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ANNEX 5.5

COMMUNICABLE DISEASE CONTROL

GUATEMALA HEALTH SECTOR ASSESSMENT

November 1977

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## Annex 5.5

### COMMUNICABLE DISEASE CONTROL

#### I. DISEASE SURVEILLANCE

##### A. Epidemiological

##### 1. Background

Disease surveillance in the Guatemalan Ministry Public Health & Social Assistance (MOH) is the joint responsibility of the Divisions of Epidemiology and Statistics. Prior to February 1976, disease reports were received weekly from health centers in all departments of the country, but no provision was made for including health posts (the most local level), the private sector, the Guatemala Institute of Social Security (IGSS), or migrant farm populations. Therefore, only approximately 40-50% of the population was under surveillance by the MOH network.

The 1976 earthquake disrupted disease-reporting from those departments affected. With the assistance of USAID/Guatemala and Pan American Health Organization (PAHO) an interim, symptom-based disease-reporting system was implemented in the Departments of Guatemala, Chimaltenango, Sacatepéquez and El Progreso through June 1976. This system was based on reporting at the health post level and was sufficiently sensitive to document the absence of major disease epidemics in the post-earthquake period. The system ceased to function on July 1st.

##### 2. Basic Health Statistics

For 1973 (the most recent data), a total of 227,480 births (39.6/1000) and 77,594 deaths (14/10,000) were registered.

This produced an annual growth rate of 2.5%. Of reported births, only 20% were attended in a medical facility. The estimated infant mortality rate (IMR) was 80.6/1000 births. Both the percentage attended and the IMR are underestimates of the actual rural statistics in Guatemala.

Table 1 summarizes the leading causes of mortality.

TABLE 1  
LEADING CAUSES OF DEATH  
BY RATE PER 10,000 INHABITANTS  
1973

	<u>Number</u>	<u>Rate</u>	<u>Percent of Total Deaths</u>
Acute respiratory illness (including influenza)	14,593	25.37	20.83
Diarrhea (all forms)	13,063	22.71	18.64
Malnutrition	4,783	8.31	6.82
Perinatal	4,228	7.35	6.03
Intestinal Parasites	2,306	4.01	3.29

Source: Office of Planning Evaluation & Statistics, Ministry of Health.

3. Epidemiological Objectives of the 5-year Plan for Health (1975-1979)

- a) To create epidemiological surveillance at the central level and in each health region of the country.
- b) To create epidemiological units in each health region of the country.
- c) To train two physicians in epidemiological surveillance each year, from 1976 to 1979 in order to increase the level of epidemiologists in the country to 0.2 per 100,000 inhabitants.
- d) To continue using weekly morbidity data as a measure of disease endemicity.
- e) To include mortality data an element of disease surveillance beginning in 1975.

4. Comments.

According to the Division of Statistics, disease reports are being received from all health centers as of February 1977, but for some areas there are time lags of 2 to 3 weeks. The principal change which has occurred is that all data are now being computerized, which further delays analysis in the Division of Epidemiology.

The principal shortcomings of disease surveillance stem from fundamental administrative procedures. Organizationally, the Division of Statistics administers all data-gathering with little input from the Division of Epidemiology about the

evaluation or improvement of the system. An example of this split is the adherence to the international coding system of diarrhea/illnesses (divided into amebiasis, bacillary dysentery, food poisoning, and nonspecific categories), although epidemiologists realize that this classification has little meaning in rural areas where such distinctions cannot be made accurately.

A second problem encountered in morbidity data is that deaths are reported independently from illness. The cause of death is certified by medical personnel for fewer than one-third of deaths. Many inconsistencies result. In 1974, for example, more deaths due to malaria were reported than the actual number of malaria cases. To date, mortality data has not been included in routine disease surveillance.

#### B. Laboratory Services

Of the 69 diagnostic laboratories in the country, 83% are outside the capital and 17% are in the capital. They are located in hospitals or medical centers serving larger population centers.

Several general problems which exist with respect to the function of laboratories are:

1. An inadequate system of laboratory organization to regulate the flow of information, quality of service, and training of personnel.

2. An inability to modify the present system due to budget limitations which affect both the staff located outside of the capital and the supply of basic materials.

The staff in laboratories located outside the capital consists of two laboratory chemical biologists, six students of chemical biology, 60 trained laboratory technicians (54%), and 51 non-trained technicians, (46%). This is considerably short of the required personnel in both the number and technical quality needed to cover the 57 laboratories. The basic capacity of these laboratories includes hematology, stool and urine exams, and Gram and Zhiel-Nielsen stains. Approximately 80% can perform the V.D.R.L. test for syphilis.

Only seven (12%) of these laboratories have diagnostic microbiology capacity and are capable of isolating and identifying common enteric bacterial pathogens and meningococcus and gonococcus. In Guatemala City, the same bacteriological tests are performed in 60% of the laboratories

Plans for 1977-78 include the opening of three laboratories outside of the capital and five in the capital. The 9-month training program for personnel will continue. At present, no program to integrate assessment of services in the laboratory network is being planned.

The critical requirement for laboratory services in diagnosis and disease surveillance will not be met in Guatemala by the expansion of laboratories to all health centers.

The present deficiencies will be corrected only by developing a systematic referral of specimens from the local level to regional laboratories. Such a network of referrals is being studied by the MOH but its implementation is far from assured.

C. Summary

The under-reporting of disease in Guatemala through both epidemiology and laboratory channels is recognized by the MOH. An advisory group to the Division of Epidemiology is presently working to determine if symptom-based reporting by village health promoters can be institutionalized nationally, an idea repeatedly proposed in the post-earthquake period.

Accurate disease reporting is important for rapid response and evaluation at a central level. Far more important is the utilization of basic health data at the local level as a basis for program planning and feedback to the health provider.

II. VACCINE-PREVENTABLE DISEASES

A. Background

Tables 2-A through 2-E indicate the number of cases and rates, by department, for the principal vaccine-preventable infections of diphtheria, tetanus, pertussis, measles, and poliomyelitis for the years 1974-1976. Tetanus cases are not categorized by age. The rates must be viewed in terms of the national vaccination campaigns which began in 1972; the epidemiology of these infections in the 4 years prior to the initial campaign is summarized in a USPHS/PAHO immunization strategy for Guatemala.

TABLE 2-A

REPORTED DISEASE RATES BY DEPARTMENT

DEPARTMENT	P O L I O						D I P H T H E R I A					
	1974		1975		1976		1974		1975		1976	
	No.	Rate	No.	Rate	No.	Rate	No.	Rate	No.	Rate	No.	Rate
1. Guatemala	1	0.06	18	1.11			5	0.3	3	0.2	4	0.2
2. El Progreso												
3. Sacatepéquez			2	1.9	1	0.9						
4. Chimaltenango					2	0.9						
5. Escuintla	6	1.3			1	0.2						
6. Santa Rosa	1	0.4	1	0.4			1	0.2				
7. Sololá			1	0.7								
8. Totonicapán	12	6.6	3	1.6	1	0.5	1	0.7				
9. Quetzaltenango	3	0.8	7	1.8	2	0.5			1	0.3		
10. Suchitepéquez	1	0.4	2	0.8	3	1.1	1	0.4				
11. Retalhuleu												
12. San Marcos	1	0.2			3	0.6						
13. Huehuetenango					1	0.2						
14. Quiché	1	0.3	1	0.3	4	1.2						
15. Baja Verapaz												
16. Alta Verapaz			1	0.3	1	0.3	10	3.				
17. Petén	5				1							
18. Izabal	1	0.5			1	0.5						
19. Zacapa	3	2.4	1	0.8								
20. Chiquimula									1	0.8		
21. Jalapa	1	0.8	1	0.8	1	0.8			1	0.5		
22. Jutiapa												
									78	31.		
TOTAL	39		36		22		18		85		4	

TABLE 2-B

REPORTED DISEASE RATES BY DEPARTMENT

DEPARTMENT	T E T A N U S						P E R T U S S I S					
	1974		1975		1976		1974		1975		1976	
	No.	Rate	No.	Rate	No.	Rate	No.	Rate	No.	Rate	No.	Rate
1. Guatemala	22	1.4	12	0.7	5	0.3	608	40.	138	8.6	146	8.7
2. El Progreso	1	1.2			1	1.1	33	40.	3	3.6	2	2.3
3. Sacatepéquez			2	1.9	2	1.9	36	36.	11	11.	2	1.9
4. Chimaltenango					1	0.5	43	21.	11	5.2	88	41.0
5. Escuintla	13	2.9	31	6.6	14	2.8	124	28.	21	4.4	31	6.2
6. Santa Rosa			1	0.4			46	19.	30	12.	13	5.1
7. Sololá									53	39.	17	12.2
8. Totonicapán			1	0.5			10	5.4	31	16.5	38	19.8
9. Quetzaltenango	1	0.3	4	1.	1	0.3	121	34.	37	10.	46	12.0
10. Suchitepéquez	12	4.9	10	3.9	12	4.6	80	32.4	30	11.8	38	14.5
11. Retalhuleu	11	6.2	7	3.8	8	4.2	7	4.	3	1.6	6	3.1
12. San Marcos			1	0.2			117	25.1	57	11.9	85	17.2
13. Huehuetenango	1	0.3					15	4.	70	18.3	79	20.1
14. Quiché	2	0.6	1	0.3			49	15.	15	4.5	49	14.1
15. Baja Verapaz	1	0.8					26	21.	10	7.8	16	12.2
16. Alta Verapaz							224	67.5	81	23.8	169	48.3
17. Petén			5		1				16		27	
18. Izabal	13	6.8	4	2.	9	4.2	54	28.1	17	8.4	21	9.7
19. Zacapa	6	4.9	1	0.8	6	4.6	69	56.3	16	12.7	9	6.9
20. Chiquimula	4	2.2	4	2.2	5	2.6	85	46.8	25	13.5	7	3.7
21. Jalapa							4	3.3	14	11.4	19	15.0
22. Jutiapa			7	2.7			1	0.4	35	13.6	7	2.6
TOTAL	87		92		65		204		724		915	

TABLE 2-C

REPORTED DISEASE RATES BY DEPARTMENT

DEPARTMENT	M E A S L E S						BACILLARY DYSENTERY					
	1974		1975		1976		1974		1975		1976	
	No.	Rate	No.	Rate	No.	Rate	No.	Rate	No.	Rate	No.	Rate
1. Guatemala	714	46.4	973	60.3	737	43.8	169	10.9	237	14.7	518	30.8
2. El Progreso	3	3.6	23	27.2	12	13.8	20	24.2	39	46.1	2	2.3
3. Sacatepéquez	8	8.0	49	47.8	71	67.5	38	37.9	32	31.2	21	20.0
4. Chimaltenango	3	1.5	43	20.5	102	47.6	1	0.5	2	0.9	2	0.9
5. Escuintla	18	4.	100	21.1	332	66.6	63	14.1	23	4.9	9	1.8
6. Santa Rosa			20	8.1	38	15.0	108	45.2	46	18.7	36	14.3
7. Sololá			52	38.	18	12.9	13	8.7	88	64.4	32	22.9
8. Totonicapán	1	0.5	89	27.7	41	21.3			5	2.7	4	2.0
9. Quetzaltenango	10	2.8	219	59.0	154	40.2	42	11.6	82	22.1	127	33.2
10. Suchitepéquez	6	2.4	39	15.3	107	40.8	64	25.9	46	18.1	13	4.9
11. Retalhuleu	2	0.8	24	13.	107	55.9	23	12.9	21	11.4	16	8.3
12. San Marcos	6	1.3	52	10.9	126	25.5	98	21.1	17	3.5	95	19.2
13. Huehuetenango	4	1.1	37	9.7	193	49.2	28	7.5	153	41.1	19	4.8
14. Quiché	2	0.6	63	18.8	114	33.0	1	0.3	68	20.2	67	19.3
15. Baja Verapaz	6	4.9	20	15.8	29	22.1	101	81.5	125	98.5	10	7.6
16. Alta Verapaz	1	0.3	34	10.	581	166.1	377	113.6	361	108.8	559	159.8
17. Petén	5		139		123		32		40		232	
18. Izabal	99	51.6	705	546.7	223	103.5	97	50.5	27	13.3	26	12.0
19. Zacapa	7	5.8	104	82.6	245	189.0	51	41.6	224	177.7	103	79.5
20. Chiquimula	8	4.4	95	51.2	200	108.8	14	7.7	58	31.3	130	68.6
21. Jalapa	4	3.3	62	50.3	144	114.3	38	31.5	34	27.6	1	0.8
22. Jutiapa	7	2.8	65	25.2	88	33.2	160	63.6	263	101.9	172	65.0
TOTAL	914		3009		3791		1538		1991		2321	

TABLE 2-D

## REPORTED DISEASE RATES BY DEPARTMENT

DEPARTMENT	OTHER FORMS OF DIARRHEA						TYPHOID					
	1974		1975		1976		1974		1975		1976	
	No.	Rate	No.	Rate	No.	Rate	No.	Rate	No.	Rate	No.	Rate
1. Guatemala	321	20.8	1032	64.1	1999	118.9	324	21.0	341	21.1	377	22.4
2. El Progreso	51	61.7	52	61.4	438	504.8	13	15.7	4	4.7	17	19.6
3. Sacatepéquez	59	58.9	146	142.2	1013	962.9	2	2.	4	3.9	15	14.2
4. Chimaltenango	34	16.6	28	13.4	1437	670.2			15	7.2	6	2.8
5. Escuintla	103	23.	115	24.3	214	42.1	75	0.3	203	43.0	165	33.0
6. Santa Rosa	237	99.3	517	210.5	259	102.5	11	0.1	7	2.8	16	6.3
7. Sololá	4	3.	1159	848.8	448	320.6			37	27.0	4	2.9
8. Totonicapán	2	1.1	274	146.2	159	82.5	2		2	1.0	7	3.6
9. Quetzaltenango	248	68.9	259	69.7	428	111.8	35	0.1	43	11.6	32	8.4
10. Suchitepéquez	255	103.4	844	331.9	720	274.5	81	0.4	119	46.8	143	54.5
11. Retalhuleu	24	13.5	156	84.7	135	70.5	80	0.6	51	27.7	96	50.1
12. San Marcos	299	64.3	776	162.	870	176.3	65	0.2	106	22.1	79	16.0
13. Huehuetenango	97	26.1	711	186.3	713	181.8	5		17	4.4	14	3.6
14. Quiché	88	27.	209	62.1	401	115.8	37	0.1	43	12.8	50	14.4
15. Baja Verapaz	223	180.1	261	205.	197	150.3	25	0.2	4	3.1	5	3.8
16. Alta Verapaz	105	31.6	452	132.7	595	170.1	17	0.1	29	8.5	3	0.8
17. Petén	178		501		885		4		5		12	
18. Izabal	393	204.7	400	196.7	515	239.0	6		6	3.0	6	2.8
19. Zacapa	304	247.9	452	358.5	719	555.0	20	0.2	150	119.0	160	123.5
20. Chiquimula	484	266.4	820	442.1	587	310.0	46	0.3	24	12.9	36	19.0
21. Jalapa	72	59.8	134	108.7	236	187.3	15	0.1	48	39.0	32	25.4
22. Jutiapa	13	5.2	217	84.1	146	281.8	62	0.3	226	87.6	122	46.0
TOTAL	3594		9515		13713		925		1484		1397	

TABLE 2-E

REPORTED DISEASE RATES BY DEPARTMENT

DEPARTMENT	A M E B I A S I S					
	1974		1975		1976	
	No.	Rate	No.	Rate	No.	Rate
1. Guatemala	792	51.5	1164	72.2	1054	62.7
2. El Progreso	148	179.1	193	228.	114	131.4
3. Sacatepéquez	93	92.8	269	262.	79	75.0
4. Chimaltenango	241	118.	373	178.2	236	110.1
5. Escuintla	436	97.4	360	76.2	253	50.7
6. Santa Rosa	106	44.4	290	118.1	166	65.7
7. Sololá	60	45.	432	316.4	348	249.1
8. Totonicapán	45	24.7	47	25.1	120	62.3
9. Quetzaltenango	261	72.5	527	142.	336	87.8
10. Suchitepéquez	343	139.1	664	261.1	486	185.3
11. Retalhuleu	42	23.7	43	23.4	56	29.2
12. San Marcos	467	100.4	600	125.3	801	162.3
13. Huehuetenango	326	87.8	820	214.9	655	167.0
14. Quiché	196	60.	566	168.3	852	246.1
15. Baja Verapaz	303	244.8	430	337.6	276	210.6
16. Alta Verapaz	424	127.8	562	165.	396	113.2
17. Petén	297		335		770	
18. Izabal	201	104.8	117	57.5	50	
19. Zacapa	297	242.2	212	168.7	295	227.7
20. Chiquimula	123	67.8	420	226.4	449	237.1
21. Jalapa	194	160.9	295	239.4	628	498.4
22. Jutiapa	672	267.	439	170.1	477	180.2
TOTAL	5977		9158		8897	

The 1972 mass campaign provided live measles vaccine to children under 5 years of age. The principal impetus for a national vaccine program was the high incidence of measles, particularly among poorly-nourished children.<sup>1</sup> In 1973, oral polio vaccine in two cycles was added. During 1974 and 1975, DPT vaccine was first used, in addition to polio and measles. As a result of changes in the tuberculosis program, BCG was added to the national campaign in 1976. No program of pre-natal tetanus vaccination has been attempted.

These yearly vaccine campaigns have been mass programs applied simultaneously in all departments during February and April. Children are brought to health centers or schools for vaccination. The coverage of the childhood population can only be assessed by the number of doses distributed by department; no data are maintained on the percentage of children who have actually received the indicated number of vaccinations. While no data is currently available, it is generally recognized that vaccine teams have not reached into less accessible villages of the highlands or privately-owned fincas. Data for 1976 coverage is summarized in Table 3.

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1

Reference 3.

TABLE 3

VACCINE DISTRIBUTION AND PERCENTAGE COVERAGE

<u>Cycle</u>	<u>D P T</u>	<u>MEASLES</u>	<u>POLIO</u>	<u>B C G</u>
1	278,089 (69.5%)	191,567 (58.4%)	271,370 (67.9%)	
2	123,170 (57.4%)		121,649 (56.7%)	103,756 (48.4%)

B. Objectives of the 5-Year Plan for Health:Vaccine-Preventable Diseases

1. To reduce mortality and morbidity due to vaccine preventable diseases (measles, tetanus, whooping cough, diphtheria, and poliomyelitis), and to maintain the eradication of smallpox.
2. To vaccinate annually with DPT vaccine 60% of children from two-months to one year of age.
3. To vaccinate annually with measles vaccine 80% of children between one and two years of age.
4. To vaccinate annually against poliomyelitis children from two-months to one year of age.
5. To vaccinate annually children enrolled in child health programs, school children from the first to sixth grades, and all persons who travel outside the country.

C. Impact of Vaccination

The incidence of vaccine-preventable infections has fallen considerably during the vaccine campaigns. An increase in measles was reported in the 1975 and 1976 data and unofficial observations confirm that definite outbreaks of measles occurred in all departments. The factors cited include: fewer actual doses of vaccine were given and, due to migration following the earthquake, many young children in marginal areas were not vaccinated.

D. Vaccine-Preventable Disease Program Proposals

Given the limitations on field staff and refrigeration in health centers, massive campaigns remain the most practical delivery system for measles and polio injective vaccines. However, for diphtheria and tetanus immunization, childhood programs will have relatively little effect on disease in adults for a generation, and will require boosters at three- and ten-year intervals. Tetanus immunization of children will not alter neonatal tetanus rates in the first generation; incorporation of tetanus vaccination into a prenatal care program will be required.

Further impact on the incidence of these infections can only be accomplished by aggressively expanding the vaccination campaign to those childhood populations currently not being reached. To extend vaccination into remote aldeas and fincas will require different delivery systems, in particular, mobile teams of vaccinators capable of reaching locations with populations of less than 500 persons.

### III. ENTERIC-DIARRHEAL DISEASES

#### A. Background

In Guatemala, as in other countries where adequate water and sewage facilities are not available to a majority of the population, diarrheal illness constitutes a principal cause of morbidity and mortality. Transmission of enteric infections may be either by non-potable water or fecal-oral contamination. Morbidity and mortality is greatest in children under 5 years of age.

The incidence, as reported nationally, grossly underestimates the magnitude of these infections. Several diagnostic entities referable to diarrhea appear in the MOH statistics, i.e., bacillary dysentery, amebiasis typhoid, and nonspecific (Tables 2-A through 2-E). Except in urban hospitals, the medical laboratory capacity to distinguish among these entities does not exist in Guatemala. Additionally, childhood diarrhea generally does not come to medical attention in rural areas.

The best estimates of the frequency, etiology, and impact of enteric infections in Guatemala derive from longitudinal studies in highland villages by the Institute of Nutrition of Central America and Panama, INCAP (Instituto de Nutrición de Centro América y Panamá). These studies have defined important interactions between diarrheal episodes, malnutrition, and impaired intellectual development in children.

1. Nonspecific diarrheal: Until the past 5 years, the vast majority of diarrheal episodes were termed non-specific, in that a specific bacterial or protozoan pathogen was not identifiable. Studies in Mexico, Bangladesh, and other countries have identified a reovirus and enterotoxigenic Eschericia coli bacteria as frequent causes of childhood diarrhea.<sup>1</sup> These and other pathogens responsible for childhood diarrhea are not amenable to specific therapy.

2. Specific Pathogens: Shigella and Typhoid

Following the epidemic of shigellosis in Guatemala during 1968-1970, Shigella infections have remained endemic<sup>2</sup> throughout the country. Since microbiological confirmation of shigellosis is required, no national incidence figures are available.

Typhoid fever is endemic in Guatemala. Reported cases from 1974-1976 are shown in Table 1. Less than 50% of these cases were confirmed by isolation of the causative bacteria. There is no evidence that the incidence of typhoid is increasing in Guatemala, yet the diagnosis can be difficult without microbiological confirmation. While

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<sup>1</sup> Reference 5

<sup>2</sup> Reference 6

typhoid can be transmitted by fecal contamination of water, the most frequent source of infection is contaminated, prepared foods.

Since 1973, the problem of typhoid and shigellosis has been under close observation, by the central laboratory of the MOH. During the last four years, no Shiga I isolates (the epidemic strain of 1968), have been reported. Group B Shigella is the predominant species isolated at present, constituting 60% of all isolates. All Salmonella species constitute 2-5% of the enteric pathogens, and S.typhi isolates amount to less than 1%. With both Shigella and typhoid, there is evidence that the causative bacteria are now resistant to antibiotics, which were previously effective therapies. As documented in Mexico, Salmonella typhi isolates in Guatemala show varying degrees of resistance to chloramphenicol. Similarly, Shigella flexneri and S. dysenteriae isolates with multiple drug resistance, including resistance to ampicillin, have been identified by the MOH laboratory. Antibiotic resistance is important in the therapy of individual patients, and becomes an important variable in considering the epidemic potential of these bacteria in Guatemala. Continued surveillance of antibiotic resistance should be a high priority.

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<sup>1</sup>  
Reference 7.

B. Objectives of the 5-Year Plan for Health: Enteric-Diarrheal Diseases

1. To reduce mortality caused by enteric diseases through:
  - a) Execution of an education program at the community level and training programs at the level of medical and paramedical personnel.
  - b) Establishment of a system at a local level that allows early detection and prevention of dehydration by the administration of oral electrolytic mixtures and, in those locations where hospitals and medical centers exist, by providing the adequate treatment of dehydration.
  - c) Obtaining community participation in the control program by training volunteer cooperators to be in charge of activities at a local level.

Several control strategies for enteric-diarrheal illnesses are feasible in developing countries.

1. Immunization. Typhoid is the only one of these diseases for which a vaccine is available as a control methodology for endemic transmission, typhoid vaccination is neither logistically or financially feasible.
2. Environmental Sanitation. Since childhood diarrhœa is a result of a complex web of inadequate water, poor waste disposal, and maternal ignorance of basic hygienic principles, it is a truism to state that environmental sanitation and public education are pre-requisites to prevention. While

many studies have investigated improvements in some or all of these variables, it remains unclear if a single intervention, such as provision of latrines, is crucial to breaking the cycle. Furthermore, perhaps only the "gestalt" of general community development will produce permanent improvement in morbidity and mortality due to diarrhea.

3. Early detection and therapy. Antibiotic therapy is generally of limited importance in the therapy of non-specific diarrhea. The 5-Year Plan for Health recognizes that, if children with diarrhea are promptly recognized and adequately treated to correct dehydration and electrolyte losses, mortality can be dramatically reduced. The program outlined in the 5-Year Plan has been strongly supported by WHO/PAHO, and a delivery strategy for rehydration centers has been proposed and field-tested. A critical factor to the success of such services is access at the local level and the education of parents about the benefits of such therapy. Much more extensive application or rapid rehydration would have considerable public health impact in Guatemala.

#### IV. MYCROBACTERIAL INFECTIONS

##### A. Tuberculosis

##### 1. Background

The national TB program has operated vertically within the MOH since 1958. Yearly programs concentrated in a single department have detected radiologically prevalent pulmonary

disease. The radiological diagnostic has been confirmed to a varying extent by tuberculin skin testing and sputum examinations. These data are summarized in Table 4. The prevalence of TB, defined radiologically, varied from 0.3 to 3.0 per 100 persons surveyed. Treatment consisted of one year of combined streptomycin-INN therapy given in bulk to the patient at the time of diagnosis without medical supervision or follow up. Patients with tuberculosis in other departments were only diagnosed in hospitals. No comprehensive diagnostic or therapeutic program has existed in Guatemala up to the present.

The Tuberculosis Division and the MOH estimate that 20% of TB patients in Guatemala City have organisms resistant to streptomycin and isoniazide. Alternative drugs (rifampicin, ethambutol) are not available, and routine antibiotic sensitivity testing is not performed.

The average number of new cases per year of tuberculosis diagnosed by the program from 1968-1974 (most recent data) was 3994 (72.6/10,000 total population). An average of 1459 diagnosed cases were hospitalized yearly during this interval. These data do not allow an accurate estimate of the overall prevalence of infection (tuberculin skin-test positivity) or open infections (acid-fast bacteria-positive sputum) or an assessment of whether the program has altered the prevalence of TB over the past 20 years.

TABLE 4

RESULTS OF THE ANTI-TUBERCULOSIS NATIONAL CAMPAIGN  
GUATEMALA, 1958-1975

Year	Department	Population	Coverage	%	X-Ray Examinations	%	Positive	Prevalence
/59	Escuintla	102,887	84,494	78	84,494	78	2,422	3.0
60	Santa Rosa	95,486	57,765	50	47,765	50	987	2.1
61	Sacatepéquez	71,370	51,342	72	36,883	52	746	2.0
62	Izabal	61,612	56,724	70	33,989	42	713	2.1
63	Zacapa	104,668	55,999	53	33,081	32	533	1.6
65	Alta Verapaz	274,016	117,475	43	80,480	29	507	0.6
66	Suchitepéquez	186,299	124,109	67	87,913	47	1,523	1.7
67	Retalhuleu	122,829	66,133	54	43,011	35	837	1.9
68	San Marcos and Quiché	173,596	100,768	58	65,813	38	1,402	2.1
69	Zona 12	46,060	36,543	76	36,525	76	102	0.3
70	El Progreso	74,005	45,117	61	40,786	55	564	1.4
71	Chimaltenango	185,000	128,238	69	89,970	49	910	1.0
72	Jutiapa	248,682	154,799	62	113,898	46	899	0.8
73	Chiquimula	180,871	119,841	66	89,023	49	814	0.9
74	Jalapa	118,103	54,483	46	45,177	38	464	1.0
75	Totonicapán	163,401	103,485	63	103,485	63	586	0.6
	TOTAL	2,230,885	1,343,315	60	1,028,293	46	14,009	1.4

## 2. Objectives of the 5-Year Plan for Health: Tuberculosis

- a) To reduce by 50% the mortality due to TB.
- b) To treat at least 75% (6,663 cases) of all TB being discovered, by using techniques and activities from the General Health Services.
- c) To vaccinate 80% of the people below 15 years old with BCG.
- d) To perform bacilloscopy for TB 75% (6,663 cases) of symptomatic respiratory cases.
- e) To bring to a negative state 90% (5,996 cases) of all sputum-positive cases of TP.

## 3. Comments

Beginning in 1977, the Tuberculosis Division of the MOH will cease to exist as a vertical health program. Both curative and preventative programs will be transferred to the department level; the national program will retain a planning and evaluation function. The stated objectives of this integrated program reflect several important new operational strategies:

- a) Base the program on the detection of open cases and their contacts.
- b) Stress the importance of well-supervised ambulatory therapy in order to diminish the high rate of hospitalization.
- c) Systematically apply BCG to children entering school, and perhaps, to all newborns, and

- d) Provide tuberculosis services to all departments equally.

Several important issues have not been addressed. The training of medical and laboratory personnel at the health center level could require several years. In addition, a great many health centers do not have microscopes or other basic equipment. Sufficient funding, or perhaps priority, has not been allocated for systematic drug-sensitivity testing in cases of resistance to the INN streptomycin. Finally, and most important, the program will detect TB only among persons presenting themselves at health centers. Provisions have not been made in the community to detect open (infectious) pulmonary tuberculosis cases which do not present themselves at the health facility. Furthermore, an outreach component has not been specified which will control drug therapy of the search for contacts.

## B. Leprosy

### 1. Background

From 1876 to 1976, a total of 325 persons with leprosy were registered in Guatemala. Approximately one-third of these have been detected since 1973. Detection of cases during the past 10 years has depended entirely on the referral of suspected patients to the Dermatology Hospital in Guatemala City. Diagnosis is based upon adequate clinical and pathological criteria, and during the past 2 to 3 years, the lepromin reaction has been

utilized to classify infections. There is a predominance of adults and patients with lepromatous leprosy in the current registry, suggesting that less obvious (tuberculoid) and less chronic infections are under-reported. The majority of leprosy has been reported from the warmer departments of Guatemala, Zacapa, Santa Rosa, Jutiapa, Escuintla, Chiquimula, Izabal and El Progreso. An established focus of leprosy is recognized in Santa Rosa, and an apparent concentration exists in Zones 6 and 7 of Guatemala City. Fewer than one-third of the registered cases have been investigated to determine where infection was acquired or to study case contacts.

Most lepromatous cases have been treated in the hospital. Dapsone is the primary therapy, with rifampin reserved for certain cases. A repository sulphone, Hansolar, has been used for ambulatory therapy in recent months.

## 2. Objectives of the 5-Year Plan for Health: Leprosy

- a) To reduce the incidence in prevalence of leprosy, through:
  - i) Search for cases by means of revision of the family group of known cases and by dermatological consults in areas endemic for leprosy.
  - ii) Treatment of 75% of open cases and protection of 75% of the cases against infection by using BCC or preventive treatments.

iii) Training given to one of the doctors of the Department of Infectious Diseases in the Hospital San Juan de Dios, and training of auxiliary personnel for the control activities.

The leprosy service is contemplating a restructuring quite similar to that described for tuberculosis. The principle of detection of open (lepromatous) cases, supervised therapy, and surveillance of contacts forms the bases for the extension of leprosy services to the local level. Training of physicians in the most endemic departments will commence this year. Until more active surveillance for leprosy has been conducted in the departments of Guatemala and Santa Rosa, it is impossible to accurately estimate the number of cases to be controlled. Leprosy does not appear to be a major public health problem. There is considerable competence in the leprosy division, and it appears that budget constraints will be the primary obstacles to the success of the program.

## V. PARASITE INFECTIONS

### A. Intestinal Helminths

#### 1. Background

The common saying, "to be a Guatemalan is to have worms," reflects the great prevalence of intestinal helminths, principally ascaris, hookworm, and tricocephalus.

Most studies conclude that most persons, including children, suffer little disease until the density of adult worms reaches

critical levels in the intestines. Heavy infections with ascaris are commonly believed to cause or exacerbate malnutrition of malabsorption in children; the exact magnitude of that relationship has not been qualified. Hookworm infection can produce iron deficiency anemia when the diet has less than optimal iron content.

The most recent reliable study of the prevailing situation with regard to hookworm infection in Guatemala was done by INCAP, with the collaboration of the Control Laboratory of the Health Service in 1965.<sup>1</sup> Although the resulting data are eleven years old, they remain representative since, in the intervening period no comprehensive program has been directed at these intestinal helminths.

Table 5 presents the percentages of prevalence of intestinal parasites.

TABLE 5

PREVALENCE OF INTESTINAL PARASITES  
(All Ages)

	<u>Ascaris</u>	<u>Trico- cephalus</u>	<u>Hookworm</u>	<u>Amoeba</u>	<u>Tapeworm</u>
Rural:	49.7%	18.3%	10.4%	23.5%	0.9%
Urban	14.3%	3.3%	2.2%	10.5%	—

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<sup>1</sup>

Reference 8.

The study also revealed a low rate of infestation in children under one year and extremely high prevalence in the age group between two and nine years of age.

In 1965, an attempt was made to initiate a massive deparasitization program, with the goal of administering 7 million doses over a 4-year period. In the first year 600,000 doses were provided. However, in subsequent years, treatment decreased to such low levels that the program was discontinued.

## 2. Objectives of the 5-Year Plan: Intestinal Parasites

The 5-Year Plan does not include provision for control of intestinal parasites.

The control of intestinal parasitism is completely analogous to the strategy outlined for non-specific diarrhea. Transmission of each worm results from fecal contamination of the environment; for each species, eggs from contaminated feces must incubate for 1-2 weeks in the soil. The definitive control measure for helminths is use of properly installed and properly used privies. Until fecal contamination is effectively eliminated, drug therapy is available to decrease the worm burden and morbidity. Some countries, such as El Salvador, have carried out mass therapy for all children with Mebendazole, a single-dose therapy effective against all three helminths. An alternative, and potentially more cost-beneficial use of mebendazole (in that therapy is only a temporary method to control morbidity) is to

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1

Reference 9.

routinely treat only children with anemia, malnutrition, or symptoms referable to parasitism.

B. Onchocerciasis

1. Background

Guatemala has the largest endemic area of onchocerciasis in the Americas (other infected countries: Mexico, Colombia, Venezuela, Brasil, Surinam). The filarial infection Onchocerca volvulus is generally limited to 3 areas of the country between 400 and 1,500 meters in altitude which provides suitable breeding conditions for the Simulium spp vectors. These 3 areas are: a small focus on the Mexican border contiguous with the Chiapas endemic zone, a narrow band in the department of Santa Rosa, and a large area, ranging from Yepocapa to Retalhuleu, on the rich, coffee-growing Pacific watershed.<sup>1</sup>

Exact prevalence figures for onchocercal infections in Guatemala are not currently available, because most infected individuals belong to an indigenous population which is not accurately enumerated. A compounding factor is that the diagnostic criteria (principally the presence of microfilariae in a skin biopsy) are not standardized. The number of infected persons may be as high as 100,000.

Blindness is the most important disease manifestation of onchocerciasis. Blindness rates in Guatemala appear to be less than one-per-100 infections, yet no comprehensive study has been done.

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<sup>1</sup> Reference 10.

The onchocerciasis program of the MOH, prior to 1976, consisted of a staff of about 15 persons. The main activity was the removal of filarial nodules from residents on selected endemic fincas in order to limit blindness. No drug therapy is sufficiently safe for mass therapy in field situations. The primary control method, insecticide treatment of the vector breeding sites, has not been attempted in Guatemala.

2. Objectives of the 5-Year Plan for Health: Onchocerciasis

- a) To diminish the incidence of onchocerciasis through:
  - (i) Entomological studies to characterize the ecology of the Simulium, as a basis of antilarval control.
  - (ii) Expanded drug therapy of infected humans.
  - (iii) Implementation of studies involving the immunological, ophthalmological, epidemiological, and operational aspects of disease transmission.

In 1976, the onchocerciasis service was merged with the malaria division. The program now centers around a long-term, externally-funded Japanese control project. In the Santa Rosa zone, the Japanese group is redefining the prevalence of human infection and disease, performing basic studies on vector ecology, and conducting trials with newer larvacides. These activities are directed at the pilot control program, which might generate a model for transmission control in other areas of Guatemala.

The social and economic impact of onchocerciasis in Guatemala is poorly understood. The prevalence of infection or disease apparently remains quite stable. Most efforts at this time should be directed at basic research into factors which limit transmission and those operational strategies which are most likely to interrupt transmission.

C. Malaria

1. Background

The lower-elevation areas in Guatemala have very favorable conditions for the transmission of malaria. As a part of the worldwide malaria eradication effort begun in the mid-1950's, malaria incidence has been reduced from over 300,000 cases per year to 9,616 reported cases in 1976. This control has been accomplished by residual insecticide spraying of dwellings and drug therapy to diminish morbidity.

At present, most reported malaria comes from the Pacific coastal areas and the eastern Motagua Valley extending to Puerto Barrios. The Department of Escuintla reported 37.4% of all malaria cases in 1976. The majority of cases are Plasmodium vivax (9,296); a continuing problem with P. falciparum infections (320) has been related principally to the movement of Salvadorans into the border areas. Escuintla reported 66.2% of P. falciparum cases and transmission is now re-established in that department.

## 2. Objectives of the 5-Year Plan for Health: Malaria

- a) To succeed in the absolute eradication of Plasmodium falciparum, the cause of fatal cases of malaria.
- b) In 1975, to pass to the consolidation phase the areas situated between 700 and 1,000 meters in altitude, with a population of 400,000 persons (50% of malarious areas).
- c) In 1975, to pass into the consolidation phase the initial 410,000 population in areas previously sprayed with DDT (50%).
- d) In 1978 to pass the remaining areas into the consolidation phase.
- e) In 1978, to pass an additional 205,000 inhabitants into the consolidation phase (25%).
- f) In 1975, to pass the initial 25% of the population living in areas sprayed with OMS-33 into the consolidated phase.
- g) In 1978, to pass an additional 25% into the consolidation phase.
- h) In 1976, to integrate those localities that terminate the consolidation phase of eradication into the General Health Services of the MOH.

In summary, without new technical problems, it should be possible to pass 85% of all originally malarious areas into the consolidated phase. The malaria program's goal remains the eradication of malaria from 85% of the country within 5 years.

While this goal may be feasible, several powerful factors remain unknown:

- a) Malaria in El Salvador and Honduras is increasing and the situation in El Salvador is approaching a critical point. Movements of population from the south continues to pose the threat of reintroduction of malaria along Guatemala's southern border.
- b. Anopheles albimanus, the vector of malaria in Guatemala is highly resistant to many insecticides. In the Pacific coastal area, anophelines are resistant to all the currently available insecticides, including OMS-33. Should resurgence of malaria occur in this area, vector control potentially would be very difficult.
- c. As malaria incidence decreases, pressure will increase to diminish the program's operating budgets, a fiscal phenomena experienced in many other countries. Such decreased funding limits the surveillance of cases, which is imperative to maintain malaria at low levels. Malaria eradication nationally is not feasible while transmission remains unchecked in adjacent countries.

## VI. SOCIAL-CULTURAL CONSIDERATIONS

Communicable diseases are not transmitted in an encapsulated world of hosts and vectors. Their flow from place to place and from person to person occurs within a system of interacting geographical, climatic, biological, economic, social, and cultural variables. In Guatemala, the social-cultural variables related to the control of communicable diseases center on two main sets of belief and behavior: (1) cultural differences in definitions of diseases, their etiologies, their most proper and feasible treatment, and their economic and social implications, and (2) the degree of social distance between the health care deliverer and the client which influences the resolution of illness episodes. The translation of these variables into program activity is complicated in Guatemala not only by the existence of two ethnic components, Indian and Ladino, but by the fact that these components are increasingly pluralistic and flux.

Two recent studies,<sup>1</sup> which examine attitudes toward and acceptance of government vaccination programs offer some systematized data, taken in samples of acceptable size. One of these is explicitly stratified into Indian, Ladino, and 'transitional' sub-samples. It appears that Indian populations do know somewhat less about vaccination and are more disposed toward traditional preventive measures than Ladino populations.

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<sup>1</sup> References 11 and 12.

However, neither of these differences between the two populations is large. Furthermore, Indians and Ladinos tend to value different vaccinations similarly, with smallpox, whooping cough, and measles having a slight lead over polio, tuberculosis, and typhoid. It has been said that resistance to vaccination lies in a basic lack of understanding of the concept of prevention; in this one instance, this does not seem to be the issue since vaccination belongs to the same preventive medical family as prayer and amulets. Resistance and/or non-continuance in both populations seems to derive less from compelling folk belief than it does from not understanding the range of protection afforded by vaccinations (one example is the expectation that pertussis vaccine will prevent all coughs), the nature and meaning of vaccine, reactions, and the importance of repeated dosages. Other causal factors are insufficient pre-training of program workers, poor treatment by program workers of the client population, hours that fit badly with client schedules, and insufficient "priming" of the population.

Data are insufficient to permit pinpointing of the areas of greatest non-compliance. Geo-political reasoning suggests that the principal unaccessed nuclei are cash-crop fincas and remote indigenous villages. The former are often doubly isolated by geography and the policy of the finca-owner, the latter by geography and more intensely held traditional beliefs. In more

accessible areas, the unreached population is again largely indigenous and, while Ministry of Health vaccination norms may be satisfied numerically, they are skewed toward Ladino and, to a lesser degree, transitional groups. Whatever the focus of non-compliance, the strategy suggested by the MOH-study of making future vaccination campaigns community activities with heavy educational components, is a better working hypothesis than a mandated medical attack from the center.

The cause of death is frequently truly unknown (this is often true in Ladino populations as well as in indigenous groups) and deaths are not well-reported in any event. Reliable morbidity reporting will become reality when it is field-generated through outreach personnel who can receive and interpret client symptom reports, and relay these to intermediate levels where they can be categorized into syndromes to be fed into the national-level coding system. The conceptual analysis and information-system design presently contemplated as part of the Rural Health Evaluation Project should lay the foundation for such a sequence.

## VII. CONCLUSIONS

The specific infectious disease programs and issues which have been discussed are not inclusive of all the communicable disease problems of Guatemala. Certain infectious problems such as venereal infections and respiratory infections, including

influenza, are significant causes of morbidity, yet, due to priorities set by the MOH or limitations in preventive potential, some disease problems have not been evaluated.

In those specific disease problems which have been discussed several programs deserve particular attention due to the potential for impact on morbidity and/or mortality in Guatemala:

1. The immunization program has been a remarkable success in terms of its impact on morbidity. Still, because of the critical refrigeration requirements of measles vaccine, the immunization campaigns have remained vertical. The increase in measles cases in 1976 reemphasizes the importance of delivery of potent vaccine to all areas of the country. A change to a locally-based maintenance vaccine program would more systematically deliver vaccine to the target childhood population. Such a program would disperse the vaccination throughout the year at the health center or post level. Utilizing a local census, there would be a greater probability of covering children (and pregnant women) in remote aldeas, the level at which the mass campaign approach is most deficient.

2. The tuberculosis control activities in the MOH since 1955 have been highly inefficient, and perhaps, ineffective. Even conservative estimates must rate tuberculosis as a major problem in Guatemala. The general outline of the

integration of tuberculosis into the general local health services represents a significant change in objectives. It is quite clear that the initial step towards tuberculosis control should be an active search for open infections in order to bring them under effective drug therapy.

This strategy has been suggested for some years within the MOH, yet there has been considerable reluctance to abandon mass chest X-ray and tuberculin testing. Considerable training and provision of equipment at the local level is now required, in order that the stated objectives are rapidly realized.

3. The disease complex in which diarrhea interacts with malnutrition may be the major health problem in Guatemala, considering the infant mortality rate in rural areas. As has been pointed out, this disease complex does not appear to be attackable via a single preventive measure such as vaccination. Rehydration programs directed at the early detecting of the life-threatening diarrhea in children can dramatically diminish morbidity and mortality. The technology for such programs is basic, generally depending on oral rehydration administered by paramedical personnel.
4. The very real potential for resurgence of malaria in Guatemala should be clearly appreciated. Continued funding of a surveillance field staff is the only feasible barrier

to the possibility of resurgence.

The 5-Year Plan for Health 1975-1979 for Guatemala, contains many progressive preventive health objectives. This represents a move from vertical planning and programs to integration of health services at the local level. Programs in tuberculosis, leprosy and nutrition/rehydration are currently preparing to transfer responsibility to a local level.

A. Surveillance Programs

1. Enteric-Diarrheic Illnesses

Tragically, the multitude of physiological, economic, and environmental factors which enter into the diarrhea equation, are paralleled by a similar multiplicity of cultural responses. First of all, perceptual differences exist between Indian and Ladino populations with regard to the importance of diarrhea, as both symptom and illness, per se. Ladinos tend to rank dysentery and diarrhea in children as of greater importance than in adults; Indians rank them as of lesser importance in children. Furthermore, almost twice as many Indians as Ladino rank fallen fontanelle (a sign of severe dehydration), quite low as an important illness or symptom in children, and neither group ranks it particularly high. Neither group ranks hinchazon (the swollen belly typical of parasites infestations), as particularly important. Diarrheas, parasites, dysentery, fallen fontanelle, and hinchazon, are perceived as separate illnesses or as symptoms of separate illnesses with separate etiologies;

there appears to be no concept that any of these are interconnected in any systematic or casual way with any of the others. Malnutrition is not seen as an illness. Finally, there is an almost total absence of perception of disease pathways and the roles of prevention and contagion in this area; where such perceptions do exist, the complex of adverse environmental forces supports any existing tendency to fatalism.

The quite logical consequence of these perceptions is a treatment response in which different solutions are sought for each of these medical problems, particularly in children. The first recourse for fallen fontanelle is a variety of mechanical home remedies; the second, the ministrations of a local midwife. The pharmacist is sought out for purges or antidiarrhetics. Food regimens are modified, often dangerously. Most important of all, is that there is little or no perception of these symptoms as parts of syndromes with possible fatal ramifications for children. Their treatment is an inconsistent mix of cures and curers which often involve perilous delay in reaching effective treatment.

The plan being contemplated by the Ministry of Health for the establishment of a network of rehydration centers is a step in the right direction; however, it will be only a bandaid if it is not accompanied by the exploitation of the opportunity to educate the mothers involved in all the causal, preventive, and curative aspects of the syndromes involved, with emphasis

on symptom identification earlier in the illness trajectory. Examination of experiments in Mexico and El Salvador, with homemade fluids for electrolyte replacement, as well as potentially crucial role of the Rural Health Aide in this entire activity, should constitute part of the pre-planning for this program.

## 2. Malaria

Malaria treatment is a problem at two cultural levels: the bureaucratic level and the client level. With regard to the first, malaria is presently regarded as a national medical problem which has come close to resolution and there will be a natural inclination toward reduced vigilance. Unfortunately, that loss in watchfulness is accompanied by leakage of contagion from Salvador and Mexico. The combination of the new concept and the new threat could constitute a major health peril.

At the client or field level, there are four major inhibitors to full program success and maintenance. One is the belief that malaria is a disease of adults, not children. Another is not connecting the vector in a causal way with the illness. Still another is a residual belief that blood is a non-renewable substance and that the required blood sample (the gota gruesa) will be permanently debilitating. Finally, there is a certain suspicion that the medicines given out by the malaria workers are in some way different from those available at the pharmacy,

added to the resistance found in many other populations to take medicine at all.

The relatively small number of cases of malaria in Guatemala, plus the residue of hard-core cultural resistance, makes tempting a non-aggressive program posture. Opting for wisdom over temptation, however, suggests a move from passive to active case detection, in which each case is viewed as a possible and therefore important focus of disease transmission, whose range of impact is expanded by seasonal agricultural migrations.

### 3. Tuberculosis

The foundation of the tuberculosis program to date has been dependence on identification of open cases through existing fixed facilities. The contemplated change from what has been essentially a vertical program to a horizontal one, will be troubled by basic ignorance, again at two levels. No systematic data exists on client health perceptions related to tuberculosis, nor are there anything but rough estimates on the number of unreported cases of TB and their geographical clusterings. One can only hypothesize that there will be three main sources of resistance to reporting:

1. Antipathy to fixed health facilities because of social and geographical inaccessibility;
2. Fear of hospitalization; and
3. Lack of recognition of tuberculosis and its symptoms as a disease, per se. In the Academia report referred

to earlier, tuberculosis is not even cited by respondents as a disease, though oddly enough tuberculosis vaccine was mentioned.

#### 4. Morbidity Reporting

Under-reporting of morbidity data is widely recognized as a problem which has its origins largely in the conceptual framework and geographical isolation of much of the client population, principally the indigenous portion. The reasons are obvious:

1. Division of Statistics administers all data gathering without input from the Division of Epidemiology. One problem stemming from this is the use of the International Disease Reporting Code which has little meaning in rural Guatemala. An alternative is to use a symptom-based reporting system, used on a limited basis immediately after the earthquake with relatively few problems.
2. Morbidity data are reported completely independently of illness. This separation leads to many inconsistencies.

## Annex 5.5

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