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Expanded Program of Immunization - Somali Democratic Republic

AID Assessment July, 1979

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File
Somalia

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EXPANDED PROGRAM OF IMMUNIZATION

I Project Description:

The Expanded Program of Immunization (EPI) is a long term continuing health activity to provide potent vaccines to individuals at risk to prevent morbidity and mortality. EPI is not a single vertical program but is a major initiative of the Somali Ministry of Health to utilize all potential delivery systems to provide a major preventive health service to the Somali people.

In Somalia EPI will be provided through three major program initiatives: MCH Services, the proposed Primary Health Care Project (4 regions) and by regionally based mobile teams. There are currently 75 MCH centers in Somalia. Located in major urban centers, the current MCH centers serve as a potential source of service to an aggregate population of 1,035,000, 36.4% of the national total. The recent agreement with UNFPA to fund 55 MCH assistants will provide for 18 districts (Mogadishu, Korioley, Kurtunwaare, Balad, and Wanle-Wein) one worker for each 1500 urban families and one worker for each 1000 rural families. The proposed AID PHC project will provide immunization as a basic component of Primary Health Care. In areas not serviced by the above programs, immunizations will be delivered by regionally based mobile teams.

EPI in Somalia was launched in February 1978 with initiation of immunization activities in Mogadishu. The initial attach phase was completed in December 1978 and maintenance vaccination was assigned to the 10 MCH centers. In February of 1979 regional programs were initiated in 4 regions; Middle Shabelli, Lower Shabelli, Togdher, and Galbeed.

II Team Scope of Work:

As part of a major new AID African Health Initiative (Combating Childhood Communicable Diseases (CCCD)) Epidemiologists and Operations Officers are being provided under a PASA with the Center for Disease Control "to assess the current country EPI capability, collect data on the 6 EPI diseases, review the country immunization plan and make recommendations for modifications, identify training needs, and provide technical and logistic data to AID Missions and host country Ministries of Health for the Development of AID project papers using the Accelerated Impact Program (AIP) criteria and format". With the concurrence of the AID Mission and the Somalia Ministry of Health Dr. Stanley Foster and Mr. Mike Marty visited Somalia from July 8-July 31, 1979. EPI activities were reviewed

at four levels Headquarters, Mogadishu, Middle Shabelli, and Lower Shabelli. Contact was also made with UNICEF and WHO to determine current and proposed levels of assistance.

Background information is recorded in Dr. Foster's WHO Assignment Report of 20 April-12 May, 1978 (WHO EM/SOM/SPI/002/VA). For clarity this report is divided into 7 sections and 2 addendums:

- III Epidemiology
- IV Program Management
- V Vaccines and Cold Chain
- VI Mogadishu Program
- VII Middle Shabelli Program
- VIII Lower Shabelli Program
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- X Recommendations
- Addendum I Mogadishu Assessment
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III EPIDEMIOLOGY

The goal of all EPI Programs is to reduce morbidity and mortality through administration of potent vaccines to populations at risk. To identify the diseases and age groups most at risk within the Somali population, better definition of disease epidemiology is also required to monitor effect of the program on disease.

Since the May 1978 report significant progress in understanding measles epidemiology has been achieved by the Smallpox Eradication Program. In a superb study Kriz followed up 42 outbreaks of measles with 910 cases in Jamame District of Lower Juba.

Measles Morbidity and Mortality Jamame Village Lower Juba-
Investigation by Kriz:

Age	Total Cases	% Distribution	Cumulative Deaths Distrib.	Case Fatality
1	51	5.6	5.6	0
1	101	4.1	16.7	2
2	170	18.7	35.4	1
3	144	15.8	51.8	2
4	134	14.7	65.9	2
5-9	219	24.1	90	2
10-14	49	5.4	95.4	0
15+	42	4.6	100	0
Total	910			9
				1.0

As Jamame is a food surplus area, the measles associated mortality of 1% probably represents a minimum estimate of national mortality. Extrapolating this rate to the entire population would estimate 8000

Measles associated deaths annually for Somalia.

Another measure of measles impact on health is to quantify complications by age.

Measles Complication Jamame District, Lower Juba

Age	Cases	Diarhhes		Marasmus		Blindness	
		No.	%	No.	%	No.	%
1	51	32	63	3	6	0	
1	101	38	38	5	5	0	
2	170	70	41	18	11	3	1.8
3	144	65	48	11	8	1	.7
4	134	56	42	4	3	1	.8
5-9	219	85	39	12	5	1	.8
10-14	49	11	22	2	4		
15+	42	2	5	2	5		
Total	910	359	39	47	5	6	.7

Morbidity and mortality are largely limited to populations under 5. Age of infection varies with population density and with probability of exposure to other population groups. 1922 measles cases investigated in 1979 by Smallpox Rash Fever Surveillance were analyzed as to age distribution.

Age Distribution of 1922 Measles Cases detected by Smallpox Rash Fever Surveillance:

Age	No.	%	Cumulative %
1	13	0.6	0.6
1	147	7.6	8.2
2	255	13.3	21.5
3	196	10.2	31.7
4	210	10.9	42.6
5	145	7.5	50.2
6	126	6.6	56.8
7	88	4.6	61.4
8	113	5.9	67.3
9	55	2.9	70.2
10-14	293	15.2	85.4
15-19	145	7.5	92.9
19+	136	7.1	100.00

Analyzing this data by Region and population density showed an expected inverse relationship between age of infection and population density.

Median Age of Measles Infection by Region.

Region	Cases	Median Age of Infection	Population density
Mogadishu	158	3	
Lower Shabelli	221	3	
Middle Shabelli	273	4	
Bay	698	5	
Galbeed	342	6	
Sannag	111	12	
Togdher	119	12	

In Jamame median age of infection among nomads, 7 is significantly higher than among the settled populations.

In a separate study by Miner, filter blood specimens were collected from three groups of children and were measured for measles HI antibody., evidence of previous measles infection.

Age Specific Measles HI Antibody among Urban, Rural Settled, and Nomadic Somalis:

Age	Urban			Rural Settled			Nomadic		
	No.		%+	No		%+	No		%+
1	29	1	3	20	1	5	15	0	0
1	25	0	0	21	5	24	14	3	21
2	19	2	11	19	11	58	10	1	10
3	9	4	44	22	18	82	12	5	42
4	14	10	77	17	14	82	16	9	56

This data adds support to the later measles infection among nomads. From a program perspective, the above data has clear implications.

1. Mortality is associated with a low age of infection
2. Low age of infection occurs primarily in settled populations.
3. Maximum program impact on measles will occur when vaccine is targeted to high density populations.

The biggest deficiency in EPI Epidemiology is that of Neonatal Tetanus. Studies by Aden and Birk demonstrated very high rates of Neonatal Tetanus. Further studies by McElroy failed to confirm neonatal tetanus as a major cause of mortality. Systematic studies of neonatal tetanus are a high program priority.

VI Program Management:

Effective implementation of EPI in Somalia will require direct central supervision of all levels of activity. As vaccinations will be carried out by at least three separate operational programs, close coordination will be essential. Assignment of specific individual coordination and supervisory responsibility will be required for each of the following program areas, detailed information will be provided in the WHO EPI training course for program managers (Syria October 1979) and the WHO EPI Manual .

Disease Surveillance
Cold Chain-Equipment Monitoring and Repair
Vaccine Monitoring and Supply
Training
Field Supervision
Program Evaluation-Monthly Data Collection
Assessment

Transport
Health Education

V Vaccines and Cold Chain:

All EPI vaccines for Somalia EPI programs are currently provided by UNICEF. Vaccines supplied, ordered and projected are summarized in Appendix I.

A. Ordering:

Current monitoring of vaccine usage, inventory, and projected needs, needs improvement. The current absence in the country of any in date tetanus toxoid points out the need to strengthen central monitoring of vaccines. Only then will it be possible to match supply with need and prevent the build up of excessive inventories.

B. Vaccine Clearance:

Three shipments of vaccine to Somalia have been lost on entry, one due to inappropriate freezing and two due to delayed notification and clearance. Attention to rapid clearance remains a priority.

C. Central Storage of Vaccine:

Poliomyelitis and Measles vaccines are stored in a new WHO supplied freezer. No thermometer was present in the freezer nor was routine monitoring carried out. The presence of pooled ice and vaccine at the bottom of the freezer indicates at least one major meltdown.

DPT and BCG are stored in three overloaded unmonitored refrigerators at EPI Headquarters and at various MCH refrigerators in Mogadishu. Thermometers and monitoring were absent at all sites. WHO thermometers (in storage) were distributed and daily monitoring of temperatures was initiated in all central refrigeration sites.

Tetanus Toxid (outdated) is kept in the central store cold room at 25 degrees centigrade.

Inventory of Vaccines at Headquarter July, 1979

Vaccine	Location	Temperature	Lot	Expiration Date	Doses
Measles	HQ freezer	-20C	45B34	January, 1981	6400
			M57B34	June, 1981	30000
			S122A4	February, 1980	2460
Poliomyelitis	HW freezer	-20C	56250	Sept 1979	6275
			S132A	May 1980	50000
DPT	HQ and MCH Refrigerators	-5 to+10	72914	Sept 1979	39000
			80-284	June, 1981	100000
TT	MOH Cold Room	+25C	407-VIIA	May, 1979	80000
BCG	HQ and MCH Refrigerators	-5 to+10	80-284	June, 1981	20000

Needles and syringes

New equipment on order from WHO (cold rooms) should solve central and regional vaccine storage. Addition of thermometers and daily temperature recording (posted) should improve monitoring. A monthly inventory system with projections of quarterly and six monthly usage needs to be developed.

D. Vaccine Distribution:

Vaccine is currently distributed either in iced cold boxes or in the mounted Engel refrigerators. The latter appear to cool well while the vehicle is in operation as evidenced by the following test:

Time	Temperature	Setting	Vehicle Status
9:00AM	28C	2	travelling
9:30	- 8	2	travelling
10:00	-16C	2	travelling
10:30	-16C	2	travelling
3:33PM	+8C	2	standing

In view of temperature fluctuations, transport to field in newly ordered cold boxes (with adequate cold dogs) will be more reliable.

E. Regional Vaccine Distribution:

Measles and Polio are stored in large possible oversized freezers. DPT and BCG are stored in small MCH refrigerators. Top opening kerosene refrigerators (on order) will significantly improve regional storage.

F. Field Storage:

All vaccines seen in the field were stored appropriately on ice in thermos jugs. New thermos vaccine carriers will further strengthen this aspect of the cold chain.

If equipment available and on order:

	In-country	On order
1. Freezer top opening compressor 19.1 cubic feet	8	16
2. Walk in cooler, 8 cubic meters		3
3. Absorbtion Refrigerator Kerosene 210 liter kerosene RAK 100		16
4. Cold Boxes 610x435x435		50
5. Thermos vaccine carriers		50

Above equipment will provide adequate central storage and regional storage in those regions with 24 hour electricity (Kismayo, Merka, Jowhar, Mogadishu, and Hargeisa). Storage in other areas with intermittent electricity provides problems. Top opening kerosene refrigerators and freezers will function adequately when properly maintained and are essential in each region when 24 hour electricity or backup cold storage is not available.

Optimum methods to minimize compressor failures due to voltage fluctuations need to be explored (voltage regulators). The relative

effectiveness of absorption versus compressor refrigeration re
needs for maintenance also needs exploration.

Additional manpower in cold chain supervision and maintenance is
being provided by UNICEF.

APPENDIX

Vaccine Provided by UNICEF to Government of Somalia:

		Provided	Projected	
DPT	April 1978	3150 X 20	1980	1981
	May 1978	3150 X 20	37,000	45,000
	Oct 1978	3150 X 20		
	June 1979	5000 X 20		
POLIO	Aug 1977	8400 X 20	37,500	
	Feb 1978	3150 X 20		
	Feb 1979	3780 X 20		
	April 1979	1000 X 20		
	June 1979	2500 X 20		
	Sept 1979	5000 X 20		
	Dec 1979	5000 X 20		
MEASLES	Aug 1977	5600 X 10	25,000	30,000
	Oct 1978	1867 X 10		
	Feb 1979	1200 X 10		
	Apr 1979	2000 X 10		
	June 1979	3000 X 10		
	Sept 1979	3000 X 10		
	Dec 1979	3000 X 10		
BCG	Sept 1978	1000 X 50 200 X 20	9,000	9,000
	Mar 1979	1000 X 50		
	June 1979	2000 X 20		
TETANUS	June 1976	10,000 X 20		
	Feb 1978	2500 X 20 2000 X 20	2,000	2,000

VI Mogadishu Project:

EPI was initiated in Somalia in February 1978. From February to
December 20 vaccinators moved en group through the 13 districts of

Benadir region to provide DPT, Poliomyelitis, and Measles vaccine to children up to the age of 5. 123,759 vaccinations were recorded, an average of 25 vaccinations per vaccinator per day (20 vaccinators x 22 days per month x 11 months). No systematic formal assessment of coverage has yet been performed in Mogadishu. It is possible however to estimate coverage by comparing reported vaccinations with the estimated target population. For Mogadishu with an estimated population of 500,000, the target age group for which complete immunization should have been achieved (9-48 months) is conservatively estimated at 12% or 60,000 children.

Estimated EPI Coverage EPI Mogadishu as estimated by Tally Data Feb-Dec '78

Vaccine	Target	Vaccinations	Estimated Coverages %
DPT 1	60000	18690	31.1
DPT 2	60000	15476	25.8
DPT 3	60000	14172	23.6
POLIO 1	60000	23075	38.6
POLIO 2	60000	18625	31.0
POLIO 3	60000	17078	28.5
Measles	60000	16613	27.7

Actual coverage which would include routine MCH vaccination may be higher. In a recent MCH initiative each MCH nurse has enumerated and encouraged vaccination in 200 families. Analysis of the high risk population in one of these groups (1 and 2 year old children) did show higher coverage:

Vaccine	Number	Immunized	%Immunized
DPT 1 2 3	82	52	64
DPT 0		15	19
POLIO 1 2 3		52	64
POLIO 0		15	19
Measles 1		24	30
Measles 0		58	70

Maintenance immunization in Mogadishu is the responsibility of the MCH clinics. Full immunization would require an estimated 1600 vaccinations of each type per month. Using MCH Tally day for January-March 1979 it is possible to estimate the current level of maintenance immunization.

EPI Maintenance Mogadishu through MCH Centers January-March, 1979

Vaccine	January-March Total	Monthly Average	Expected	% Coverage
DPT 1	3049	1016	1600	63
DPT 2	2470	823	1600	51
DPT 3	2310	770		48
POLIO 1	2750	917		57
POLIO 2	2326	775		48
POLIO 3	2349	783		49
Measles	1665	555		35
BCG	874	291		18
TET TOX 1	1893	631		39
TET TOX 2	1624	541		34

Although these levels are encouraging, significant improvements will need to be implemented to increase coverage to 1982 targeted of 80%. Three MCH centers (Hamarweyne, El Gab, Hodon) were visited to assess current immunization activities. Refrigerators were functioning at each center with temperatures of 0, 10, and 5 degrees centigrade. In none of the centers was a refrigerator thermometer present nor was there any system of temperature monitoring. Refrigerators were overloaded with central supplies of vaccine, a practice that needs to be discontinued as soon as possible. Vaccine handling and vaccination techniques were satisfactory. Centers did not appear to be organized structurally or functionally to handle large numbers of patients. The current physical structure of one entrance with several side rooms is cumbersome. Exit doors would be very useful. MCH center use as indicated by monthly Tally and by observation is low. Staff frequently outnumbered patients. Discussions with staff indicated a lack of understanding of area or population served or target load that the center should be handling. Without this understanding it will be difficult to develop an outreach program to make the MCH service more accessible to the public.

One of the explanations for the low measles vaccine coverage is that children with a history of measles have been excluded from immunization. Simultaneously with the campaign Mogadishu has had a major epidemic of measles. Fever rash cases identified as measles in the smallpox surveillance system are as follows:

Month	Measles Cases in Mogadishu detected by Smallpox Surveillance		
	1977	1978	1979
January		38	135
February		43	194
March		49	36
April			33
May			12

Month	Year		
	1977	1978	1979
June		167	
July		141	
August	2	171	
September	10	107	
October	2	141	
November	11	104	
December	13	125	

Although the epidemic occurred during the latter stages of the campaign, the continuation of high number of cases during January and February indicates that the levels of immunity were not sufficient to stop transmission. Although no systematic study of vaccination status of cases was carried out the general impression of investigators was that cases were occurring mostly in the unvaccinated.

The future of EPI in Mogadishu clearly rests with the ability of the MCH to expand their coverage. The addition of the WFPA MCH assistants should facilitate contact. Services will however have to be made more convenient to the public to ensure fuller utilization.

To document program achievement to date and to provide a baseline for projected experimental MCH services a systematic sample survey was carried out in Mogadishu (Addendum I).

VII Middle Shabelli:

EPI was inaugurated in Middle Shabelli in February 1979. A team of 1 Team Leader, 1 Driver, and 8 vaccinators is vaccinating Jowhar town and surrounding villages at 21 collecting sites. Two 3-4 person teams work each of two sites daily from 7 AM to Noon. Local political committees and buildings (orientation centers) are used extensively for publicity.

Vaccination Age	Tally Data February 19-July 14, 1979						
	DPT 1	DPT 2	DPT 3	Polio 1	Polio 2	Polio 3	Measles
1	632	530	583	762	579	712	519
1-2	600	523	548	951	813	835	700
3-4	507	417	562	920	626	682	685
Total	1739	1470	1693	2633	2016	2232	1904

Over 5 months 13687 vaccinations had been given in 1000 person days of work (8 vaccinators, X 25 days per month times 5 months) or 13.7 vaccination per vaccinator day. Looking at vaccinations per day

over time, rates have fallen as the number of susceptible decreased.

Date	Vaccinations	Vaccination per Vaccinator Day
19/2-19/3	2999	15
20/3-20/4	3392	17
20/4-20/5	3441	17
21/5-31/5	2161	34
1/6-30/6	1111	6
1/7-14/7	773	8

Estimates of current vaccination coverage vary from 75% (team leader) to 25% (Tally Data). In order to better assess current coverage a cluster survey coverage assessment was carried out. (Addendum II).

Program Operation:

EPI has its own locked office adjacent to the Jowhar MCH center. Measles and Polio vaccine are stored in slightly damaged freezer (In future packing should not be removed until appliance is distributed to field.) Temperature at bottom of freezer -9 at top 0C. DPT is stored in poorly closing UNICEF MCH refrigerator +4-10C. No inventory of vaccine is maintained nor is temperature monitored.

Teams arrive at office at 7AM where supplies (new cold boxes, syringes, and needles, alcohol, and forms) are collectex. Operation at site demonstrated good technique in screening, vaccine administration, and recording. Areas for improvement discussed with team.

1. Site organization to maximize efficiency (entrance, waiting, registration, vaccination, health education, exit)
2. Stop practice of excluding children with past history of measles (measles vaccine) and pertussis (DPT vaccine)..
3. Develop and post advance tour program rather than current day to day planning.
4. Intensify current efforts to educate mothers on value of vaccination, need to complete full series, on possibility of and care for febrile reactions. Teams strongly recommended that they be provided ASA to supply to mothers.

Expansion of EPI beyond Jowhar town will be difficult. Special attention in planning, supervision, and assessment will be needed.

Initially it is proposed that teams spend five nights a week in the field working 4-7PM and 6-9AM. Using smallpox maps and lists of fixed search units a three week.

Program for Search Zone 9 was developed with the Team Leader

Week	Day	Team	Village	No Houses
1	Sat - Tue	I	Burfule	250
1	Wed	I	Mareery	77
1	Sat-Tues	II	BarroWayne	248
1	Wed	II	Gumbe	86
2	Sat-Mon	I	Kulmis	160
2	Tues-Wed	I	Sabban	100
2	Sat-Mon	II	Bulo Ahmed	160
2	Tues-Wed	II	Lama Waar	113
3	Sat-Sun	I	Baroy	100
3	Mon-Tues	I	Banaarey	120
3	Wed	I	Muryade	40
3	Sat-Mon	II	Bulla War	140
3	Tues	II	Mafadly	40
3	Wed	II	Gefey Well	45

At each site team would vaccinate main village, surrounding smaller villages, and nomads in the area. Six monthly rounds should be used. Maximum use of local leadership will be needed for publicity and local support.

Variables that will need checking will include coverage, time required to cover village, and size of team required. Hopefully it will be possible to speed up operation as teams develop efficiency.

Current cold chain will maintain vaccine for 3 days in the field. Addition of ordered cold boxes should extend this period to 5 days.

Program monitoring in terms of Tally Data, monthly reports, and vehicle monitoring are major problems. Simplified recording and reporting forms are submitted in Section X of this report.

The current pink vaccination card is holding up poorly. A more durable card with plastic envelope is need.

In summary the Middle Shabelli operation has run well in Jowhar. Expansion to the field is the next challenge.

VIII

Lower Shabelli:

Lower Shabelli with its five districts and 900,000 population contains

30% of the Somali population. In terms of national achievement of objectives, success in Lower Shabelli is required.

As observed during July 18 and 19 the EPI program in Lower Shabelli has major grounds for improvement. During its first four months of operation in Merka and Shallanbot 13,409 vaccinations were recorded by 10 vaccinators, an average of 2 vaccinations per vaccinator per day.

Coverage in the high risk 1 and 2 year age group as estimated by Tally Data is less than 10% four clusters of 10 children each were sampled from the three villages of Merka town and from Shallanbot.

Vaccination Coverage in 39 Sampled Children-Lower Shabelli July, 1979

Vaccine	Number	Percent
DPT 0	12	30
DPT 1	10	25
DPT 2	8	20
DPT 3	9	23
POLIO 0	10	25
POLIO 1	10	25
POLIO 2	10	25
POLIO 3	9	23
Measles 0	36	90
Measles 1	3	8

Although the number of clusters is not statistically significant, low coverage is confirmed.

Problems identified during the visit for which administrative action, training, and supervision are needed are as follows:

Cold Chain

- No thermometers
- Non monitoring of temperature
- High temperature DPT storage + 10C
- No vaccine inventory

Office

- No tour program
- No weekly or monthly vaccination tally

Field

- No measles vaccine carried to field
- Recording of vaccination not done
- Poor site organization

Vehicle

- No log book or monitoring of petrol use

A session to discuss problems and solutions was held with the local political committee and the vaccination team to identify problems and to provide possible solutions.

Problem 1 Parents do not know value of vaccination

Solutions: More Health Education
Provide Megaphones
Improve Person to Person Health Education at Vaccination Site
Need Poster and Recognition Card Showing Sick and Well Children

Problem 2 Low coverage-most people are away at farms during time that team is in village.

Solutions: Schedule vaccination sessions for late afternoon 3-8PM especially Fridays when most everyone is home.

Problem 3 Fever reactions to vaccination reduce attendance at round 2 and 3..

Solutions: Inform mothers of possibility of fever.
Provide aspirin to mothers at time of vaccination.

Problem 4 Mothers want treatment for sick children.

Solution: Provide drugs to team (Past experience has found this totally disruptive).

The leadership potential demonstrated in Jowhar was not readily apparent in Merka. It is also not clear how many of the current team will walk and spend nights in the field program. Should replacement be necessary priority should be given to smallpox surveillance agents who have proved their reliability.

In summary the program in Lower Shabelli is operational but is not performing at a level which will significantly impact on morbidity and mortality. Training, supervision, and possibly personnel replacements will be necessary.

Conclusions:

EPI has been launched in 5 of the 16 regions of Somalia. Effective implementation will require major inputs in training, supervision, and evaluation. Optimum methodology will need to be developed

through planned monitored trials.

Equipment in country and on order will provide a satisfactory cold chain to the regional level. This will ensure maintenance of cold chain for at least 72 hours from each regional base.

At this stage of the program priority should be placed on program experimentation and quality rather than rapid expansion. Optimum strategy for service delivery to rural areas is not readily apparent. Schedules will require local planning to maximize accessibility (road conditions) and access (public). This will probably require hours of work other than usual government hours, (evening and early morning vaccination with night halt in villages). In Somalia programs may be vehicle based or walking based. Each has its advantages and disadvantages.

Current reliance on city based workers and program initiation in regional capitals are developing patterns of work which will not transfer readily to rural operation. Future programs need to limit urban exposure to 4-6 weeks (to develop technique) and move quickly to field operation.

Public cooperation will require continuous exposure and education. As the people recognizes the protective effect of vaccination, cooperation will improve. Every vaccination given is important in establishing the credibility of vaccination. Resources of health education unit need to be more thoroughly utilized.

Neonatal tetanus may be the most important EPI disease in Somalia. At present no EPI program is administering Tetanus Toxoid. In Addition lack of in date vaccine has stopped almost all Tetanus Toxoid administration through MCHs.

X Recommendations:

A. Cold Chain

1. Keep all appliances in export packaging until delivered to final destinations.
2. Provide thermometer to every cold chain appliance.
3. Implement daily poster record of temperatures.
4. Develop contingency back up plans for cold chain failure at each level.
5. Strengthen curren UNICEF liaison re equipment maintenance and repair.

B. Vaccine

1. Establish WHO recommended procedures (Blue Book) for vaccine inventory control.
2. Implement regular monthly monitoring of vaccine use by all units giving vaccines including MCH (Appendix A).
3. Procure ASAP potent in date tetanus toxoid.
4. Transfer outdated tetanus toxoid to adequate refrigeration and send for refrigeration.

C. Training

1. Develop specific training objectives for each month.
2. Provide each team with at least two day training per months.

D. Operations

1. In each region schedule 2 month rural delivery for the two months following Ramadan.
2. Proceed operation with training session to review objectives and methods.
3. Systematically vary work plan to determine optimum time and duration of field operation.
4. Ensure continued access to samllpox maps and lists of fixed search units (Very important).
5. Evaluate coverage of rural programs.
6. Defer expansion until operational methodologies are proven.
7. Provide DPT and Mealse Vaccine to all children irregardless of desease history.

E. Program Monitoring

1. Develop advance monthly program for headquarters and field personnel.
2. Implement simplified form for daily recording of vaccinations Appendix A
3. Establish regular monthly reporting form from each unit giving vaccine MCH and Mobile Team Appendix B.
4. Prepare and distribute monthly report of activities.
5. Explore alternatives for current vaccination card.
6. Carry out field assessment of at least one regional program each month.

G. Program Review

1. It is strongly recommended that a program review session be held between Somali attendees at October course and Regional

For each child name, age, and presence or absence of vaccination card were recorded. For children with cards the vaccinations on the cards were recorded on the tally form. Five children whose cards had been lost were excluded from the sample. Using the nearest door method of Christenson, houses were visited until at least 7 children were selected for each cluster. If the last house included more than one child in the proper age group all were included in the sample.

Results: Results are summarized in the following table.

Section	1 # of Child.	2 Ages			3 Card	4 No. Card	5 DPT 1	6 DPT 2	7 DPT 3	8 POLIO 1	9 POLIO 2	10 POLIO 3	11 MSL	12 BGC
		1	2	3										
A. Kulmis	59	17	22	20	52	7	27	17	15	52	43	35	32	0
B. %	24	29	37	34	88	12	46	29	25	88	73	59	54	0
C. Hantiwadag	70	23	26	21	51	19	32	18	8	51	43	20	30	0
D. %	29	33	37	30	73	27	46	26	11	73	61	29	43	0
E. Horseed	57	23	16	18	50	7	40	27	19	47	35	20	19	2
F. %	23	40	28	32	88	12	70	47	33	22	61	35	33	4
G. 21 Oktober	58	21	20	17	42	16	24	14	4	41	28	11	26	0
H. %	24	36	34	30	72	28	41	24	7	21	48	19	45	0
I. Total	244	84	84	76	195	49	123	76	46	191	139	86	107	2
J. %	100	34	34	32	80	20	50	31	19	78	57	35	44	1

Eighty percent of the children enumerated had a vaccination card. Many of the cards were severely mutilated, half eaten, water damaged dirty and torn.

In spite of their condition their presence represents a major achievement during the first few months of the program. 50% of the children had DPT 1, 31% DPT2, and 19% DPT3. For polio 78% had polio 1, 57% polio 2, and 35% polio 3. The discrepancy between DPT and polio (vaccine given simultaneously in API) is due to the teams practice of excluding for DPT all children with

a history of pertussis. The low coverage for measles also relates to exclusion on the basis of history. The 1% rate for BCG as a major responsibility.

Interpretation:

At the time that the survey was carried out in the mornings, many children had been left with friends or relatives while parents were away on the farms. It was not possible to include these children in the survey. The evening survey was better in terms of finding parents at home. The survey included all parts of the Jowhar community but was not statistically tight as individual district population data, for which sample selection should have been adjusted was not available. Also the method of selecting the first house, although random, may have been biased. In the future the orientation center lists of households will provide a better frame for sampling.

Histories will no longer be used to exclude children from immunization. More attention will be needed in health education on the importance of completing immunization. A major reason for non completion as reported by the team was the occurrence of febrile reactions. Although mothers were told of the possibility and the effectiveness of aspirin, most mothers complained that they didn't have funds or access. The Team strongly recommended that aspirin be supplied to each child on vaccination. This is a good recommendation which should be tried on a trial basis.

The local committees which have assisted in the campaign and the vaccination team should be commended for the results obtained. Future training, program experimentation, and assessment will be needed to achieve 1982 80% coverage of the population.

GOVERNMENT OF SOMALI DEMOCRATIC REPUBLIC
 MONTHLY REPORT OF IMMUNIZATIONS
 DISTRICT _____ UNIT _____ MONTH _____ YEAR _____

NO. DPT ₂	POLIO	DPT ₃	POLIO	MEASLES	BCG	BCG SCHOOLS	TETANUS 1	TETANUS 2	TETANUS CHILD

TOTAL IN VIALS		
NO. =	LAST MONTH	VIALS USED

VACCINATION UNIT
No Workers _____
* No Days Worked _____
= No Work Days _____
∴ TOTAL VACC _____
= VACC/work/day _____
NUMBER SIGNS IN FIELD

VEHICLE NO
Km End of month
- Km BEGIN OF MONTH
= KM TRAVELLED
∴ L PETROL
= KM / L
DATE LAST OIL CHANGE
DATE LAST MAINTENANCE

Best Available Document

DAILY REPORT OF IMMUNIZATION

DISTRICT _____ LOCATION _____

DATE DAY MONTH YEAR

DPT ₁	POLIO ₁	DPT ₂	POLIO ₂	DPT ₃	POLIO ₃	MEASLES	BGG	School	Other

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Addendum I - Mogadishu Assessment

The Mogadishu E.P.I. Cluster assessment was conducted July 22 through July 25 by Mr. Ahmed Salah Suleyman, Chief of Operation Office (E.P.I) and Mr. Michael J. Marty, C.D.C. Public Health Advisor. Surveys were carried out daily between the hours of 7:30 AM to 1:00 PM. The surveyors express their gratitude to the Smallpox Program for their assistance, use of maps and demographic data. Many individuals workers from the orientation and MCH Centers were exceptionally helpful in locating the cluster sites.

Thirteen districts comprise the Benadir Region. The districts are subdivided into eightythree wards (waaxda). Boundaries are not well defined and it was discovered after the assessment was underway that many of the residents were not aware of their specific ward number. In order to achieve a random cluster sample and compile a unbiased collection of data, the following procedure was followed. The Smallpox Program had just finished canvassing the entire Benadir Region. They had data stating the number of houses, number of families and number of members per family in each population component. This information was used as a basis for arriving at the total population figure for Mogadishu. For example: In the Waberi District. Horseed - 1 ward there are 225 houses with 3.2 families per house and 5.6 members per family. Therefore the estimated population of this ward is 4,032, using the formula number of houses x number of families x number of members per family this process was carried out in all the wards.

The population for each of the 83 wards was cumulated serially. The sample

interval was determined by dividing the total population by 30. To achieve the first sample site, a 10 shilling note was selected at random. The first four serial number digits between zero and the sample interval become the first cluster site. The remaining sample districts were selected serially by adding the sample interval until 30 sites were selected. The individual cluster locations are enumerated with estimated population and map. (attachmēt).

CLUSTER SITES			Est. Population
District	Ward		
1. WADAJIR	Xaawo Taako	- 1	7,318
2. WADAJIR	Yassin Cartan	- 1	2,055
3. WADAJIR	J. Daauud	- 3	4,816
4. HOODON	Oktoober	- 1	3,326
5. HOODON	Axmed Gurey	- 3	5,019
6. HOODON	Kacaan	- 3	2,943
7. HOODON	Taleex	- 4	2,308
8. HAWLWADAGH	Xaawo Taako	- 1	7,945
9. HAWLWADAGH	Xaawo Taako	- 4	8,700
10. HAWLWADAGH	Sagawidin	- 3	8,477
11. HAWLWADAGH	Axmed Gurey	- 3	12,149
12. HALWADAGH	Axmed Gurey	- 4	12,252
13. WARDHIGLEY	Barwaaqo	- 1	9,405
14. WARDHIGLEY	Barwaaqo	- 4	6,207

15.	WARDHIGLEY	Horseed	- 2	4,602
16.	WARDHIGLEY	Hantiwadagh	- 4	2,997
17.	WARDHIGLEY	Hnatiwadagh	- 1	5,969
18.	YAAGSHIID	Kacaan	- 1	4,714
19.	YAAGSHIID	Heegan	- 4	3,303
20.	BOONDHERE	Nasiib Buundi	- 3	5,590
21.	Boondhere	yusuf Kowneyn	- 3	2,808
22.	SHIIBIS	Kacaan	- 2	1,903
23.	KAARAAN	Wajiir	- 1 & 2	4,834
24.	ABDI AZIS	Lowya Cadde	- 1	845
25.	SHINGAANI	Moyaaaale	- 1	2,393
26.	HAMER WEYNE	Kacaan	- 1	1,382
27.	HAMER JABJAB	Hantiwadag	- 3	2,773
28.	WABERI	Oktoober	- 3	4,677
29.	WABERI	Horseed	- 1	4,032
30.	WABERI	1ST MAY	- 3	3,494

After a cluster site was identified a random starting house was selected. At each house all children 1,2 and 3 years of age were assessed for the presence or absence of vaccinations. The mothers were asked to produce the pink vaccination card as a record of their children's immunizations.

The data was collected on the cards that were available . The Mogadishu E.P.I. has been in operation for over a year, therefore, many of the pink

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cards had been lost or destroyed. If the cards could not be produced the mothers were specifically questioned as to how many times their child had been given drops (Polio), buttock injection (DPT), arm injection (measles) and scar for B.C.G. It is felt that the histories given were reliable based on the similarity with the sample population that had cards. The number of the children and data were enumerated and recorded on the following format.

CLUSTER AREA

(11)

NAME	AGES	Hawlwadagh				Axmed Gurey				MSL	BCG
		Card	No Card	1 DPT	1 POL	2 DPT	2 POL	3 DPT	3 POL		
1. Abdulqadir Abukar	1	X		1	1	1	1			1	HX
2. Farxiya Ismacil	3	X		1	1	1	1	1	1	1	HX
3. Muxyadin	2	X		1	1	1	1	1	1	1	
4. Ismahan Abdi	1			1	1	1	1				
5. Hussein Moh'd	3	X		1	1	1	1			1	HX
6. Muxyadin Moh'd	1	X		1	1	1	1			1	HX
7. Abdi Ahmed	1			1	1	1	1	1	1	1	
	7	2	5	7	7	7	7	3	3	6	123
											4/1/2

CLUSTER AREA

(12)

NAME	AGES	Hawlwadagh				Saqawidiin				MSL	BCG
		Card	No Card	1 DPT	1 POL	2 DPT	2 POL	3 DPT	3 POL		
1. Lu1 Osman	3				1		1		1		
2. Safiya Osman	1			1	1	1	1	1	1	1	
3. Samsam Hassan	1			1	1	1	1	1	1	1	
4. Moh'd Abdi	2			1	1	1	1				
5. Moh'd Hassan	2				1		1				
6. Hodon Hassan	2				1		1				
7. Abdi Hassan	2				1		1				
	7	7		3	7	3	7	2	3	2	21

Using the nearest door method of Christenson, houses were visited until at least 7 children were selected for each cluster. If the last house included more than one child in the sample group all were included.

Results are summarized in the following table. The categories are described into two groups; samples with cards and samples giving a history of vaccination but without cards.

CLUSTER SAMPLE	# Of Children	Ages			Card	No Card	1		2		3		MSC	BCG
		1	2	3			DPT	POL	DPT	POL	DPT	POL		
A With cards	129	46	50	43	124	15	106	121	21	109	71	81	68	13
B %	65	33	36	31	89	11	76	87	65	78	51	58	49	9
C History/card lost	74	14	36	24	-	74	73	74	67	68	33	33	54	2
D %	35	19	49	32	-	100	99	100	90	92	45	45	73	3
E Total	213	60	86	67	124	89	179	195	158	177	104	114	122	15
F %	100	28	40	32	56	42	84	92	74	83	49	54	57	7

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Fifty eight percent of the children enumerated had a vaccination card. Many of the cards were in very bad condition. Some mothers had said that they had thrown the cards away not expecting them to be of any further use. A few mothers had vaccination records scratched on the back of syringe boxes. Evidently the standardized cards were in short supply at the local MCH Center. Much of the documented vaccination record of those children with cards was written on the back. This further addresses the need to come up with a better card that will be utilized by mothers and the E.P.I. Program workers.

35% of the sample gave accurate histories of vaccination. These children are included in the total assessment data and appear to fall within acceptable ranges. 84% of the children had DPT1, 74% DPT 2 and, 49% DPT 3, 92% were given Polio, 83% Polio 2 and 54% Polio 3. The discrepancy between DPT and Polio vaccines is due to the practice of excluding DPT to all children with a history of pertussis. The 57% coverage for measles also relates to the exclusion on the basis of history. The 7% rate of BCG coverage indicate that the program has not accepted BCG as a priority effort.

Interpretation:

The children excluded from the survey were those children left with friends or relatives while the mothers were at work or at the market. This absence of the parent posed more of a problem after 10 AM in the morning. It may be advisable to conduct future assessment between 7 am-9am and 5pm-6:30pm.

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The survey included cluster in all thirteen districts in the Benadir Region. The method of selection for the first house, although random, may have been biased. At this time it was not possible to select a block on a random number basis because of the difficulty in establishing exact boundaries.

It is felt that the samples selected represent assessment data in the area to which they were assigned. This assignment was based upon the cooperation of many local residents and orientation center workers who verified the respective cluster sites.

Histories are no longer to be used on exclusion of children from immunization. Health education will need to play a more active role in assuring compliance and the importance of maintaining health records of children.

The local units that have assisted in the assessment and vaccination must be commended for the results obtained. Future training, demonstration, program experimentation, and record and/or field assessment are needed to provide better coverage of the population.

