

The following report was prepared in consultation with East Pakistan Government health officials by a WHO team (Dr D. A. Henderson, WHO, Geneva; Dr A. Tabibzadeh, WHO Representative, Pakistan; and Dr V. Parisi, Malaria Adviser, Pakistan) during the course of their visit - 29 June to 8 July 1971.

INTRODUCTION

At present, the health of the population of East Pakistan appraised in terms of nutritional status and incidence of the major infectious diseases, is generally satisfactory. The nutritional status, while recognized to be only marginally adequate, is believed to be essentially the same as in recent years except possibly in some of the less accessible areas devastated by the cyclone. Cholera incidence is at its seasonal low point; the country is believed to be smallpox-free and the malaria situation, after 9 years of an eradication programme, is perhaps at its most favourable. Medical Services which were disrupted during late March and April appear to be slowly recovering. The most immediately pressing problems are a severe shortage of drugs and basic medical supplies of many types at essentially every level and possible nutritional problems in parts of the cyclone affected area.

Within the next 4 to 8 weeks, however, the situation almost certainly will become increasingly serious. Anticipated problems in the area of health necessarily interrelate with the many other problems being experienced in food production, transport and security. The sequential events of floods in the autumn, the cyclone in November and the difficulties since March have stressed to breaking point an already fragile transport and communications network; food production, insufficient during normal times, has been further compromised, and uncertainty regarding security in some areas, especially within 8 to 10 miles of the border, impairs active restorative efforts. While the future is difficult to forecast with precision, it is clear that major problems must be anticipated beginning within the next two to three months and extending for a year or more. Despite concerted efforts now being made by national and international authorities, moderate to serious food shortages are almost inevitable in scattered, perhaps moderately extensive food deficit areas of the central, southern and eastern parts of the Province. This is in consequence

of indigenous food production being sharply reduced and internal transportation, both of indigenously produced and imported foodstuffs, as well as other commodities, being severely curtailed.

Food shortages necessarily imply the possible development of nutritional deficiencies and inevitably are associated with internal migration of the population and the spread of infectious diseases of all types, including three major problem diseases, cholera, malaria and smallpox. The extent and severity of health problems to be anticipated is thus correlated in fact with the success of the efforts now being made to cope with the problem of food deficits. At the same time food shortages are developing over the ensuing months, the seasonal increase of cholera incidence will occur in most of East Pakistan beginning in August or September and reaching a peak during the October to January period. With moderate to extensive internal migration, the extent and severity of outbreaks may be substantially greater than usual as infection is carried rapidly from place to place and existing water sources are more rapidly and heavily polluted than usual. The probability of one or more importations of smallpox from India or West Pakistan into now smallpox-free East Pakistan increases sharply with the advent of the normal December to May "smallpox season". With a partially disrupted reporting-surveillance network and increased internal migration, moderate to severe outbreaks in a number of areas may be anticipated following importation. Malaria constitutes a further major problem. Both spraying and surveillance have been largely suspended since April. The re-establishment of transmission throughout the northern and western parts of the Province is increasingly probable as a result of population movement to and from malarious areas. During the September-November and March-May transmission seasons, the development of uncontrolled localized outbreaks in these areas, where there are now substantial numbers of non-immune children, would provide the basis for massive outbreaks during 1972. If falciparum (malignant tertian) malaria were the agent, outbreaks could assume disastrous proportions. Finally, internal migration, coupled in some areas with malnutrition, could cause a sharp increase in the frequency and severity of a variety of communicable diseases, thus taxing existing medical facilities, as well as medical supplies which are now in seriously short supply and for which, at present, the normal distribution network has been almost totally disrupted. The return of large numbers of refugees would naturally exacerbate these problems.

The present situation is superficially deceptive as from the nutritional and infectious disease standpoint, problems do not now differ significantly from those in previous years. The period when obvious problems will demand emergency assistance can be foreseen as beginning in two to three months and extending over at least one to two years. Obviously the effectiveness of emergency action now will determine the extent of difficulties ahead.

PROPOSED ACTION

Priorities for specific action are obviously necessary. In consultation with government health authorities, several specific areas were identified based on considerations noted above and the existence of a structure believed to be capable of conducting some or all of the activities depending on security factors. Because of the emergency needs and difficulties with communications, significant innovation or modification of present structure and scope of activity necessarily have had to be avoided. Specific subject areas are as follows:

1. Cholera (including water supply);
2. Smallpox;
3. Malaria;
4. Nutrition;
5. Drug supply and distribution.

Specific programmes to cope with various other possible disease problems were considered and rejected for a variety of reasons. A variety of parasitic diseases, other than malaria, are admittedly extensive but not susceptible to short-term or straightforward solution. Although some increase in incidence in these would not be surprising, it should not be substantial. The frequency of various respiratory illnesses might well increase but no potentially applicable effective preventive measures could be identified. Therapy for pneumonias to the extent possible, would have to be provided by existing medical facilities. Diarrhoeal diseases of all types are prevalent and, as with cholera, can be expected to be somewhat more frequent in the coming months. Improved water supply (see below) is a long-term measure; administration of typhoid vaccine would appear to be the only possible short-term measure which might be taken. This was considered and rejected on the grounds that typhoid has been long prevalent and the overall level of immunity is presumed to be reasonably high. Widespread administration of vaccine would serve to

protect a comparatively small proportion and in the short term would involve more difficulties in procurement, distribution and administration than seemed worthwhile from the potential benefits to be realized. Of other major problem diseases, neither plague nor yellow fever are prevalent in East Pakistan. Poliomyelitis is a minimal problem. Typhus is known in the Chittagong Hill Tracts but taking into account probable population dispersion, it is not believed to constitute an immediate threat. Dengue as well as occasional cases of hemorrhagic fever have been observed in the past and the Aedes mosquitoes, which are the common vector, are present in the coastal areas and are reported to be resistant to DDT. While hemorrhagic fever has not been observed in recent years, the possibility of outbreaks must be kept in mind and vector control measures instituted if required. Pertussis and tetanus are long standing problems for which comparatively little immunization has been performed. Considering the disruption in existing services, this would not seem a propitious time to institute a new programme. However, if large numbers of refugees were to congregate in fixed camps, vaccination against diphtheria, pertussis, tetanus, typhoid, measles and smallpox should be undertaken to minimize medical problems requiring medical care. However, stockpiling of supplies for this purpose are not presently warranted.

CHOLERA (see also Annex II)

The ultimate measure for cholera control is primarily improved water supply. A water supply project for Dacca, Chittagong and the larger towns has been under way for several years under contract with a private firm. A UNICEF project calling for installation of 10 000 shallow wells each year began in December and a two year project begins in November which calls for the drilling of 1 200 deep (800-1 200 ft) wells over a two year period. A request for a full-time WHO engineer to assist with water supply problems has been requested by the government and UNICEF. Appointment as soon as possible but no later than January is necessary. For the interim period, a consultant is desired and should be provided.

Cholera vaccine continues to be administered in a number of districts, usually in association with smallpox vaccine. While admittedly conferring limited protection, its administration cannot practicably be interrupted. Vaccine is currently being produced at the Institute of Public Health, Dacca, and is in adequate supply. Production capacity is 50 000 000 doses per year provided modest quantities of expendable supplies are provided.

The best available measure to cope with the cholera problem at this time is to extend treatment facilities. The Cholera Research Laboratory (CRL) Dacca, is the essential national resource to assist in extending this capability. The CRL treats all patients in the Dacca area (population area about 1 000 000) and Matlab area (population area about 500 000). A scheme has been elaborated by the Director and government officials to train at the CRL 6 physicians and 12 nurses, to be permanently based in Dacca hospitals but to be on emergency call to provide treatment over extended periods at one or more of perhaps 12 treatment facilities to be equipped on a standby basis. Additional assistance might also be provided by CRL staff. Considering that major cholera problems are expected this year, it is desirable to implement this plan as soon as possible. Supplies and equipment necessary from international assistance include tetracycline and intravenous fluids as well as IV administration sets and 6 vehicles suitable to be used as ambulances. The Government would need to supply cholera cots, plastic sheets and buckets as well as personnel. The IV fluids, however, could be produced at the Institute far less expensively than they could be shipped from external sources. A plan for production of IV fluids at the Institute has been drawn up, approval for funds has been given by UNICEF and the formal request has been submitted. Space is available, a steam generator has been installed and is operating, necessary water stills are in the central stores. It is recommended that the necessary equipment be airshipped to Dacca immediately along with plastic bags in the expectation that production could begin within perhaps 2 months. The only alternative to this plan is to supply perhaps 50 000 glass bottles which, in bulk, would require more space than the production equipment itself.

SMALLPOX (see also Annex III)

East Pakistan is believed to be smallpox-free at present. It is critical that it remain so. Under present conditions, if re-established, smallpox transmission would be difficult or almost impossible to interrupt and outbreaks could be substantial. Detection of cases is vital. Malaria surveillance workers, previously instructed to notify all "pox" disease, will now be given one of the newly prepared smallpox recognition cards and asked to report

"suspect smallpox" only, so as to reduce the number of cases requiring checking by the four divisional surveillance teams. The central surveillance team will need to be reactivated and provided transport to travel as extensively as possible.

Systematic vaccination activities will continue to the extent possible in Districts in the "attack" phase. In other areas, smallpox vaccinators performing maintenance vaccination will be asked to travel with malaria surveillance workers.

Efforts will be made by WHO to accelerate smallpox programmes both in bordering provinces and in West Pakistan to reduce the chances of a reintroduction. All persons coming by boat or plane from West Pakistan should be checked and vaccinated as required as Karachi, the usual port of embarkation, is heavily endemic for smallpox.

A minimal reserve of smallpox vaccine (3 500 000 doses) is available at the Institute of Public Health in Dacca and production has been resumed. No further supplies are immediately required but some additional expendable supplies from international sources will be required beginning in about 6 to 9 months.

The WHO Smallpox Adviser is requested to assume duties as an urgent matter.

MALARIA (see also Annex IV)

Surveillance activities should be continued to the maximum possible extent and to this end, the complement of personnel should be brought up to strength. Forty additional vehicles are required as soon as possible to provide two vehicles per district for supervisory purposes. If cases are detected in malaria-free areas, spraying will be performed as usual and to the extent possible and local mass treatment will also be administered as an emergency measure. It is estimated that 100 000 tablets of Primaquine and 10 000 000 tablets of Darachlor are required from international sources. Assuming at least 35 or so of the vehicles now missing, can be recovered, efforts will be made to initiate spraying operations in August in the areas and according to the schedule previously planned.

Smallpox surveillance activities conducted by malaria workers will be modified (see Smallpox) and multivitamins administered to children (see Nutrition).

NUTRITION

With UN and WFP, plans are being elaborated with the Government for importation and internal shipment of foodstuffs. UNICEF plans to undertake a special child feeding programme (wheat soya blend and corn soya mix) at primary schools where it is hoped, pre-school children might also come. Initially, plans call for feeding 1.5 million children beginning in September and possible expanding over the course of the year to provide food to as many as 12 million. For this purpose a UNICEF staff of 25 is presently forecast. A full-time WHO staff member, knowledgeable in the area of child feeding, is requested to assist in training of teachers, evaluation of acceptance, etc.

It is proposed also that Malaria surveillance workers be given multi-vitamins for distribution to children up to age 10 years. It is estimated that 3 750 000 tablets would be required monthly. Recognizing that administration once each month is not optimal, nevertheless, it is felt that this might serve to prevent serious problems in some and, further, would assist in the malaria workers again gaining acceptance after a troubled period.

DRUGS AND CURATIVE SERVICES (see also Annex ^I ~~II~~)

There is now an acute shortage of many critical drugs and medical supplies. Supplies received by the government for the cyclone relief have been essentially depleted of the most important items; the status of other supplies understood to be held by Red Cross is not yet known. Rail and commercial truck transport formerly used for distribution of supplies by Central Medical Stores are not now available and only limited ad-hoc arrangements have been able to be improvised. Very limited supplies are said to be available through private producers and importers and a new foreign currency exchange policy for purchase of various commodities, including drugs, has effectively doubled the cost of all drugs imported since April.

A list of urgently needed drugs and supplies was drawn up by the Government and reviewed by the WHO team (Annex I). A further comprehensive and detailed inventory of the present status of drugs and other medical supplies needs to be undertaken by the Government in cooperation with WHO as a priority measure to assess fully what is available or is expected in delivery and to prepare a list of what is required to satisfy longer term needs of essential supplies with the hope that some substantial proportion of those needs could be

satisfied through donor aid. A full-time WHO medical supplies officer should be assigned to work out with the central medical stores staff and the UN transport staff an effective distribution system both on an immediate and long-term basis. Ten trucks, one each for distribution warehouses at Dacca, Chittagong and Rajshahi and one each for 7 District supply warehouses are urgently required. Water transport is also required for delivery of medical supplies but needs in this area should be worked out in coordination with UNICEF and UN-assisted projects.

Depending on the status of hospital staffing which requires yet to be assessed and contingent, of course, upon the wishes of the Government, plans should be worked out to accommodate, as appropriate, volunteer medical service personnel from various agencies to supplement resident staff. Such assistance is not now required as hospitals are reported to be seeing fewer patients than normal. The need will be from perhaps October.

Assistance of the type proposed by the experienced and well-received Save the Children Fund - effectively, training of local personnel and comprehensive care for a population of 500 000 to 1 000 000 persons would seem desirable to be implemented as soon as possible.

SUMMARY OF KEY MEDICAL NEEDS

1. Personnel - full-time

- 1.1 Senior WHO Medical Officer - There is an urgent need for a WHO Senior Medical Officer to serve as a consultant to the UN focal point operation, to be responsible for day to day contacts with government health offices and the Cholera Research Laboratory. His duties would also include continuing assessment of medical and health problems, needs for medical personnel and supplies; supervision of the activity of other WHO staff and coordination and direction of the activities of medical and health teams provided by other organizations under the UN umbrella. On an interim basis, Dr Zaghloul, WHO Medical Officer presently serving as Professor of Public Health Administration in Dacca, has been requested to assume this role as of 8 July.
- 1.2 Malaria Adviser - Dr Grasshof, the present incumbent of this post, should return soonest.
- 1.3 Smallpox Adviser - Dr Zaphiropoulos, recently selected for this post, should come soonest.
- 1.4 Sanitary Engineer for water supply projects needed no later than 1 January 1972. This post has been budgetted by WHO and a request from the Government of Pakistan is awaited.
- 1.5 Nutritionist experienced in child feeding - needed by September.
As noted under "Nutrition", to work with UNICEF personnel in the child feeding operation. It is understood that the Norwegian assistance programme may be able to provide such a person.
- 1.6 Entomologist - malaria and vector control - needed as soon as possible (recruitment is under way).

1.7 Epidemiologist - As soon as possible.

A post of epidemiologist in the school of Tropical Medicine has been budgetted for by WHO. In discussion with the Director of Health and the Director of the School, it is proposed that this post be filled as soon as possible by an experienced epidemiologist but that the individual instead be assigned to the Directorate of Health Services to assist in developing methods for the collection and evaluation of epidemiological data regarding the pattern and status of communicable disease and nutritional problems and to propose approaches for the appropriate utilization of resources to meet the problems. Studies conducted by the CRL during February in the cyclone area and nutritional studies conducted by the Quakers in Eastern Nigeria are illustrative of studies which might be undertaken. (It is possible that the US Government might assist in meeting this need, at least in part, through assignment of one or more epidemiologists through the Cholera Research Laboratory.)

1.8 Medical Supply Officer - urgently required.

To fulfill duties as noted under "Drugs and Therapy" and to assist in regard to supplies in connection with other WHO Projects.

1.9 Medical Officer to provide medical care to UN staff.

Present projections call for 100 to 150 UN staff and some unknown number from voluntary agencies working under the UN umbrella. As existing Pakistani medical staff will undoubtedly be fully occupied with the many problems of the coming months, it is proposed that a medical officer be assigned to provide essential primary medical services for UN personnel and others working under the UN umbrella. Facilities for emergency care of patients can be arranged through the Holy Family Hospital in Dacca which is presently working on a restricted basis only. It is proposed that Dr Hoffman (WHO Medical Officer due to arrive shortly for the tuberculosis project) assume these duties at least for the time being and that he call on other WHO medical officers as appropriate. One other WHO staff member, Dr Trapmann, (Leprosy), is expected to arrive at an early date.

2. Short-term Consultants

2.1 Medical Officer or pharmacist with knowledge of drug and medical supply needs - Required immediately for perhaps two months.

To fulfill duties as noted under "Drugs and Therapy".

2.2 Sanitary Engineer for water supply - period required 3 months.

To serve on an interim basis until full-time staff member can be recruited. If WHO is not able to meet this request UNICEF is prepared to do so.

2.3 Consultant from VIFOR to install and advise on production equipment for intravenous fluids - approximately 4 weeks when equipment arrives.

3. Supplies and Equipment - Immediate Needs

3.1 Vehicles

40 Jeep type - Malaria programme.

6 long wheel Landrover type - Cholera - to serve as ambulances for treatment centres.

3 Jeep or Landrover type - to provide transport not otherwise available for WHO staff.

10 trucks (5 ton) - to serve medical supply depots in Dacca, Chittagong and Rajshahi and District supply centres.

3.2 Drugs

Annex 1 includes a comprehensive list of drug requirements, prepared by the Directorate of Health Services and believed to include most key items: required over the next two months. These should be shipped by air. In compiling this list, consideration has been given to the needs of refugee camps at present or modestly-expanded capacity as well as tetracycline requirements for the cholera treatment centres and drugs and vitamins as proposed for the modified activities of the malaria programme. Fluid therapy requirements are for 6 months as it is recognized that time will be required for the Institute to reach full production with its new unit; the present "pipeline" of IV fluids is virtually nil; and initial efforts of the new production unit will need to be directed toward production of IV fluids in anticipation of the imminent cholera season.

3.3 Other Supplies

- 3.3.1 Surveillance reports - 100 - to be supplied by WHO/SE.
Smallpox recognition cards - 3 000 - to be supplied by WHO/SE.

- 3.3.2 Tools and spare parts for vehicles employed in smallpox programme - a separate list of tools and of spare parts required primarily for Landrover repair has been prepared by health authorities and is being discussed with UNICEF transport specialists in the context of overall transport maintenance and vehicle repair needs.

- 3.3.3 Intravenous fluid production unit (cost agreed to be paid by UNICEF). All items to be air shipped.

- Equipment as noted in VIFOR proforma invoice of 14 April 1969.
- Plastic bags (one litre) - 150 000 (approx. 6 months supply).
- Air compressor with storage tank. Minimum pressure 42 PSI Volume of aspirate air, 58 m³/hr, 50 cycle.

Approximate cost \$150.

- Demineralizer capable of delivering 500-1 000 gallons per day, approximate cost \$1 500.
- Materials suitable for use in preparing intravenous solutions:

Sodium Chloride 750 kg

Sodium acetate 450 kg

Potassium chloride 60 kg

Glucose 1 750 kg

- Materials suitable for use in preparing oral cholera treatment fluids:

Glucose 1 000 kg

Potassium citrate 120 kg

An earlier draft of this paragraph read:

" ... a separate list required primarily for landrover repair is submitted separately. Repair facilities for the 50 vehicles in this programme and mechanics are available. These vehicles are employed now in cholera and smallpox work and in emergency delivery of drug supplies. Several are now inoperative because of a lack of available tools and parts. As this is an essential multipurpose fleet in a transport poor situation, it is proposed that the tools and half of the spare parts be sent by air and the remainder of the spare parts by sea."

ANNEX I

List of medical supply articles needed, the stock of which is virtually exhausted and unavailable on local market (Estimated needs for 6 months)

<u>Sl. No.</u>	<u>No.</u>	<u>I t e m</u>
1.	72,000 plastic 500 ml. bottles	5% glucose in water
2.	52,000 " " "	5% glucose in normal saline
3.	24,000 " " "	Normal saline
4.	1,500 " " "	5% dextran
5.	2,400 100 ml. units	Normal human plasma <u>or</u> substitute 5% dextran if not available
6.	150,000 sets	Infusion sets for above
7.	750 20 ml. amps.	Hypaque - 45% solution
8.	600 20 ml. amps.	Conray - 280 - 60%
9.	2,100 20 ml. amps.	Conray - 420 - 70%
10.	120 3 ml. amps.	Myodil (CSF contrast media)
11.	2,400 2.5 ml. vials	Polyvalent gas gangrene antitoxin (10,000 IU)
12.	24,000 amps.	Anti-tetanus serum (1,500 IU)
13.	600 5 ml. vials	Cortisone acetate
14.	1,200 vials	Solu cortef
15.	2,400 tablets	Biligradin
16.	3,000 tablets	Telepaque
17.	3,000 500 ml. bottles	Ether for anesthesia
18.	1,420 250 ml. bottles	Halothane
19.	24,000 100 mg. ampoules	Injectable pethidene hydro
20.	6,100 500 mg. ampoules	Tetracycline injectable
21.	100,000 sets	MRC bottles (glass or plastic) for collection and preservation of blood with infusion set.
22.	2,500,000 500 mg. tablets	Vitamin 'C'
23.	35,000,000 tablets	Multi-vitamine
24.	2,560,000 tablets	Vitamin B complex
25.	500,000 tablets	Vitamin A and D complex
26.	3,000,000 O.I.G. tablets	Avlosulfon
27.	1,000 bottles	Anti Rh-D serum
28.	1,000 bottles	Anti human globulin (combs.) serum
29.	100,000 10 c.c. ampoules	7.5% sodium bicarbonate for injection
30.	50,000 10 c.c. ampoules	Potassium chloride for injection
31.	5,000 tablets	Terramycin ointment (ophthalmic)
32.	2,500 tablets	Cortisone ointment (Ophthalmic)
33.	50,000 tablets	Valium

- | | | |
|----------------|--------------------------|---|
| 34. | 200,000 tablets | Sulfadimidine |
| 35. | 25,000 tablets | Anti histaminic (as phenergan) |
| 36. | 5,000 tablets | Methyl dopa (aldomat) |
| 37. | 200 pounds | DDT spray (for adulticiding) |
| 38. | 100,000 tablets | Primaquine |
| 39. | 10,000,000 tablets | Darachlor |
| 40. | 180,000 0.5 gram tablets | Tetracycline |

Note: This list does not take into account a supply of drugs from Canada of unknown type said to have arrived on 5 July in Dacca.
5 July 1971.

ANNEX II

STATUS OF CHOLERA AND OTHER DIARRHEAL DISEASES

1.0 Official Reports to the Government.

Only data regarding cholera is available. Reports are submitted regularly to the provincial government through government health channels. As in other countries, reporting is recognized to be incomplete and except in Dacca and Matlab where the Cholera Research Laboratory is operative, cases are not bacteriologically confirmed. While some cases which are reported as cholera may be due to other organisms, such "overreporting" is believed to be negligible compared to the many cases and deaths which occur without coming to medical attention are not reported if they do.

Two seasonal patterns are recognized. The first resembles that in Calcutta and other areas of West Bengal and is observed in limited areas only of Kushtia, Khulna and Jessore. In this pattern, cholera incidence reaches a peak during the Spring and Summer months and is usually at low levels during the Winter. Data for 1969-1971 (May) are shown below.

Cholera cases-Kushtia, Khulna, Jessore districts.

	J	F	M	A	M	J	J	A	S	O	N	D
1969	3	0	0	1416	803	230	136	10	7	11	7	57
1970	8	0	33	87	68	30	320	380	258	173	178	46
1971	27	0	0*	0*	0*							

*Data incomplete.

Throughout most of East Pakistan, a second pattern generally prevails with cholera outbreaks beginning to develop in late August or September, reaching a peak in the November-December period, with a secondary peak in April and May.

	J	F	M	A	M	J	J	A	S	O	N	D
1969	171	9	43	325	247	42	38	48	107	435	983	2276
1970	352	137	458	503	240	99	142	92	254	1356	2346	2096
1971	723	34	76*	14*	31*							

*Data incomplete

Overall, 7411 cases with 1556 deaths were recorded in 1969 and 9626 cases with 2419 deaths were reported in 1970.

Planning for the development and staffing of treatment centers is difficult since outbreaks develop in a rather erratic and unpredictable pattern so that explosive outbreaks may occur in one or several adjoining villages and no cases may be present only a mile away. This reflects the circumstances of chance transmission as the disease is primarily spread by the water-borne route occasionally by food, and, exceptionally, by direct person-to-person contact. In establishing treatment centers, therefore, the best one can do is to establish in existing hospitals, standby facilities, staffed perhaps by a cook, nurse and sweeper as experience has shown that such personnel are difficult to obtain to staff a cholera ward. When outbreaks occur, one or two vehicles useable as ambulances, specially trained nurses and physicians and necessary fluids, antibiotics, etc., must then be moved to the facility as rapidly as possible.

2.0 Date from Cholera Research Laboratory regarding cholera in Dacca.

All suspect cases of cholera in the Dacca area (perhaps within a population area of 1,000,000) are referred to the Cholera Research Laboratory which, in addition to treating the cases, conducts various studies related to the pathology and physiology of the disease, improved methods of treatment, etc. All cases are bacteriologically confirmed.

The response to competent treatment is evident from the fact that the case fatality rate of patients treated at the Laboratory is far less than 1% while in most hospitals 5 to 15% is not unexpected.

Untreated cholera cases of the type admitted to hospitals would experience a case fatality rate of not less than 30%.

Confirmed cases of cholera-Dacca Cholera Research Laboratory

	J	F	M	A	M	J	J	A	S	O	N	D
1969	65	4	40	112	126	30	3	11	12	62	391	1024
1970	129	66	84	109	36	2	0	9	36	652	986	798
1971	206	59	42	122	264	51						

In these data, a peak during the October-January period is noted with a secondary peak in April-May.

Other cases of diarrhea treated at the Laboratory do not follow such a distinct seasonal trend, and it is noted that the number of cases seen this year is little different from that observed during past years.

Other diarrhea cases-Dacca Cholera Research Laboratory.

	J	F	M	A	M	J	J	A	S	O	N	D
1969	36	28	79	51	53	63	46	37	37	45	90	178
1970	77	79	120	137	51	77	84	106	82	120	136	120
1971	70	54	72	52	86	53						

3.0 Overall Magnitude of the Cholera Problem

One can only speculate regarding the overall magnitude of the cholera problem in East Pakistan. A crude minimal estimate may be obtained if one assumes that most cases in the Dacca area (one million persons) are admitted to the wards of the CRL. In 1969, 1910 cases were admitted and, in 1970, 2907 cases were admitted - say, 2500 cases in an average year. If the population is 75 million and incidence in Dacca is assumed to be average for the province as a whole 187,500 cases might be expected with perhaps 56000 deaths (30% case-fatality rate).

The twelve treatment centers proposed would be unlikely at best to deal with more than 10 to 15% of this problem. Nevertheless, it is felt that this would represent a worthwhile effort which, if successful, could serve as a model for further extension during the coming years.

ANNEX III

MY REPORT TO UNICEF HEALTH IN EAST PAKISTAN
VISIT IN JUNE 1971 DURING CIVIL WAR

SMALLPOX

The status of the smallpox programme was recently summarized (25 June) in the Weekly Epidemiological Record. In brief, no cases were detected between August 1970 and the end of February, 1971, by Malaria Surveillance Workers, other health workers, smallpox vaccination teams or the surveillance teams.

Since March, reporting has been incomplete from many areas and although contact is now established with all District Medical Officers, reporting from more peripheral areas is incomplete. The four divisional surveillance teams are intact and moving about their respective divisions to some degree but their regular schedule involving area by area search has been disrupted for the present. The central team is not, at present, operative.

While one cannot be certain that no endemic foci are now present in East Pakistan, the failure to discover cases during a 7 month period, part of which constitutes the normal epidemic season, indicates that, at most, foci are very limited in extent. Experience gained in other parts of the world suggests that East Pakistan must be provisionally regarded as smallpox-free.

Systematic vaccination programmes conducted by special teams are now in progress in 21 sub-divisions. At the direction of sub-divisional authority they are also giving cholera vaccine in 13 of these districts. Areas now being vaccinated include Mymensingh, Bogra, Pabna and Faridpur Districts, Dinajpur District, Sadar Subdivision, Dacca District (Sadar and Narayanganj Subdivisions), Kushtia District (Meherpur Subdivision), Khulna District (Sadar and Bagerhat Subdivision). Following the cyclone, approximately 80% of the population in Patuakhali and Barisal Districts were also vaccinated. Detailed information regarding the work of the teams or results of assessment have not yet been able to be obtained. Three of the 46 vehicles are known to have been lost but a full accounting has not yet been possible. Most are believed to have been spared.

Several consignments which were due to arrive have been off loaded in Karachi. Included are 1 500 bicycles intended for vaccinators.

Information regarding the work of vaccinators in areas other than where the special teams are active is not available. Considering present problems, it was decided for the present to request these vaccinators to accompany malaria surveillance workers on their regular rounds.

Vaccine production was interrupted for approximately 3 months as neither calves nor eggs were available. Both have been recently obtained and production has recommenced. A stock of 3.5 million doses is in reserve. Approximately 40 million doses were used last year but consumption is presently diminished significantly. Testing of vaccine lots which was, in the past, performed on a regular basis by WHO Reference Laboratories has been suspended for the present but should again be instituted at the earliest possible opportunity.

ANNEX B IV

STATUS OF THE MALARIA PROGRAM

I. Introduction:

The recent events thus far have affected the Malaria Eradication Programme in East Pakistan to a limited extent. Nevertheless the epidemiological situation of malaria is such that urgent action is needed to avoid increasingly major problems in areas in which malaria has practically disappeared.

The operational structure of the programme, most of the establishments, equipment and supplies, with the exception of transport, have been maintained. The functional aspects of the organisation are being reorganized and most of the personnel is in place.

Some emergency measures are needed to prevent and contain possible epidemics and this will require some limited emergency supplies.

II. Epidemiological status of the Programme:

The attached map No.1 shows the status of the programme as of 1 March 1971. It may be noted that in a number of zones, malaria transmission has been essentially interrupted for some years:

TABLE I

<u>Zone.</u>	<u>Year Transmission, essentially interrupted.</u>	<u>District</u>
1-3	1962-1963	Dinajpur, Rangpur
4-7, 11-14	1964-1965	Bogra, Fabna, Rajshahi, Mymensingh (part)
8.9.15,23,25,26	1966-1967	Kushtia, Jessore, Mymensingh, Sylhet (part), Comilla (part).
10,16-18,27,28	1968-1969	Khulna (part), Dacca, Comilla (part), Noakhali (part).

The Zones not listed were mostly under insecticide protection in 1970-71.

The fact that malaria transmission has been interrupted for a number of years in many areas implies loss of acquired immunity of the population to the disease. The total population living in malaria free areas as of March 1971 was about 48 million of a total population of 65 million (73.8%).

Factors which favour the recurrence of epidemics in this population are:

- (1) Lack of immunity of the population
- (2) Return of the vector mosquito to pre-eradication densities.
- (3) Increased movement of parasite carriers into the malaria free areas.
- (4) Interruption of the case detection mechanism.

The risk of reintroduction of malaria varies in East Pakistan according to the ecology of the areas and to the bionomics of the vectors.

The following important vectors of malaria have been responsible for transmission of the disease in East Pakistan: (see map No.2).

1. A. minimus minimus
2. A. philippinensis
3. A. sundanicus
4. A. leucosphyrus balabaceusis
5. A. annularis (suspected secondary vector)
6. A. vagus (suspected secondary vector)

1. A. minimus minimus is a very "powerful" vector, the mosquito survives for a long time and a high proportion of the mosquitoes are infected. This vector is highly susceptible to DDT and almost disappeared after the commencement of the campaign. It was responsible for transmission of malaria in the northern districts and in some areas along the eastern Assam border. Interruption of spraying operations in areas where these mosquitoes are present is usually followed by a slow build up of vector densities. Once the critical density is achieved, however, disastrous epidemics may occur. The Zones where such could be expected are: Dinajpur and Rangpur Districts with a total population of approximately 4 million. In these areas substantial population movements across the boundaries with India have been reported and an influx of malaria carriers is to be expected.

2. A. philippinensis is a "moderate" vector of malaria in the coastal alluvial plains of East Pakistan where, before malaria eradication started, a low degree of endemicity was recorded. There are, nevertheless, areas in which a

high degree of endemicity was recorded. Such areas were mostly located along the western provincial border and it is expected that the epidemic potential in these areas is higher than in the central plains.

3. A. sundaicus is a "powerful" vector which has been found only in coastal areas where breeding places have a relative salinity. Malaria was hyperendemic in the areas. The extension of coastal areas suitable for A. sundaicus breeding and the recent havoc resulting from the cyclone of last year constitute a serious problem for the southern districts of East Pakistan but movement of population in these areas is relatively limited.

4. A. leucosphyrus balabacensis. This vector has recently been incriminated in the eastern and north-eastern regions of the province bordering Assam. This vector is difficult to control in view of the outdoor resting habits. Thus, indoor spraying of DDT is of limited use. Even though the incidence of malaria has been reduced in the eastern districts, malaria transmission persists. These areas are likely to become the source of infection for the other districts of the province as soon as communications are fully re-established.

5 & 6. A. annularis and A. vagus. These two anophelines have been long suspected to carry malaria although this has not been conclusively demonstrated. They are present in areas in which malaria transmission persists despite a few years of insecticide spraying. Both species are resistant to DDT. Pockets of transmission of malaria in otherwise malaria free areas persist in Khulna, Faridpur, Dacca, Chandpur and Noakhali.

In brief, the northern and north western districts of the province are those in which epidemics are most likely to occur. As there are many children born since transmission was interrupted. This is the age group which would be most severely affected. Focal outbreaks of minor severity may occur in the central plains. Setbacks to the eradication programme will necessarily occur in the eastern and south eastern districts as a consequence of the interruption of spraying operations.

The plasmodia present in the province were P. vivax, P. falciparum and P. malariae. The prevalence of P. falciparum (malignant tertian malaria) was quite high before the eradication programme. This plasmodia persists in the eastern districts and in Assam. Its reintroduction into now malaria free areas is unavoidable. Should epidemics of P. falciparum occur a high-case fatality rate may be expected, particularly among children. Because of these circumstances, special measures should be undertaken at this time including mass prophylactic treatment should cases occur to contain the spread of this malignant form.

III. Operational status of the programme.

In 1971 spraying operations were planned to be undertaken in two rounds: the first in March-May and the second in August-Oct. Each round would have applied $1\frac{1}{2}$ gm. of DDT per square meter of sprayable surface. The areas scheduled to be sprayed are shown in red in the attached map No.3.

The spraying operations were prepared in detail, the necessary personnel had been recruited and trained and started on schedule. The events occurring at that time prevented the continuation of the operations after a week or two.

The next round of spraying is due in August-September. The possibility to undertake this operation should not be missed if circumstances permit. Even a partial spray coverage may serve the purpose of limiting the possibility and size of the epidemic outbreaks.

The insecticide which was distributed at sub-sector (population about 10,000) level for the first round is believed to be still available and can be replaced if losses have occurred. Spraying equipment is still with the Zonal and provincial authorities and reserves are available.

A major problem is transport as out of a total strength of 264 vehicles only 39 are at present mechanically operable.

IV. The functional status of the programme:

The MEP has been a very efficient operation over the past ten years and is, perhaps, a unique organization in that it covers the whole of the province with a complete network of house visitors, supervisory echelons and a functioning administrative machinery. The logistics of the programme have been running smoothly and delays observed at the beginning of the programme, have more recently been avoided by appropriate and timely planning.

With the recent events, this organization, like others, has suffered disruption, partly due to lack of communications among different levels of authority. Such communication has been re-established during the month of June and all Zonal offices are now in direct contact with the Headquarters in Dacca and are now beginning to re-establish links with the staff at subsector level (10,000 pop). Most of the workers are in place and house to house visits are being reorganised in undisturbed areas. It is expected that very soon full complement of staff will be in place.

The attached statement (Annex 1) shows the staff in place and vacant posts as of 1 July 1971. The fact that payment of salaries to staff has been carried out regularly despite the disturbed situation testifies to the organizational solidity of the structure.

Supervision in the field has not yet been fully reorganized for lack of transport.

IV. Conclusion:

The MEP which had reached a very advanced stage of progress and has been generally successful in achieving its objective is now facing serious set backs which at least in part might be avoided if emergency supplies could be provided:

- a) Transport to reestablish the full efficiency of the organization
- b) Drugs to cope with containment measures in epidemics
- c) Replenishment of the limited losses in equipment.

Such equipment and supplies can be provided from reserve stocks held by WHO or by transfer from other programs. Additional needs are shown in the list of supplies required.

The plan of work in 1971-72 provides for the continuation and implementation of normal operation as per the original plan of operations, but does not include emergency measures in malaria free areas to cope with epidemic outbreaks.

Because of present circumstances, it is recommended that, as soon as house to house visits and malaria case detection can be initiated, the following action should be taken to minimize the problem:

- 1) Residual insecticide spraying of the locality in which the case/cases have been detected.

- 2) Presumptive treatment with a single dose of pyrimethanine-chloroquine (Darachlor) of all inhabitants in the infected localities.
- 3) Radical treatment (5 days) with primaquin of all inhabitants in the case of P. vivax outbreaks.
- 4) Radical treatment (3 days) with chloroquin of all inhabitants in the case of P. falciparum outbreaks.
- 5) Follow-up spray (after 6 months) of all localities in which cases have occurred and focal spraying has been applied.
- 6) Radical treatment (5 days) with primaquin and chloroquin of all those detected in communities who have returned from abroad and from malarious areas within the country.

Drug requirements for this purpose have been included in the overall list of drugs which has been compiled.

MALARIA ERADICATION - STATUS OF STAFF - 15 JUNE 1971

EAST PAKISTAN

	<u>Posted</u>	<u>Present</u>	<u>%</u>
Class I	38	35	92
Class II	126	110	87
Class III	8 883	6 912	78
Class IV	783	99	13