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A SUMMARY OF THE PROCEEDINGS
OF SEMINARS ON ORAL REHYDRATION THERAPY
FOR ACUTE WATER DIARRHEAS

Amman, Irbid, and Kerak, Jordan
(July 12 - 19, 1980)

A Report Prepared By:
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During The Period:
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We would like to express our appreciation for the excellent assistance we received from all levels of the Ministry of Health, Government of Jordan, and from the United States Agency for International Development, Amman. In particular, we would note the invaluable assistance provided by Dr. Sami Khoury and Mr. Jack Thomas in helping to arrange our program. Staff of the Ministry of Health, in particular Dr. Suleiman Subehi and Dr. Suleiman Qubani, were especially helpful in completing our arrangements. Dr. Naji Ayash made possible a detailed review of oral rehydration in the refugee camps near Amman, and Dr. Lubani was kind enough to accompany us to Irbid for one of the seminars.
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EXECUTIVE SUMMARY

A series of seminars on oral rehydration therapy for acute watery diarrheas was held in Jordan on July 12-19, 1980. Over 250 doctors, nurses, and paramedicals attended. The response was enthusiastic. Based on the urgent need to eliminate deaths due to diarrheal diseases, the Minister of Health requested that an oral rehydration training center be established, preferably at Al Bashir Hospital in Amman. Plans for the establishment of such a center, and the appointment of a physician-coordinator and of an assistant coordinator, who would be in charge of the center full-time, were discussed with the Minister, the USAID mission, and coordinating personnel connected to the Ministry of Health. A tentative timetable for the next four months was prepared.
I. INTRODUCTION AND BACKGROUND

Purpose of the Assignment

The purpose of this assignment was to conduct a series of workshops or seminars on modern methods of treating acute watery diarrheas, with the accent on oral rehydration therapy.

Itinerary

The Oral Rehydration Seminars were planned and coordinated by Dr. Suleiman Subehi, Director of Preventive Services, Ministry of Health, Government of Jordan, in collaboration with Dr. Sami Khoury. Two seminars were held in Amman, Jordan, on July 13 and 14; a third was held in Irbid on July 15, and a fourth in Kerak on July 16. On July 17, Dr. Ayash arranged for visits to the refugee camps at Jebel Hussain and Baqaa to discuss oral rehydration with the physicians and staff of the UNHRA Health Services.

Additional meetings were held with the Minister of Health on July 16, at the Pediatric Medical Association on July 16, and at USAID on July 13 and July 17. The Chief of Mission, Mr. Harrell, and Dr. Turman and Mr. Thomas were present at the mission meetings.

A lecture entitled "Recent Advances in the Pathophysiology and Treatment of Acute Watery Diarrheas" was delivered before the Pediatric Medical Society on July 16.

A list of persons contacted is attached as Appendix A.

Country Profile Data

A recent census indicates a population of less than 2 million, with an additional half million or more Jordanians living abroad. Curative health services at hospitals located in urban centers (where more than 70 percent of the population live) have been highly developed, but preventive services are still in the developmental and planning stages. Extension services are needed to cover rural areas and semi-nomadic groups. Twenty-four-hour services in certain high-risk urban areas are needed as well. The cost of living is high but is partially offset by foreign earnings sent back by expatriate Jordanians living in the Gulf States. The new Minister of Health has indicated a keen interest in correcting deficiencies in the health structure, and particularly in tackling the diarrheal disease problem.
The population growth rate--more than 3.4 percent per annum--is one of the world's highest. The infant mortality rate is 97/1,000 live births. The average family size is 7.5.

Diarrheal diseases are the leading cause of death. A recent study showed a case-fatality rate of 5.4 percent at a leading hospital.
II. FINDINGS

Response to the Seminars

The response to the seminars was excellent, as the following findings attest:

a. More than 250 physicians, nurses, and paramedics attended the seminars.

b. There was vigorous and intelligent questioning by participants.

c. More than 200 participants spoke. (Additional literature on oral rehydration will be sent to these persons.)

d. Several hundred oral rehydration ingredients packets were taken by attendees.

e. Participants from the Jordanian Medical Journal requested an article on diarrheal disease therapy for the Journal.

f. Members of the Jordan Pediatric Medical Society requested a lecture presentation. (The presentation was made.)

The most important development was the request by His Excellency, the Minister of Health, Dr. Zuheir Malhas, for a second visit for the purpose of establishing an Oral Rehydration Therapy Training Center. This center will probably be set up at Al Bashir Hospital in Amman.

Summary of Visits and Discussions

The general impression was that the opportunity for a major advance in reducing diarrheal disease case-fatality rates in Jordan is ripe, and that the Ministry of Health, physicians and nurses, and MCH and paramedical workers are sufficiently interested to justify an intensive training program.

To conduct such a program, a training facility with an adequate number of daily admissions of patients with diarrheal dehydration must be designated. The Minister of Health has suggested that an Oral Rehydration Training Center could be established at Al Bashir Hospital.
At the request of the Minister of Health and Dr. Khoury, a draft plan to establish the National Oral Rehydration Training Center was prepared (see Appendix C) and a set of guidelines for practical treatment was written. These materials were to be produced in Arabic and distributed through the health system.
III. SUMMARY OF RECOMMENDATIONS

The seminars in oral rehydration conducted between July 12 and July 18, 1980, in Amman, Irbid, and Karak, Jordan, provided an opportunity for site visits to a number of hospital and clinic facilities treating patients for dehydration due to acute watery diarrhea. The participants also were able to discuss with administrators, physicians, nurses, and MCH and paramedical workers the problem of diarrheal diseases and their management and control. The following is a summary of findings and recommendations. (A full report will follow.)

1. Death rates from diarrheal diseases can be reduced virtually to zero in Jordan by training medical workers in, and disseminating information about, practical modern treatment methods.

2. Due to the various characteristics of the health system in Jordan (high level of hospital- and clinic-based facilities, high literacy rate, high degree of urbanization), the potential control of diarrheal mortality is feasible within a relatively short time.

3. Realization of this potential will require the establishment of a Jordanian Training Facility in a centrally-located hospital where the diarrheal patient caseload is relatively high. Al Bashir Hospital is a suitable choice.

4. To implement this program, the following steps are recommended:

a. Assign space at Al Bashir Hospital for an oral rehydration ward.

b. Assign a project coordinator and an assistant coordinator, both of whom should be interested in pediatrics and health services delivery (both also should be physicians). These persons should be placed in charge of the ward full-time. The positions should be considered permanent.

c. Eight paramedicals or MCH workers should be assigned to the project (two per shift, three 8-hour shifts per day, 7 days per week).
d. Residents should rotate for one-month periods on the oral rehydration ward.

e. A plan for a three- to six-week Oral Rehydration Center Training and Development Project should be developed to initiate the program and to familiarize center and hospital staff with all aspects of oral rehydration therapy in a wide range of typical patients. This plan should be developed and executed jointly by the staffs of the Ministry of Health, Government of Jordan, USAID, and hospital authorities in collaboration with consultants.

f. It is crucial that certain essential supplies be budgeted for the initial training and demonstration project during the first six weeks (non-recurrent expenditure). The total estimated supply expenditure, based on previous similar projects, would be approximately U.S.$20,000.

5. The center will continue to function as a national training resource after the first six weeks. Physicians, nurses, MCH workers, auxiliaries, and others should be rotated through the center for thorough training in rehydration and maintenance therapy. A course curriculum outline will be developed to suit local needs. A copy of a typical curriculum of this type with a Program Project Plan for such a center (one has been developed for Lahore) was given to Dr. Khoury for discussion purposes.

6. Plans should include the coordination of center activities and center "graduates" with National Diarrheal Disease Control Program planning. For example, center "graduates" should receive a certificate of training and be the highest priority group to receive oral rehydration solution packets when they become available, since they will be capable of using the packets most effectively. Similarly, center activities should be coordinated with patient referral routes, MCH efforts, nutrition intervention programs, etc.

7. A possible timetable would be to plan to begin the Center Development Project about August 20th (after Eid). The goal of this six-week project will be to establish the center and provide, with consultant assistance, the initial training of its personnel. However, if this proposed date proves to be too soon to obtain the vital supplies, the second week of October would still be acceptable, judging from hospital admission data from previous years.
8. Use of the oral rehydration solution packets will probably be increased if the packets are available in homes and villages. Supplies could be channeled through distribution depots that are established at locations accessible to villagers. The training of indigenous deliverers (e.g., dayas) will be considered in the future.
Appendix A

LIST OF PERSONS CONTACTED

Government of Jordan and United Nations

His Excellency Dr. Zuheir Malhas, Minister of Health, Government of Jordan

Dr. Rizk Rajhdan, Undersecretary of Health

Dr. Suleiman Subehi, Director of Preventive Services, Ministry of Health

Dr. Suleiman Qubani, Assistant Director, Preventive Services, MOH

Dr. Lubani, Chief, MCH, MOH

Dr. Salim Sumady, Medical Director, Kerak

Dr. Naji Ayash, Medical Director, UNWRA

Dr. Abu Awad, Medical Officer, Baqaa

Dr. Abou Ghazala, UNWRA Medical Officer

Dr. Said-Agh, UNWRA Medical Officer

Dr. Mahdi Abu-Dahab, Chief, Pediatric Department, Al Bashir Hospital

USAID Mission

Dr. Ed·ar C. Harrell, Chief of Mission

Dr. James Turman, Chief of Technical Projects

Mr. Jack Thomas, Health and Population Adviser

Ms. Lois Richards, Deputy Chief of Mission

Dr. Sami Khoury, Health Officer, Mission, and Chairman, Preventive Medicine, University of Jordan

A-1
University of Jordan

Dr. N. Khuri-Bulos, Department of Pediatrics, University Hospital

Dr. Saad Hejasi, Associate Professor, Department of Community Medicine
Appendix B

INSTRUCTIONS TO MOTHERS ON USE OF ORAL REHYDRATION SOLUTION AT HOME

1. Add all the powder in the packet to one liter drinking water.
2. Mix until totally dissolved.
3. Taste the solution. It should be very slightly salty.
4. Examine your baby's eyes to see if they are sunken. Pinch the skin the way the doctor showed you and see if it stands up.
5. See if the baby's diarrhea is totally watery or not.
6. Follow the following steps to give your baby back the water and salt lost in the diarrhea:
   a. If skin and eyes are normal and diarrhea semisolid, continue breastfeeding or formula feeds as usual but give extra fluids, including water, fruit juices, orange squash, etc.
   b. If diarrhea is just like water, and skin or eyes do not appear normal, give two baby bottles of oral solution followed by a third bottle of plain water during the first 3-6 hours. Use 4-ounce bottles if baby is under 3 months old; if older, use 8-ounce bottles. You can use a cup and spoon instead of bottles if you prefer.
   c. After each bottle (or cup) recheck skin and eyes. Continue the oral solution and plain water in this way until the skin and eyes are normal.
   d. When the skin and eyes are normal, stop the oral solution and continue with breast milk or diluted milk formula, 8 ounces every 3-5 hours, plus extra fruit juices and water. Resume normal feedings when stools become curd-like.
   e. If skin and eyes do not improve after six hours, take baby back to doctor immediately.
7. If baby vomits, do not stop oral solution or feedings. Wait 10-15 minutes until stomach is not distended. Then begin oral solution again, but more slowly. If baby vomits more than 4 times, see the doctor.
8. Do not starve the baby. Give more milk and juice, water and other fluids. Give extra juices and bananas after diarrhea stops, for several weeks.

9. Do not use other medicines for diarrhea.
DRAFT

OUTLINE OF PROJECT PROPOSAL FOR ESTABLISHMENT OF
A NATIONAL ORAL REHYDRATION CENTER
AT AL BASHIR HOSPITAL, AMMAN, JORDAN

David R. Nalin, M.D., F.A.C.P., and E. Sullesta, B.Ns., M.P.H.
OUTLINE OF PROJECT PROPOSAL FOR ESTABLISHMENT OF 
A NATIONAL ORAL REHYDRATION CENTER 
AT AL BASHIR HOSPITAL, AMMAN, JORDAN

INTRODUCTION

Based on the request of His Excellency Dr. Zuheir Malhas, Minister 
of Health, Government of Jordan, that a project be implemented to create 
an Oral Rehydration Training Center at Al Bashir Hospital, Amman, the 
following Project Proposal Outline has been drafted.

This proposal is based on similar projects previously carried out in 
other countries. In general, the factors which are absolutely essential 
for a successful introduction of oral rehydration in the most effective 
manner at the national level are as follows:

a. Proper selection of center facility. The Center must be 
located at an existing facility admitting at least three 
patients with 5% or more dehydration due to acute watery 
diarrhea per day. The administrative and professional 
staff of the institution must have strong motivation to 
cooperate in such a venture.

b. Proper selection of key personnel. One highly motivated 
individual interested in oral rehydration and diarrheal 
diseases must be selected to act as a trainer or project 
coordinator after the initial six weeks' establishment of 
the Center. This should be a full-time position taken 
by someone who is part of the Center Facility and who 
is not preoccupied with other administrative or private 
practice responsibilities. One assistant or deputy 
center coordinator should also be assigned to the project.

c. At least two auxiliaries who are literate (or dayas or 
MCH workers, or paramedicals, etc.) must be present during 
each of 3 daily 8-hour shifts, SEVEN DAYS PER WEEK.

d. Residents, interns and/or medical students should be 
assigned to rotate through the Oral Rehydration Center 
Ward on 4-6-week assignments based on specific duty 
shifts. The same should be true of nursing and paramedical 
trainees.

e. The initial development of the Center, including evaluation 
of the innovation in the local context, should closely 
involve the medical community.
f. For this purpose (e) a series of demonstrations and evaluations of whatever local modifications of method or routine which may appear desirable must be carried out.

g. Supplies and a few small equipment items and related air-freight and other expenses (estimated approximate total: U.S.$20,000) are required for the first 6 weeks of demonstrations and training.

h. It has been found that little is accomplished in less than four weeks of intensive interaction between consultants and local institution personnel. Six weeks of innovative inputs is an ideal period. This is due to various characteristics of the psychology of institutional practice and behavior, and the reaction to change, i.e.:

1. Initial skepticism (1st week).

2. Early results begin to convince some (2nd week).


4. Information diffusion generates prestige for innovators, including local collaborators (4th week).

5. Successful results and recognition by community and institutional staff provide basis for suggesting trial implementation of results of project, as a routine practice, to institutionalize the innovation.

**PLAN OF ACTION**

Based on the above, the following plan is recommended:

a. Preliminary discussions between staff of the Ministry of Health, USAID, and Al Bashir Hospital should take place with the goal of gaining acceptance of a leading role for Al Bashir Hospital in the proposed Center. The Ministry staff and coordinating personnel can discuss the matter with hospital authorities.
b. After confirming Center location and agreeing on space allotment adequate to the task, and essential staffing requirements (vide supra), consultants are arranged for. I personally would require at least one assistant consultant (for example, I's. Sullesta might be available if her government agrees) and, ideally, due to my own time constraints, one additional lower-echelon helper from my University of Maryland staff would be a major asset in ensuring project success.

c. The TIMETABLE would be as follows, if the Ministry plans to begin after Ramadan. HOWEVER, the project could also start October 1st, which would allow better time for obtaining supplies and for staff planning, etc. If October is selected, the intervals apportioned to each phase would be the same, but I could be present for the entire period. One assistant would be required.

<table>
<thead>
<tr>
<th>Date</th>
<th>Activity Description</th>
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<tbody>
<tr>
<td>July 19-August 15</td>
<td>Arrange for funding, supplies, Center Facility, staffing, etc.</td>
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<tr>
<td>August 15</td>
<td>Arrive Amman with 1 Assistant Consultant and 1 Assistant Physician.</td>
</tr>
<tr>
<td>August 15-18</td>
<td>Unload or requisition supplies and store in locked storage at Al Bashir; meet staff and hold introductory seminar; review ward space and hospital sleeping quarters; make local personnel and secretarial arrangements, etc.</td>
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<tr>
<td>August 18-September 4</td>
<td>Begin admitting infants to Oral Rehydration Ward (6-8 cribs). Begin demonstration and training sessions. Rotate trainees through.</td>
</tr>
<tr>
<td>September 4</td>
<td>Return to Lahore (holds only for August/September scheduling). Two assistants remain for 4 more weeks of demonstrations and training.</td>
</tr>
<tr>
<td>September 28</td>
<td>Return Amman for follow-up and institutionalization phase. Locally, training staff carry on.</td>
</tr>
<tr>
<td>October 4</td>
<td>Leave Amman.</td>
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</table>
SUPPLIES

A detailed list of supplies and related costs will be sent this week with all specifications. If local purchase is entertained, most of the items are locally available on the market. Prices are higher but air-freight is saved. List includes: Pampers, underpads, syringes, needles, scalp-vein needles, suction tubes, urine bags, test-tube racks, alcohol, gauze pads, Dermicel, KCl IV Glucose, Baby Balance, DiaL-O-Meter, hematocrit tubes, sealant, centrifuge and crit-reader, plastic bags, vacutainer tubes, carboys, baby bottles, bottle warmer (for dozen bottles), refractometer, glycine, thermometers, labels, markers, tape, forms, oral therapy ingredients, freezer test tubes, parafilm, table centrifuge, pasteur pipettes etc.

BUDGET

Estimated U.S.$20,000, all expenses included. A detailed budget will be submitted with the supply list next week.
Appendix D

REHYDRATION AND MAINTENANCE THERAPY
OF INFANTS AND OLDER PATIENTS WITH ACUTE WATERY DIARRHEA
HOW TO CARRY OUT REHYDRATION AND MAINTENANCE THERAPY OF INFANTS AND OLDER PATIENTS WITH ACUTE WATERY DIARRHEA

David R. Nalin, M.D., F.A.C.P., and E. Sullesta, B.Ns., M.P.H.
Appendix E

REFERENCES


LITERATURE DISTRIBUTED AT SEMINARS

"Instructions to Mothers on Use of Oral Rehydration Solution at Home."*


* Xerox; see Appendix B.
INTRODUCTION: RECENT SCIENTIFIC PROGRESS IN DIARRHEAL DISEASE MANAGEMENT.

Research in diarrheal diseases has advanced rapidly during the last two decades. Balance studies have identified the composition of diarrheal stools and have quantitated the losses of water and salts which must be replaced for effective treatment. Many new bacteria and viruses which can cause diarrhea have been identified, but laboratory tests to detect them are largely unnecessary, because therapy depends on prompt replacement of water and salts lost in the diarrheal fluid. Other medications, including antidiarrheal preparations, antiemetics and antibiotics, are largely useless and are expensive and often harmful. They should be avoided except in special cases, such as the use of tetracycline or furoxone for cases of strongly suspected cholera, or of ampicillin for severe shigellosis.

Other studies have shown that glucose absorption is intact during diarrhea, including cholera and infantile diarrheas, and that addition of glucose to solutions of water and salts makes such solutions absorbable during diarrhea (without glucose salt water cannot be absorbed during diarrhea). Application of these findings has led to a practical method of replacing diarrheal salt and water losses by mouth. This is called ORAL REHYDRATION. The oral solution can also be used for ORAL MAINTENANCE of previously rehydrated patients, or of those patients not yet advanced to the stage of dehydration.

Satisfactory results have been obtained using the WHO/UNICEF ORAL REHYDRATION SOLUTION, containing (GRAMS PER LITER OF WATER):

<table>
<thead>
<tr>
<th>Glucose</th>
<th>20.</th>
</tr>
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<tbody>
<tr>
<td>Salt (NaCl)</td>
<td>3½</td>
</tr>
<tr>
<td>Baking Soda (NaHCO₃)</td>
<td>2½</td>
</tr>
<tr>
<td>Potassium Chloride (KCl)</td>
<td>1½</td>
</tr>
</tbody>
</table>

These amounts are sufficient to make one liter of oral solution when added to one liter of drinking water. The water can be boiled first and the salts and glucose added when it has reached a slightly warm temperature. The oral solution should not be boiled after mixing, and should not be given chilled. It can be stored in the refrigerator before use, and warmed slightly before administration to the child. Any unused nonrefrigerated solution should be discarded after 24 hours at room temperature.

The solution as made up contains 2% glucose, which is the optimal amount for promotion of absorption. The solution has been found effective and safe in many clinical and field trials. It can be used in several regimens, as described below.
TREATMENT METHODS.

I. PATIENTS PRESENTING IN SHOCK WITHOUT ANY RADIAL USE.

Diarrhea patients in shock due to dehydration require RAPID REHYDRATION with INTRAVENOUS FLUIDS EQUIVALENT TO 10% of body weight in kilograms. For example, a child with dehydration and shock who weighs 10 kg. on admission (weight can be estimated if no scale is available) should receive 1 kg. (= 1 liter) of intravenous fluids, within one to three hours, to restore pulse and blood pressure to normal strength.

Immediately after restoring normal blood pressure and pulse, oral maintenance therapy should be started. Any delay at this point will lead to recurrence of dehydration and shock.

CHOICE OF INTRAVENOUS FLUIDS.

Patients in shock can receive initial rehydration using the following fluids:

- NORMAL SALINE (or for infants, \(\frac{1}{2}\)-NORMAL SALINE + 5% GLUCOSE)
- RINGER'S LACTATE
- HARTMANN'S SOLUTION

NEVER GIVE PLAIN 5% DEXTROSE FOR INTRAVENOUS REHYDRATION OF DIARRHEA PATIENTS, as it totally lacks the necessary salt and is harmful.

SITE FOR INTRAVENOUS INFUSION.

In patients with shock, veins are often collapsed. DO NOT WASTE TIME SEARCHING FOR A CUTDOWN SITE. If a peripheral or scalp vein is not immediately available, use the technique of FEMORAL VEIN INFUSION for initial therapy. After giving 10% of body weight equivalent via the femoral vein, other veins appear and intravenous drips can be started in peripheral veins.

TECHNIQUE OF FEMORAL VEIN INFUSION.

Mount an 18-gauge (adults) or 20-gauge (children) needle loosely on a syringe. Direct the needle perpendicularly into the femoral vein just medial to the pulsations of the femoral artery in the femoral triangle while withdrawing the hub of the plunger on the syringe so as to draw blood into the
When the dark venous blood enters the syringe, hold the needle firmly with one hand and with the other hand remove the syringe and replace it with the male end of the INTRAVENOUS DRIP TUBING. HOLD THE NEEDLE IN PLACE CAREFULLY IN THE FEMORAL VEIN DURING THE ENTIRE INFUSION PERIOD (this can be done by an attendant).

After initial femoral vein infusion, search for a suitable peripheral vein and stop the femoral infusion as soon as a peripheral IV can be secured.

II. ORAL MAINTENANCE FOLLOWING INITIAL INTRAVENOUS REHYDRATION OF SHOCKED PATIENTS.

I. Oral therapy for ADULTS with profuse watery diarrhea and for ALL AGE PATIENTS WITH CHOLERA.

ADULT DIARRHEA PATIENTS AND ALL AGES OF CHOLERA PATIENTS benefit from oral rehydration given after correction of shock with intravenous rehydration fluids as above.

FOR ADULTS, losses average 500-750 ml. per hour in severe cases, with a maximum of 1 to 1½ liters per hour in severe cholera. Patients can be given 750 ml. of oral solution per hour initially; diarrhea will decrease with time. Tetracycline or furoxone can be added if cholera is strongly suspected.

FOR CHOLERA, optimal management includes use of the CHOLERA COT. This is a simple cheap wood frame and canvas cot with a hole in the center of the canvas, which permits the diarrhea fluid to pass into a calibrated bucket below. Staff periodically check the level of diarrhea (in liters) lost into the bucket, and match this level with equal amounts of appropriate oral (or IV) solutions. If cots are not available, patients' clinical signs of hydration should be closely monitored and oral solution drinking rate must be adjusted to match estimated losses and to keep hydration signs normal. The rate must be increased if any signs of dehydration begin to appear.

If cots are available, patients who are rehydrated and who are begun on oral maintenance therapy with the WHO formula given above must receive oral fluids equivalent to 1½ TIMES the volume of diarrhea lost per hour. For example, such cholera patients who lose 500 ml. diarrhea per hour must drink 750 ml. oral solution per hour to maintain electrolyte balance. Diarrhea generally declines with time.

All such patients should be allowed to drink extra plain water, which should be available at the bedside whenever they want it.

III. INFANTS AND NEONATES WITH MODERATELY SEVERE DEHYDRATION (5-10% dehydrated) due to acute watery diarrhea should receive the 2:1 regimen, as follows:
1. NOTE THE SIGNS OF HYDRATION STATUS, including skin elasticity, sunken eyes, sunken fontanelle, rapid pulse, dry mouth, lack of tears when crying, etc. If shock is present, rehydrate with IV fluids.

2. If no shock is present, but signs of dehydration are present, give the 2:1 oral rehydration regimen.

3. Give 8 ounces of warm oral rehydration solution (WHO formula) every 30 to 60 minutes. After the first two 8-ounce bottles (240 ml. each) are finished, give a third 8-ounce bottle of plain drinking water. CONTINUE GIVING THIS 2:1 regimen until all signs of dehydration disappear (usually 6-8 hours.). DO NOT MIX the plain water and the ORAL SOLUTION together.

4. AS SOON AS HYDRATION SIGNS ARE NORMAL, immediately switch to breast milk or half-strength milk formula. Give 8 ounces every 3-4 hours, even if diarrhea continues.

5. IF DIARRHEA CONTINUES AND SIGNS OF DEHYDRATION BEGIN TO REAPPEAR, PREPARE AND ADMINISTER TO CHILD ANOTHER ROUND OF THE 2:1 FORMULA. REPEAT THIS REGIMEN UNTIL HYDRATION SIGNS AGAIN RETURN TO NORMAL. THEN GO BACK TO MILK.

6. IN GENERAL, WHEN DIARRHEA BECOMES SEMILIQUID AND CURDY PARTICLES APPEAR, CONVALESCENCE IS BEGINNING AND MILK CAN BE CONTINUED. IN THESE CASES GRADUALLY ADVANCE TO WHOLE MILK FORMULA AND STRESS THE NEED FOR ADDITIONAL FLUIDS, INCLUDING FRUIT JUICES, BANANA PUREES, ETC.

7. WHEN DIARRHEA CONTINUES TO BE TOTALLY WATERY WITH NO SOLIDS AT ALL, ORAL SOLUTION THERAPY IS USUALLY NEEDED THE SECOND DAY AS WELL.

8. In cases of totally watery diarrhea continuing past 3 days, suspect shigellosis or salmonellosis. Ampicillin can be added for shigellosis.

9. STUDIES HAVE SHOWN that the use of the above methods makes intravenous therapy unnecessary in 93% of all patients with moderately severe (5-10%) dehydration, and totally unnecessary in milder cases.
IV. ORAL MAINTENANCE IN MILD CASES.

Diarrhea is an "iceberg" disease, and for each severe case there are more than 10 mild, self-limited cases. The mild cases have some loose stools but rarely advance above a semiliquid stool to a totally watery stool. They do not get significant dehydration and therefore are not very thirsty. Thus they do not need, nor do they want much, oral rehydration solution. They prefer tasty fluids, milk, juices, etc.

Mothers seeking treatment for mildly rehydrated infants should be shown how to mix oral rehydration solution correctly and can be given one packet for the home and told to mix it and give it over 24 hours if diarrhea becomes totally watery. The child should not be forced to take all the fluid if it is not thirsty and is alert and not weak. (If a severely dehydrated child refuses the solution, search for a major complicating disorder, such as pneumonia, etc.).

Mothers of mildly ill infants should be told NOT TO STARVE THE CHILD, and to continue giving extra milk and fluid supplements to replace the diarrhea losses. Teach the mother how to check for sunken eyes or decreased skin elasticity, and tell her what they signify. Children do much better with continued nutrition during diarrhea than when they are starved. Starving the child leads to malnutrition and marasmus and is bad therapy.

Instruct mothers to return promptly if skin and eyes become worse and weakness appears despite vigorous oral therapy.
Appendix E

REFERENCES AND LITERATURE DISTRIBUTED AT SEMINARS