 80% are treated, according to region. Local, regional and national ORT programs elsewhere have already been shown to be highly effective in averting deaths due to dehydration diarrhea, while at the same time, they are among the lowest cost/beneficial interventions (see Mata, 1986). The ORT program in Oman seems to be a very successful one, and publication of this experience should be a priority.

Other factors undoubtedly must have played a role in the control of diarrheal diseases, for instance, the measles immunization program. This intervention may avert 0.6-3.8% of diarrhea episodes, and 6-26% of diarrhea deaths in programs targeting on the 0-11 month-olds, with a coverage of at least 45-64% (Feachem and Koblinsky, 1983).

While the situation of water availability and sanitation in rural and periurban populations of the Sultanate is of serious concern (see reports by Bradbury and Al-Behlany, 1985; and Al-Saedy, 1985), serious efforts are being made to improve prevailing conditions. It has recently been shown that these interventions have the greatest demonstrable impact on averting diarrhea cases and deaths (see Esrey et al., 1985). One of the most impressive developments in Oman is the widespread use of water tankers (averaging one cubic meter) by Bedouins and Jebelins. The possibility of contamination of this water seems small because tankers are closed to sources of contamination such as hands, flies and dust; furthermore, tankers are periodically refilled with water transported by pick-ups. The greater availability of water in cities and towns, and in villages, hamlets and even Bedouin camps, in all probability is contributing to more

frequent hand washing, ablutions and other practices prescribed by the Holy Koran (see the comprehensive review of Koranic public health wisdom, by Hashim et al., 1985). Hygienic practices undoubtedly are curtailing some transmission, and therefore, are averting cases and deaths due to diarrheal diseases (see Feachem, 1984).

Breast-feeding is almost universal in rural areas of Oman, a situation quite evident to the visitor. This is not the case in cities, where weaning appears to be increasing at a younger age than recommended, favoring the genesis of urban malnutrition. In fact, the only case with marasmus was in a child in a main hospital in Muscat; the child was artificially fed in early infancy; other children seen with moderate malnutrition had not been given the breast as required. Prolonged and exclusive breast-feeding for at least six or seven months is fundamental to avert cases and deaths due to diarrhea (see Feachem and Koblinksky, 1984).

Finally, there is evidence that the rate of low birth weight has declined in Oman in the last decade. The exceedingly high infant mortality rates assumed to occur in the past, must have been due in great part to fetal growth retardation. Rates currently range from 8 to 22% according to records of hospitals in various regions (Buehler, 1985; El-Bualy et al., 1985). It has already been shown that an improvement in fetal growth results in greater resistance of infants to severe diarrhea and death from dehydration (Ashworth and Feachem, 1985).

It is now impossible to determine how much each one of these interventions contributed to the observed decline in diarrhea mortality, although there seems to be little doubt that ORT had the greatest impact, probably followed by measles immunization. Probably, diarrhea morbidity also declined, for reasons given above; the significant numbers still seen in clinics may reflect a greater proclivity of the population to seek medical services, aided by greater prosperity, availability of health services and transportation.

One important consideration is that diarrheal disease no longer occupy the first or second place as a cause of death among children under five, yielding to respiratory diseases, immaturity and perinatal problems, a structure more typical of transitional societies (see annual report of Directorate of Statistics, Planning and Follow-up, 1984). Another important consideration is the decline in severe malnutrition and related complications, which in all probability must have been related to the reduction in diarrhea morbidity.

4. Remaining Constraints

There are several kinds of interrelated constraints that to some extent interfere partially with maximum success in control and prevention of diarrheal diseases at the national level. Such constraints also affect other interventions, particularly antenatal care and certain elements of maternal and child care.

The first group of constraints relates to deficiencies in training of personnel at the various levels, to attain uniformity in knowledge, procedure, and intended effect. This is said with due respect for the well qualified and devoted medical and health staff - mainly expatriates - which is doing much to improve the health of the Omanis. Nevertheless, it is quite evident that there is no formal briefing and continuous education of this staff on the curative and preventive duties that they will be performing, and even less on the basics of primary health care (PHC) and each of its fundamental components.

The Government has already shown great interest and some commitment to improve maternal and child health through the primary health care approach. Pioneer and praiseworthy developments by national and foreign health officers resulted in various maternal and child health pilot projects, in several parts of the country. The Rural Health Service in Salalah has been ongoing since early 1970's, a truly pioneer effort, and more recent developments are being effected in Muscat and Rustaq. Several documents have been also prepared (see Rossi-Espagnet, 1984; Rosi-Espagnet, 1985; Institute of Health Sciences, 1985). However, there is great need for recruiting and training health workers for PHC, an overt necessity not yet satisfied despite its unquestionable priority.

Discussions among our team and authorities and health personnel in the various regions visited, lead us to believe that the training of health orderlies or comparable individuals, primarily women, but also men, is feasible within the short range. This staff will have the primary responsibility of communicating with the rural families for attaining the goal of Health for All. It appears logical that health orderlies with complete primary schooling, if possible, could rapidly and accurately learn the basics of the primary health care system. They would be supervised by other health orderlies of higher rank or greater experience, or by trained auxiliary nurses or community matrons, all of this to be determined by the experienced Omanis who know better their particular situation.

In turn, supervisors would report to regional directors, one for each ecological region, which in the case of Oman, should not be more than five or six regions. All supervisors would be coordinated by a Director of the PHC program, highly desirably an Omani, or if not possible, a professional from the Arab world, obviously fluent in Arabic and with first-hand knowledge of the customs, beliefs and traditions of the rural peoples of Oman. The administration of the program, programming of visits, develo-

pment of teaching aids and materials, standardization of procedures, selection and contents of messages to be delivered, supervision and quality control, and other matters could be easily developed within one calendar year. Although this proposal is an obvious departure from the current organization, the system can be developed without disturbance of the present structure, seeking continuous cooperation and communication between the staff and resources of both systems.

This model has worked out adequately in other countries where dual health system exist, for instance, a Ministry of Health and a Social Security Bureau, each one with much independence and funding. This is the situation in Costa Rica, a nation with twice the population of Oman and a fourth of its area, where the Social Security embraces all the hospitals, and the Ministry of Health is responsible for delivery of health services (particularly PHC) to the bulk of the population (Mohs, 1982; Mata, 1983). Such a system is not necessarily advocated for Oman, but it is mentioned here to show that quite independent - although interrelated - systems can coexist.

The second group of constraints relates to deficiencies observed in the execution of the ORT program and the embryonic PHC program under way, with its main component of maternal and child care. Specifically, information on preparation of oral rehydration solution at the home level may not always be adequately given to mothers, while all the required material and other instruments needed to reach mothers, and accomplish the goal, may not be available. Also, there is lack of uniformity of criteria on fundamental issues of maternal and child health. For instance, there is diversity in guidelines regarding the age of initiation of weaning, and often there we saw lack of knowledge on the proper way to wean, particularly regarding kind and quality of locally available foods, and on how to prepare and administer them, to prevent infection while favoring good nutrition.

On the other hand, mothers are being overmedicated in some places, for instance, they may receive five or more different prescriptions at one time; often, overmedicated women appeared otherwise healthy to our team. Also, in one of the hospitals, antibiotic was being administered routinely by vein to all measles cases in the particular ward set up for this disease. These observations reveal the need to prepare manuals of standard operation procedures and treatment protocols, which actually could be rapidly adapted from those already in existence elsewhere.

Again, no negative criticism is aimed either at the planners or the effectors of an exemplary health program that has improved the health of Oman so much in such a short time. The aim of these remarks is to contribute and stimulate further action to the never ending battle to improve medical services, in any particular situation.

New forms and materials have been recently prepared for a project in maternal and child care in Rustaq. This pilot project

requires scrutiny according to the reality of what can be done as a function of priorities and resources. Emphasis has been given to description of diseases or syndromes more than to symptoms and signs, and this undoubtedly will pose difficulties to health orderlies or other non-professional PHC workers who deal directly with mothers in need. Resorting to certain cumbersome, expensive, and perhaps not quite necessary laboratory tests under field conditions, should also be avoided in favor of other priorities. The counterpart project in Muscat has the advantage of being carried out by orderlies with very little education, in a successful way. This provides evidence that such kind of PHC can be effected within the realities of the country, at a low cost and with expected measurable impact. An evaluation of both projects is urgently needed.

Many of the problems perceived in the field are geared to the fact that preventive medicine has been, unwillingly, delegated to a second plane in the current structure of delivery of health services. This even shows in the lack of seniority appointed to medical officers in rural and community health services. The situation may be subsanated by designating a Director of Primary Health Care as described above, who will report directly to the Director of Preventive Medicine and who will receive the required support from advisers and experts in the difficult job of fulfilling the goal of Health for All. The proposal, however, should be examined within the context of other administrative issues in the present structure of the Ministry of Health. For instance, the Director of Primary Health Care could well report to a different person, inasmuch as the work gets done with the ultimate goal of serving the community.

Considerable duplication of functions and actions was observed, a logical consequence of an inversion of priorities, stemming from the historic evolution of health services in Oman, as has been as in most countries in the world. Excessive expenditure in curative medicine has been an unwanted product, often obstructing the delivery of health care in Oman. A serious condition may arise in the possible event of financial difficulties.

A third group of constraints is the lack of denominators and census data for Oman, of great concern to Dr. M.J. Al-Dawood and to all. Such information is fundamental to assess evolution of health indices, coverage of services, impact of programs, and cost/benefit of interventions. At the present moment, there is no way to sensibly determine the degree of under-reporting of cases and deaths due to diarrheal disease, in order to know better the impact of interventions, particularly in rural areas. This problem has been discussed at length, since these data are required to plan further health actions in a rational and beneficial way. A comprehensive discussion is being provided by Drs. David Sencer, Team Leader, and Stanley Foster.

A fourth group of constraints derives from the inevitable evolution of Oman from a traditional towards a transitional way of life, and an increasing degree of modernity of Omani women.

These changes are accompanied by the introduction of undesirable features to an unspoiled culture, for instance, bottle-feeding and baby foods to replace breast-feeding and traditional weaning foods; and carbonated beverages, processed foods, too salty and sweet foods. Other contaminants like inconvenient radio and television programs, foreign music, alcohol, pornography might be introduced, unless precautions and legislation are taken to that effect.

A fifth constraint that needs careful immediate attention is possible drawbacks in the control of diarrheal and parasitic infection, as a result of immigration of large labor forces from areas where prevalence rates are now in excess to those attained in Oman. To illustrate, Table 2 presents data obtained from the laboratory technologists of Qaboos Hospital, in Salalah. While there is no assurance that the data collected over five years are wholly comparable, the laboratory staff indicated no change in procedure through the study period. The rates eloquently reveal a significant increase in the prevalence rate of important parasites, particularly hookworm. An increased in water availability for agriculture, coupled with a labor force from countries where these parasites are highly prevalent, and where squatting on the ground is the usual way of defecation, would explain part of the increase. There is a possibility that diseases that are foreign to Oman, for instance, schistosomiasis, Shiga bacillus dysentery and cholera, may be introduced.

5. Improvement of Programs to Control Diarrhea and Malnutrition

His Excellency, Dr. M.B.S. Al-Khaduri, Minister of Health, meeting with our team, wisely indicated that much remains to be done. If more and better work is accomplished, The Sultanate of Oman could advance to the level of developing countries which at present exhibit very good health indicators, similar to those of industrial nations during the 1960's and 1970's. As indicated in earlier paragraphs, there are conditions in The Sultanate that indicate that such a goal is possible.

Further control and prevention of diarrheal diseases and of the still prevalent mild and moderate malnutrition, as well as the rare severe form, will then depend on successful integration of activities of the present CDD Program, with other preventive programs. The approach should be holistic, within the strategy of primary health care (PHC), as established to fulfill the goal of Health for All by the Year 2000.

The PHC strategy is based on delegation of a set of simple health, medical, and community activities to non medical personnel, who nevertheless have the capacity to reach and communicate with the suburban and rural population, regardless of how traditional, uneducated or rural it is. PHC is the only way to reach the most needed segments of the population, not only in less developed countries, but also in advanced nations. The commitment of nations to implement PHC programs was clearly

stated in the Alma Ata Conference in 1978, and Oman already has taken important steps towards implementing it, as previously discussed.

There are many models and ways in which PHC works, which will depend on the particular situation prevailing in a given region or country. The basic characteristic is that the target population is that in greatest need, in the most distant places, the poorest, and sometimes potentially the most important from a political viewpoint. A PHC program must have a Director, a highly motivated physician with a thorough understanding of the priorities and needs of the community, directly reporting to the Director of Preventive Medicine (or another appropriate authority), with established links with the Directorates of Curative Medicine, Statistics, Planning and Follow-up and whatever other departments as required.

Intersectoral action is fundamental in modern public health practice, and there are evident signs that it is being effected in Oman. The Director of PHC will have to have under his command several Regional Directors (one for each ecological area of the country), several Supervisors for the various population segments, and Rural Health Workers (medical orderlies) who ultimately are the ones in direct contact with the community. The nature, qualifications, and other characteristics of the rural health workers and supervisors will have to be defined by the Omanis as a function of the cultural values and public health goals, as indicated above.

Since mother-infant dyads are the main target of a PHC program, the rural health workers and their supervisors should be primarily women, with more education than the average village women and with great credibility, hopefully high school graduates. The supervisors should be women or men if accepted. The main functions of the rural health workers will be:

- a. to prepare a simple census of the population directly under their responsibility, and a simple map to identify all inhabited houses
- b. to discuss the Program with villagers and to promote the creation of local health committees
- c. to visit periodically every household to immunize against diseases preventable by vaccination
- d. to monitor prenatal care, identify high-risk pregnancies, and educate in health and nutrition during pregnancy
- e. to promote breast-feeding, and help the mother during the first few days postpartum

- f. to train mothers in ORT and provide them with sachets of oral rehydrating solution salts
- g. to treat for intestinal parasitism, anemia, and other problems which need to be dealt with under rural conditions
- g. to collaborate in arthropode-borne disease control (case finding, prophylaxis, spray)
- h. to promote adequate weaning practices, to train mothers in growth monitoring, by instructing them to use growth charts
- i. to educate in health, particularly hygienic practices, in weaning and in feeding during and after illness
- j. to collaborate in development of joint government-community programs of water supplies and sanitation

It is quite evident that all activities of a primary health care program in a devolving nation are directly or indirectly related to the control and prevention of diarrheal diseases. The most important measures in terms of averting cases of diarrhea (reducing morbidity) are those that improve personal hygiene, environmental sanitation, breast-feeding and adequate weaning practices. Promotion of fetal growth also has a positive effect by reducing the number of small babies, who are known to be at greater risk of premature weaning, excess morbidity, and less resistance to infection.

6. Recommendations

Observations derived from our visits to Omani rural communities, indicate great need to improve weaning practices, personal hygiene and environmental sanitation. There is also need for an aggressive training of staff, for standardization of messages to be delivered to the community, and for the eventual transfer of concepts and technologies to the population in the most expeditious and efficient manner. The following specific recommendations are deemed necessary for continued improvement:

- a. To fully develop a Primary Health Care program by adding, adjusting or expanding on the present activities. The program should have strong components of maternal and child health and health education
- b. To maintain and strengthen, within the Primary Health Care program, ongoing activities like ORT and expanded program of immunizations
- c. To increase efforts to improve water and

sanitation, and the proper handling of water, by capitalizing on the teachings of the Holy Koran

- d. To improve coordination of preventive and curative actions, in all their components, with all participating institutions in delivery of health care. A manner to foster coordination is through strengthening intersectoral action at all levels, including direction and management
- e. To continue efforts for development of national health manpower

7. References

- Ahmed AM (1985). Report on National Workshop on the Concept of Risk Approach in Maternal-and-Child Health in the Sultanate of Oman. Institute of Health Sciences. Muscat, Omand, restricted document, 7 pp and annexes.
- Al-Saedy SBM (1985). Rural water supply and sanitation in the Central Area. Directorate of Finance and Administration, Ministry of Interior, Sultanate of Oman, Muscat, Oman, restricted document, 8 pp and annexes.
- Ashworth A, Feachem RG (1985). Interventions for the control of diarrhoeal diseases among young children: prevention of low birth weight. Bull. Wld Hlth Org. 63:165-184.
- Bradbury JCS, Al-Behlamy SBM (1985). Pilot study for water supply and environmental health in Rustaq. Environmental Health Section, Preventive Medicine Department, Ministry of Health, Sultanate of Oman, Muscat, Oman, restricted document, 10 pp and tables and annexes.
- Buehler, JW (1985). Report to World Health Organization on the situation of low birth weight in Oman. Restricted document, 32 pp and tables and annexes.
- Directorate of Statistics, Planning and Follow-up (1984). Annual Statistical Report 1984. Sultanate of Oman, Ministry of Health, Muscat, Oman, 98 pp.
- El-Bualy M (1985). Low birth weight in The Sultanate of Oman - an epidemiologic study, Ministry of Health, Muscat, Oman, restricted document, 15 pp.
- Esrey SA, Feachem RG, Hughes JM (1985). Interventions for the control of diarrhoeal diseases among young children : improving water supplies and excreta disposal facilities. Bull. Wld Hlth Org. 63:757-772.
- Europa Public (1985). OMAN. In section on The Middle East

- and North Africa, 1984-85, 33rd. ed. pp 581-594.
- Feachem RG (1984). Interventions for the control of diarrhoeal diseases among young children: promotion of personal and domestic hygiene. Bull. Wld Hlth Org. 62:467-476.
- Faechem RG, Koblinsky MA (1983). Interventions for the control of diarrhoeal diseases among young children: measles immunization. Bull. Wld Hlth Org. 61:641-652.
- Feachem RG, Koblinsky MA (1984). Interventions for the control of diarrhoeal diseases among young children: promotion of breast-feeding. Bull. Wld Hlth Org., 62:271-291.
- Grant J (1986). State of the World's Children. UNICEF, NY.
- Hashim A-HAM (1985). Child Care in Islam, 1405(H)-1985(A.D) Al Azhar University, Islamic Resarch Council. UNICEF, Cairo, Egypt, restricted document, 101 pp.
- Institute of Health Sciences (1985). Report on National Workshop on the Concept of Risk Approach in maternal and child health in the Sultanate of Oman. Muscat, 7 pp and tables and annexes.
- Ministry of Health (1985). A Manual for the Prevention and Treatment of Acute Diarrhoea. Control of Diarrheal Diseases Project. Sultanate of Oman, Ministry of Health, Muscat, Oman, 7 pp.
- Mata L (1983). The evolution of diarrhoeal diseases and malnutrition in Costa Rica. The role of interventions. Assignment Children, UNICEF, 61/62:195-224.
- Mata L (1986). Control and prevention of diarrheal diseases at the national level. Second International Conference on Oral Rehydration Therapy (ICORT II), U.S.A.I.D., Wasihington DC, in press.
- Mohs E (1982). Infectious diseases and health in Costa Rica: the development of a new paradigm, Ped. Infect. Dis. 1:212-216.
- Rossi-Espagnet A (1984). Primary Health Care in the Sultanate of Oman. Issues for the Preparation of an Action Plan, WHO-EM/PHC/25, 33 pp.
- Rossi-Espagnet A (1985). Report on a National Workshop on Primary Health Care, Nizwa, Oman, WHO-EM/PHC/33, 17 pp and annexes.
- Tulloch J (1988). Control of diarrhoeal diseases in the

Sultanate of Oman. WHO-EM/Diar.Dis./33, 26 pp.

Traverso HP (1985). Control of Diarrhoeal Diseases (CDD).
Project Profile Summary, Annual Report, 1985, WHO-EM,
6 pp.

TABLE 1

CASES OF DIARRHEA AND LETHALITY RECORDED IN
HOSPITALS, PUBLIC HEALTH COMPOUNDS AND HEALTH
CENTERS OF NIZWA, OMAN, SELECTED MONTHS OF 1985

	Age in years			Total
	<1	1-4	5+	
Number of cases (a)	10,076	9,841	2,871	22,788
Number treated				
ORT				22,381 (98)
Intravenous fluids				129 (<1)
Cases referred (b)				14
Number of deaths	2	0	0	2
Lethality/10,000 (c)	1.98	0	0	0.88

(a) Data available only for Feb-May, Jul-Sep and Dec

(b) No information available on surveillance of referred cases

(c) Lethality by age estimated for reported cases; global lethality for total cases treated

Note: impressive use of ORT and very low lethality

TABLE 2

FREQUENCY (PERCENT) OF INTESTINAL HELMINTHS,
ALL PATIENTS, QABOOS HOSPITAL, SALALAH, OMAN

	1980	1982	1985
Number of examinations	7,786	11,169	12,580
Number (frequency)			
Hookworms	169(2.2)	274(2.4)	801(6.4)
Strongyloides	13(0.2)	15(0.1)	154(1.2)
Trichuris	15(0.2)	12(0.1)	41(0.3)
Ascaris	16(0.2)	57(0.5)	26(0.2)
Hymenolepis nana	3(0.04)	14(0.12)	25(0.2)
Taenia spp.	1(0.01)	6(0.05)	13(0.10)
Schistosoma mansoni	1(0.01)	1(0.01)	16(0.13)

GROWTH MONITORING
Maria Celeste Bustillo, MPH, Bogota, Columbia

A. INTRODUCTION

During the last fifteen years Oman has witnessed important improvements in the health status of its people. According to the prevailing situation at the time, these improvements have been characterized by major capital investments, hospital-based, physician-oriented curative approaches, and highly successful vertical programs such as CDD and EPI.

Maternal and child health is now one of the leading priorities for national development. One of the areas of major unanswered concern is the nutritional situation of Omani, specifically of the most vulnerable groups, pregnant and lactating women and children under five years.

The Sultanate is now interested in identifying those areas whose improvement will make an overall contribution to the quality of services provided by the existing health infrastructure.

There follows a series of activities which could be field-tested in order to introduce a nutrition component into the health care of Omani women and children. Growth monitoring will be a major aspect of this component.

B. THE NUTRITION SITUATION IN OMAN

There seems to be no evidence of severe malnutrition among pregnant and lactating women and among children under five in Oman. However, the potential for suboptimal nutritional status exists.

There is:

- a. a dangerous trend away from breast-feeding and towards mixed feeding (breast milk plus powder and/or cow's milk) at a very early age, in some cases soon after birth.
- b. inadequate understanding of the quantity and quality of foods a child needs when the breast is no longer sufficient as the sole source of nutrients.
- c. inadequate understanding of the food needs of pregnant and lactating women.
- d. deterioration of the Omani diet by the increasing introduction of non-nutritious foods such as sodas, biscuits, chips, commercial weaning foods, among others.

C. GOALS AND OBJECTIVES

The goals and objectives suggested here are to be determined for specific communities as they are phased into the program. It is expected that as the program progresses and patterns start emerging regarding general health and nutrition conditions, goals should be made more specific as to their nature (what is supposed to be happening), time (when), and coverage (to how many people).

4/10

Two essential baseline data may be collected before program implementation starts: % of low-birth-weight babies and % of children under the lower line of the growth chart (may be collected from all or a sample of children from each of the target communities before any other activity is started). This will give an overall index of the nutritional status of mothers, children and the community as a whole.

1. Goals Targets

- a. To improve the nutritional % of children under-5 below the status of infants and children lower line of the growth curve under five
- b. To improve the nutritional % of LBW babies status among pregnant and % of women with Hg level lactating women above 12 grams

2. Objectives

- a. To promote adequate antenatal % receiving TT care according to schedule
- b. To promote breast-feeding
 - i. as the sole source of nutrients for a child during his first months of life
 - ii. as an important complement to other foods for as long as both mother and baby so desire
- c. To promote adequate complementary feeding as soon as the growth curve falters family meal (adequate quantity and frequency) by 12 months

D. OVERALL STRATEGY

The main elements of the strategy proposed to reach the above-mentioned objectives are the monitoring of pregnant and lactating women and the monitoring of children to the age of five. Monitoring assumes that corrective action takes place when deviations from normality occur.

1. General Considerations

a. This strategy envisions that the present health-care system continues to extend its services in such a way that every child/mother in a community can be monitored and corrective action taken in an opportune manner.

b. The strategy rests upon a solid communications/educational component aimed at i) creating an awareness about the importance of growth and development monitoring and ii) training health workers at all levels about the mechanics of weighing and registering, recognizing when a problem has arisen and making appropriate decisions.

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Considering the extensive use of breast-milk substitutes and the apparent lack of awareness among health workers about local weaning habits and foods, special consideration should be given to the Child Feeding component of the strategy. Appendix A contains specific suggestions regarding this component.

c. The fact that growth monitoring takes into account activities such as CDD, EPI, and malaria control does not mean that it is being suggested that administratively they will have to come under the same managing body. What is being proposed here is to use the concept of "growth and development" and the activity of "weighing" to present in a simple and graphic way to mothers and health workers the results of their integrated care on the status of mothers and children.

d. Finally, better nutritional status results from the success of several health measures being now implemented such as CDD, EPI, and TB and malaria control. It is also dependent upon the success of environmental measures such as the provision of water and adequate garbage and excreta disposal. The continuing access to education, particularly for women, is essential.

2. Growth and Development Monitoring

The keystone of this strategy is the growth monitoring of children under 5 and the monitoring of the health status of pregnant and lactating women. Growth and development monitoring is the systematic contact with every mother/child in the community for the purpose of identifying those that may be presenting problems, giving advice on what can be done and referring those in need of special help to the nearest health facility.

The growth of the child and the progress of the pregnant woman can be recorded on a growth chart card that contains additional information on their health and development status. This card also constitutes a basic element of the educational and communications activities of the program.

Growth charts are not new to Oman. Several have been used in the past and others are now being used with some success. Recently, a new prototype has been proposed for both mothers and children.

3. Procedure

Based on the existing health infrastructure, a working methodology needs to be defined aimed at:

1. Establishing periodic and systematic contact with every pregnant and lactating woman and every child under years. The method suggested is the weighing of children at sufficient intervals and the registering of the weight on a Growth Chart that the mother keeps. A pregnant woman also keeps a card where her progress is recorded.
2. Identifying those children and women at risk.
3. Informing and educating mothers about child-feeding and care.
4. Referring those in need of special care to the nearest link of the health system.

E. PROGRAM OPERATION

At present, two types of programs are being executed. The activities centered at Rustaq could be carefully monitored as a prototype for a rural program while what is now being done at Muttrah (MCH Center, El Nahda Hospital) could be field-tested as an urban approach.

The program may be carried out in four phases:

1. Preparatory Phase

- a. Designation of a Coordinator of Child Health (see Recommendation of the Report).
- b. Identification of participating communities, e.g., Rustaq, Muttrah and perhaps two others.
- c. Training of health personnel serving the communities so that they will be knowledgeable of monitoring and know the appropriate intervention should it be needed.
- d. Identification and training of other personnel at all levels.
- e. Planning, development and testing of methodology.
- f. Identification of the service network to establish continuous contact with every child/mother in the area and link them to the nearest facility of the health system.
- g. Define specific tasks for each link in the system according to the problems to be encountered.
- h. Provision of logistic support (scales, charts, forms, manuals, others).
- i. Motivating the communities about the program.
- j. Program initiation.

2. Exploratory Phase

During the early phases it is essential to develop and refine a field methodology and to obtain pertinent experience regarding the management, execution and supervision of the program.

With appropriate training and support, the medical orderly may become the link between the community and health services at the village level. It is also important to carefully identify the points at which referral is necessary and the most efficient way of doing it.

Growth monitoring is easily accepted by participating communities. (Some reluctance may be found among professionals who may have to come in direct or indirect contact with the program. However, care must be taken to prevent the weighing of children and keeping of records becoming ends in themselves. Also:

- . Scales must be calibrated.
- . There must be a clear understanding on how to fill out the charts.
- . Each mothers must be motivated to understand what is happening to her child and must be given prompt and relevant advice.
- . Results should be discussed with the communities.

The implementation of the program implies continuous supervision and support.

3. Extension Phase

During this phase actions may be extended to other areas of the country. It is important to identify the person(s) who will be responsible for supervision at each area and to ensure that all participating health workers receive appropriate practical training.

4. Evaluation

This program is in itself an evaluation of the feasibility and impact of this type of activity. It is then important that an evaluation component be built into the program to continuously evaluate methods and alternatives with the purpose of identifying the most appropriate way of carrying out the program.

Parallel to the execution of the program information will be produced about what is happening to the health of the children, the women and the community as a whole.

F. EDUCATION AND TRAINING

One of the most critical inputs to this type of programme is the training of those health workers that will take part in it. The following themes should be considered for inclusion in the training.

1. Training of Trainers

Unit 1. Health and Community Participation: An alternative to improve and extend health services. Importance of community education.

Unit 2. Child Health as an activity around which community participation can be generated.

Unit 3. Growth Charts, Monitoring Growth. Its usefulness.

Unit 4. Practical training: Weighing, registering and doing surveys.

Unit 5. Program Management and Organization at the community level. Planning, programming and evaluation of activities.

Unit 6. Critical Areas: Breastfeeding, Weaning, Management of Diarrhoea, Respiratory Infections and other common diseases.

Unit 7. Training of the extension worker.

2. Training of the Extension Agent

Unit 1. Malnutrition

Unit 2. Food, Health and Adequate growth. Importance of growth promotion to prevent malnutrition.

Unit 3. Practical training. How to use and read scales, weigh child, chart growth, fill other forms.

Unit 4. What does the growth chart tell us?

Unit 5. Community Organization for Project Development: Planning, Programming and Evaluation of Activities.

Unit 6. Educating the Mother

Unit 7. Education on Foods, Health and Growth: Breast-feeding, weaning, diarrhoea/other disease management, vaccinations.

3. Education of Mothers

Unit 1. The role of the mother and the community in Child Health

Unit 2. Food, Health and Growth.

Unit 3. Monthly weighing, its importance.

Unit 4. Breast-feeding, the; management of diarrhea and other common diseases; vaccinations.



APPENDIX A

A National Strategy for the Promotion of Breast-feeding

The following outlines a series of suggestions to promote breast-feeding, in view of what appears to be a very dangerous trend towards the use of breast milk substitutes.

1. Purpose

To create a national awareness about the importance of Breast-feeding for child health.

2. Audiences

- a. (for a Public Information Strategy)
 - . General Public
 - . High level government officials
- b. (For a formal education strategy)
 - . Elementary and Secondary Schools Students
- c. (for a non-formal education strategy)
 - . Professionals
 - . Others
 - . Health team
 - . Mothers
 - . General Community
 - . Shopkeepers

3. Contents

The following content categories would have to be adapted to the educational level of the different audiences being more concrete as we move towards audiences with little or no schooling.

- a. Problem definition (frequency and duration of breast-feeding is apparently diminishing in Oman. How this may affect child's health and nutrition. Possible causes and consequences).
- b. Breast-milk and breast-feeding properties and functions
 - 1) Specificity of breast-feeding
 - 2) Human Milk properties
 - 3) Conditions for successful breast-feeding (mother's presence, information and support available to her, production of milk--child and mother's reflexes, psychological and physiological preparation, techniques--, the role of the father).
 - 4) Critical areas:
 - . Feeding the pregnant and lactating women with a mixed diet of locally available foods
 - . Breast-feeding alone at least during the first four months
 - . Introduction of multimixes from 4 months onwards (process, preparation, frequency and quantity of feeds)
 - . Breast-feeding for as long as possible, at least during first two years, or as long as it remains a positive and feasible experience for both mother and child.
 - 5) Reasons to discontinue breast-feeding
 - 6) Danger of bottle-feeding (requirements for its use)
 - 7) Breast-feeding and legal aspects
 - 8) Breast-feeding and the structure of health services

APPENDIX B

Observations and Suggestions on the Cards

Both the Mother and the Child Card should be printed in such a way that they can be read from right to left. This is of utmost importance particularly if both the medical orderly and the mother are to take an important role in this program.

1. The Mother's Card

Too much information has been included in this Card. Six to twelve months into the program a conscientious effort must be made to carefully examine every item as to its usefulness for decision making purposes regarding the health of the mother.

2. The Child's Card

1. It is very important that as soon as a child is entered into the program all the months of his calendar are filled in, making sure that his birth month falls on the specified spaces. None of the cards that have been used in the past followed this procedure which is of critical importance to ensure that age is accurately recorded throughout the five years.

2. To facilitate understanding particularly among medical orderlies, each month must be clearly numbered at the center, like this:

3. As with the Mother's Card, after 6-12 months into the program every item should be carefully examined as to its usefulness regarding decision-making on the child's wellbeing.

4. Components

The strategy may include the following components:

- . Educational activities
- . Activities aimed at regulating the promotion and propaganda of breast milk substitutes, commercial weaning foods and other foods considered to be of little or no nutritional value.
- . Activities aimed at strengthening Health Service Policies on Rooming-in.
- . Legal Aspects
- . Research Projects
- a. Educational Activities

1) Medical and Paramedical personnel. Training courses and Seminars with the purpose of disseminating the most recent information and publications on the value of breast-feeding, the dangers of breast-milk substitutes, and practical aspects related to child feeding.

2) Health team. Considering that this personnel is responsible for some type of educational activity with mothers, pertinent information must be prepared for them so that they can offer simple and non-contradictory messages.

3) Education to the general public. This can be done through a multimedia strategy, to create awareness about the importance of breast-feeding and the critical aspects of child feeding.

4) Organized community groups. Local organized groups-- such as the Omani Women Association--may be integrated to the educational activities with communities and the general public.

5) Secondary and Elementary Schools. The possibility may be explored as to the inclusion of a Unit in the Schools curriculum on the importance of breastfeeding and the food needs of the child for adequate growth.

b. Propaganda Regulation

Care should be taken to regulate the propaganda of breastmilk substitutes that may claim an advantage over breast milk.

c. Strengthening Health Services Practices

This may include:

1) To advise mothers on the preparation for breast-feeding as part of pre-natal care;

2) Rooming-in, which appears to be done very successfully in Oman; and breast-feeding of the child who must be admitted for hospital treatment, also appears to be a general practice;

3) to give pertinent information on breast-feeding when child curve falters, particularly during the first three months of life.

d. Legal Aspects

If feasible, the possibility could be explored for the provision of breast-feeding facilities near the workplace, examination of the working schedule and maternity leave in order to adjust them to breast-feeding requirements.

e. Research Projects

Several research projects can be carried out parallel to the introduction of growth monitoring activities in the target communities. One of these would be to determine the length of breast-feeding in Oman. Basically, what has to be found out is the age of the child and whether he is being breast-fed totally, partially or not at all. This will give us both the length and median age for breast-feeding. Also, the present knowledge of health workers could be assessed using a very short questionnaire addressing the critical aspects of breastfeeding with which they should be familiar. The results, in turn, could then be used to help design both the training and evaluation strategies.