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**TUBERCULOSIS CONTROL
IN THE EASTERN MEDITERRANEAN REGION**

Review of the present situation

by

Dr J. Kaleta
WHO Regional Adviser on Tuberculosis

I GENERAL INFORMATION

The Eastern Mediterranean Region (EMR), stretching over an area exceeding 14 million square kilometers, consists of twenty-four Member Countries encompassing: Tunisia in the west, Cyprus and Syria in the north, Somalia in the south and Pakistan in the east. The population amounts to some 260 million, which, owing to vast deserts, extensive wasteland and high mountainous complexes, are more or less unevenly distributed along rivers, coastal belts and circumscribed fertile or semi-fertile areas. Hence the overall density of population varies from 1 (Libyan Arab Republic) to 373 (Bahrain) per square kilometer. Though this is one of the most homogeneous regions as far as religion and language are concerned -- the vast majority being Moslems and Arabic-speaking, sharing similar cultural and social habits and traditions -- yet it is an area of the highest diversity and contrasts of demographic, geographic and socio-economic features. Only in the recent past

have we witnessed an astonishingly rapid change in the economic and social structure of some of the countries in the Region, whose rich natural resources (oil) have placed them among the richest in the world. On the other hand, there are also five of the twenty-five economically least fortunate countries of the world in this Region, with a national income of barely fifty to a hundred dollars yearly per capita. Likewise, there is one of the highest physician/population ratio in the world (1 to 360), as well as the lowest (1 to 73 000).

Despite the recent unparalleled economic upsurge, almost all the countries are equally confronted with some handicaps common to all developing countries: most of them lack skilled manpower and have a large proportion of illiterates (80% - 95%), though their health problems are rapidly changing in some of them. New health hazards have crept in as a consequence of rapid industrial development, such as environmental pollution, heart disease and mental health problems. But there is still malnutrition, and widespread communicable diseases are rampant, not to speak of such areas where there is absolutely no health care of any sort.

The estimates of birth rates (46 per thousand) and death rates (17 per thousand) are among the highest in the world, and infant mortality still records extremely high figures reaching up to almost 200 per thousand. Many of the member countries show the highest natural population increase (3.5% yearly), and some countries have an average annual rate of net increase as high as 12.5%.

II EXTENT OF THE TUBERCULOSIS PROBLEM

The magnitude of the tuberculosis problem in a country is usually measured by two most relevant indices:

(a) The proportion of infected population in a given age group - age-specific prevalence of tuberculosis infection as demonstrated by tuberculin testing.

(b) The proportion of persons excreting tubercle bacilli among the population, obtained by bacteriological examination.

Other indices, such as rates of X-ray positive findings indicating active tuberculosis, specific mortality rates, etc., are for well-known reasons, of less importance.

It would be extremely difficult to give a reliable picture of the present extent of the tuberculosis problem in the Region, for generally no reliable statistics are available. Even in countries where notification of tuberculosis is compulsory and a well-established reporting system is supplying relevant health statistics, the data collected reflect only the capacities and capabilities of health services to detect tuberculosis cases and suspects rather than the existing epidemiological situation.

However, the data obtained from epidemiological surveys, carried out with WHO assistance or by national teams as well as during tuberculin testing of selected population groups at different points of time do furnish a certain insight into the distribution of tuberculosis in the Region. They reveal considerable contrasts and identify three distinct groups:

(a) Low prevalence countries comprising Cyprus, Israel, Lebanon and Syria, with an annual infection rate below 1% and sputum positive rates below 0.1%. Even during the ITC campaign carried out in 1949-51, these countries showed the lowest prevalence rates of infection not only in the Eastern Mediterranean Region but also as compared with some European countries.

(b) Moderate or relatively high prevalence countries, viz. Egypt, Iraq, Jordan, Oman, Pakistan, Tunisia and a few others, with 0.1% - 0.3% bacteriological positive rates and 5% to 20% infection rates among children of 5-9 years of age, showing a constant though moderate decrease of tuberculosis.

(c) High prevalence countries including Ethiopia, Somalia, Sudan and Yemen, with unusually high bacteriological positive rates of 0.4% or more and extremely high proportion of infected children of 5-9 years of age amounting to 20%-30%, without indication that their tuberculosis problems are diminishing.

There are also countries such as Kuwait, Libyan Arab Republic, Qatar, etc. with an originally high prevalence of tuberculosis but their epidemiological situation is rapidly improving owing to an unusual intensification of health services in the recent past.

1. Tuberculosis infection

Among the various epidemiological indices, the most sensitive, simple to establish and easy to compare, is the prevalence of infection among children. Infected children in fact mirror the existing open cases in the community, provided that no BCG vaccination has been widely applied.

During the WHO/UNICEF-assisted vaccination campaigns, carried out in 1949-55, valuable data were collected from most of the countries in the Region. Later on surveys were carried out by national services in areas not included in BCG vaccination campaigns (see table 1). Some partial results clearly point out the fact that the risk of infection is decreasing, as may be seen from the following table.

Proportion of infected children by age and year
in some countries of EMR

Country	Year	Age		
		0 - 4	5 - 9	10 - 14
Afghanistan	1955 - 1960	10	19	39
	1966 - 1972	5	11	22
Egypt	1952	9	25	37
	1974	2.6	9.4	20.5
Lebanon	1956	2.5	4.6	12
	1964 - 1973	1.8	3.7	9.7
Libya	1959	5.6	21.9	29.1
	1969 - 1971	-	7.5	-
Pakistan	1961	4.8	23.1	47.7
	1974 - 1975	1.5	12.0	37.2
Syria	1952	5.0	16.0	29.0
	1972	1.5	4.0	9.0

However, this trend has not been observed in some other countries like Somalia, Sudan and Yemen.

Tuberculin survey carried out by National teams among selected, non-vaccinated groups of children of 5-9 years of age during the past ten years (1965-1975) revealed the following percentage of infection:

Lebanon	2.7%	Iraq	11%
Syria	4.0%	Afghanistan	11%
Bahrain	7.0%	Pakistan	12%
Libya	7.5%	Ethiopia	16%
Saudi Arabia	7.5%	Sudan	18%
Egypt	9.4%	Yemen	28%
Jordan	10.5%	Somalia	35%

2. Prevalence and incidence of tuberculosis

Since comprehensive tuberculosis prevalence surveys, including X-ray and bacteriological examinations, have not been carried out in the Region for the last 10-15 years, no reliable data are available on the prevalence of bacteriological positive cases nor on X-ray suspects.

Estimates indicate that prevalence of bacteriological positive cases ranges from 0.05% (Cyprus) to almost 1% (Somalia) and those radiologically positive, from 0.4% (Kuwait) to 6% (Somalia).

Incidence trends in some countries also indicate an obvious decrease in the disease:

<u>Year</u>	<u>Kuwait</u> new cases rate per 100 000	<u>Libya</u> new cases rate per 100 000
1965	257	-
1966	251	210
1967	208	230
1968	174	180
1969	140	100
1970	127	130
1971	-	60
1972	-	60

The need for further epidemiological surveys is felt in almost all countries. Such surveys would not only spotlight the present tuberculosis problems and the progress achieved, but also provide useful data for current programme policies in the frame of a broader and a more systematic analytical approach.

III NATIONAL TUBERCULOSIS CONTROL SERVICES.

In the absence of reliable data, a questionnaire was sent to responsible tuberculosis officers in twenty-two member countries of the Region in order to form an idea of the present situation in tuberculosis control in the Region. Twenty countries so far responded to the enquiry. After consolidation and evaluation of compiled information (see tables 3-7) the most important findings were summed up as follows:

1. National Tuberculosis Control Programme

The basic concept of a national tuberculosis control programme has been adopted in almost all member countries and is being increasingly applied under widely varying and, in some countries, rapidly changing socio-economic conditions through specialized or general health services. Only a few countries remain which have yet not developed their strategy in tuberculosis control.

2. Integration

Although a more or less developed network of basic health services is operating at various levels of efficiency in all of the twenty-two interrogated countries, only nine of them claim to have integrated tuberculosis activities into the routine work of these services. In ten others tuberculosis control measures are being executed through specialized tuberculosis services while in three smaller ones the type of the programme has yet to be properly established. Countries such as Afghanistan, Democratic Yemen, Ethiopia, Iran, Jordan, Pakistan, Somalia and Sudan recorded moderate to substantial achievements in integration of tuberculosis activities into the Basic Health Services; though some of them have not yet succeeded in establishing full-fledged programmes they have at least started to apply the basic principle underlying integration.

In Ethiopia, 67% of the general hospitals, 83% of the existing rural Health centres and 27% of dispensaries are participating in integrated tuberculosis activities and thereby contribute with 55% to the present extent of tuberculosis control. In Somalia 75% of districts have developed tuberculosis control activities, and although the overall output is still modest, 70% of new cases are being detected just in the integrated Basic Health Services

Participation of BHS in case-finding, Somalia
(Percentage of all detected new cases by year)

1972	69% in TB centres and 31% in BHS
1973	48% " " " " 52% " "
1974	30% " " " " 70% " "

In Afghanistan 41 out of the 105 Basic Health Centres were involved in tuberculosis activities in 1974. In Pakistan, nuclei of integrated activities or even fairly developed rural programmes have been established in 30 out of the 62 existing districts.

However, the scope and intensity of such endeavours depend largely on the state of development of the basic health services and their ability to undertake additional responsibilities as well as on the attitude and orientation of those responsible for implementation of this policy.

It is obvious that the task of integration, uphill as it is, demands continued strenuous efforts on the part of all concerned in order to ensure it a permanent place in the national tuberculosis programme.

3. Administration and supervision

Administration of tuberculosis control is mostly with central tuberculosis offices attached to ministries of health (fourteen countries) or less frequently with public health departments (eight countries). Their responsibility involves organization, planning of programmes and their implementation, management, co-ordination, follow-up and evaluation and training of health workers.

Supervision, which has been established in seventeen countries through central public health departments, tuberculosis institutions, or other authorities, remains, however, one of the weakest points of programme implementation. The "managerial team" techniques of supervision has, so far, not materialised for various reasons.

4. Specialized institutions and personnel

Attempts to establish national tuberculosis institutes responsible for implementing tuberculosis programmes did not generally succeed due to various constraints, except in Iran, Iraq and recently in Afghanistan. Instead, directorates of tuberculosis control were set up and attached to Ministries of Health or leading tuberculosis centres. On the other hand, training and demonstration centres were established and are operating in the majority of countries. The number of specialized tuberculosis/chest centres or clinics varies considerably from country to country, one centre covering an average of 600 000 inhabitants, in the Region, ranging from 140 000 inhabitants in the Libyan Arab Republic to 1 per 8.7 million inhabitants in Ethiopia. Similarly the number of tuberculosis beds, though not an essential item for tuberculosis control, is relatively the highest in Kuwait (1 per 1 500 inhabitants) and Somalia (1 per 1 600 inhabitants) whereas it is the lowest in Afghanistan (1 per 273 000 inhabitants). The most favourable physician/population rate in tuberculosis services has been noted in the Libyan Arab Republic (1 per 33 000 population) and the worst in Ethiopia (1 per 4 million population).

It should be noted that some of the developing countries are vexed with the problem of permanent exodus of skilled personnel (doctors and para-medicals) who are migrating to other countries for better jobs and thus jeopardizing tuberculosis control and the functioning of health services, particularly in rural areas of their own country.

5. Legislation

Compulsory notification of tuberculosis cases has been introduced only in nine countries, representing 22% of the whole population. Paid sick-leave is permissible to workers and

other health insured persons in eleven countries while financial assistance is provided to the non-insured in five countries. (see table 4).

BCG vaccination is free of charge in all countries and so are diagnostic and treatment services in government tuberculosis clinics. Ambulatory treatment is charged only in one country while hospitalization has to be paid partly by tuberculosis patients in three countries and partly in several others.

6. Recording, reporting and assessment

Recording and reporting system is in operation in eighteen countries. In some of them, however, it is working on a limited scale, i.e. collecting selected information pertaining to certain activities only, such as bacteriological work in Iraq, BCG vaccination and MMR investigation, as in Kuwait, etc. Efforts are being made to improve national recording and reporting systems in specialized services and to incorporate simple elements of tuberculosis activities in the overall system of general health services, particularly in Afghanistan, Ethiopia, Jordan, Pakistan and Somalia. A uniform quarterly reporting form on tuberculosis activities has been finalized at WHO/EMRO and recommended for use in the national tuberculosis programmes throughout the Region. These would ensure better uniform monitoring and assessment of tuberculosis activities.

IV TUBERCULOSIS CONTROL ACTIVITIES

1. BCG vaccination

It is gratifying to note that BCG vaccination occupies a dominant place in tuberculosis control in all countries of the Region, with the exception of one. The strategy of vaccination programmes is constantly shifting from the sporadic and irregularly conducted mass campaigns towards integrated vaccination programmes, presently operating at different levels of development in eighteen of the twenty integrated countries, often in addition to mass campaigns. Also combined BCG/smallpox vaccination programmes have been introduced in eight countries for their operational and economical advantages, and are being applied on an increasing scale, particularly in Afghanistan, Ethiopia, Somalia and Sudan. Apart from

the tuberculosis services, other health institutions are also participating in BCG vaccination programmes in almost all countries — maternity wards and MCH centres (14), school services (14), basic health services (11) and others.

The methodology being used is direct vaccination without prior tuberculin test. Only four countries in the Region (Iran, Kuwait, Saudi Arabia and Cyprus) practise tuberculin testing before vaccination.

There has been a manifest desire on the part of all those responsible for tuberculosis control to use only high quality vaccine. Since liquid vaccines are unstable, difficult to transport and highly susceptible to light as well as heat, thus giving poor protection under field conditions, freeze-dried vaccines have been generally introduced. Three countries are, however, producing and applying their own liquid BCG vaccine.

The production of freeze-dried BCG vaccine in the Region is still at the experimental stage under WHO assistance in Cairo and Teheran. Because of the difficulties involved in producing BCG vaccine of high quality, the initiative by some member countries to establish "their own" BCG production centres has been strongly discouraged. Emphasis has been laid on regular checking of the quality of BCG vaccine applied in BCG mass vaccination programmes by the International Reference Centre for BCG Quality Control in Copenhagen. But only a few countries have responded positively.

As for the target groups, new-borns and pre-school children are included in vaccination programmes of fourteen countries, while school-going children are being vaccinated in almost all countries. The strategy of vaccination varies from country to country. After having conducted an intensive mass campaign, some countries are now concentrating the maintenance phase on school-entering children, while others are trying to cover unvaccinated children and the new generation through integrated services.

However, a factor which still remains to be overcome is the proper BCG coverage of the eligible population, particularly the youngest lot. In a good number of countries this coverage does not exceed 2%-5% of new-borns and 10%-15% of pre-school children. However, the coverage of school-going children is usually satisfactory, reaching 50% - 90%.

2. Case-finding

Systematic mass X-ray screening for the purpose of detection of infectious sources is definitely a method of the past. Only two countries are conducting mass mobile MMR screening for case-finding purposes on a very limited scale.

Bacteriological procedures are unanimously considered to be the priority procedures in case-finding. Special emphasis is being placed on direct microscopy examination as an efficient, cheap, simple and diagnosis-proving method to identify the most important sources of infection among coughing patients reporting themselves to various health institutions.

To meet this need, an efficient and reliable network of laboratory services at all levels is indispensable, and should be established in consonance with the strengthening of rural services and overall development of health facilities. Where such services already exist and are involved in tuberculosis control it has been observed that their output could be increased manifold by systematic selection of patients for sputum examination. This requires firstly the oft-missing collaboration of doctors in general health services, secondly training and orientation of microscopists to remove the doctors' mistrust of these methods, and thirdly regular supervision of peripheral laboratories by highly skilled technicians. Microscopy examination of sputum is still not available to the majority of the population in many countries as evident from the fact that only eleven countries have introduced this method in the basic health services, and that on a limited scale.

Examination of sputum by culture — important for improving diagnosis and follow-up of treatment — as well as drug sensibility testing of tubercle bacilli is currently beyond the reach of several countries of the Region (Democratic Yemen, Qatar, sensibility testing is not available in Jordan and Somalia). There is also need for improving the quality of work in most of the central laboratories, demonstrated by the often surprisingly low yield of positive cultures (5% - 10%) in addition to positive microscopy findings, as compared to European or other countries where 50% - 70% contribution from cultures could be expected. Another noteworthy problem is that peripheral health institutions have not been able to take proper advantage of the services of central bacte-

riological laboratories owing to considerable difficulties in forwarding sputum.

To sum up, further efforts in strengthening the laboratory network at all stages are necessary to bring case-finding to a satisfactory level.

It should be kept in mind that even the best case-finding programme is useless, unless an efficient treatment programme is organized to neutralize the discovered sources of infection.

3. Treatment

The spectacular technical progress made in the past twenty years has made it possible to cure nearly all tuberculosis patients, i.e. to neutralize them as spreaders of infection. Therefore treatment is at the same time a most effective preventive method too.

Proper organization of ambulatory treatment in many countries has still a long way to go in order to minimize the existing rates of defaulters and irregularities in drug intake, which lead to treatment failures and drug resistance.

Efforts are being made in a number of countries to improve ambulatory treatment and regularity of drug intake by systematic motivation of patients (motivation rooms in tuberculosis clinics). At present, there is practically no treatment supervision due to lack of manpower.

As for treatment regimens applied, the standard combination of STM + INH + PAS, followed by INH + PAS is predominant in most countries (17), while combination of INH with Thiacetazon is much rarer (7 countries). On the other hand an increasing number of countries apply the so-called "second line" drugs in primary ambulatory treatment, using combinations with Myambutol or Rifampycin.

The fully supervised intermittent, twice-weekly chemotherapy regime tried under programme conditions in a few countries of the Region proved disappointing and organizationally extremely difficult.

The new realistic outlook to shorten treatment to nine or even six months with INH/RIF/STR/PZ might not be economically feasible in the majority of the countries in the Region, although the more fortunate ones may take advantage of it.

There was no tendency in the Region to increase the number of hospital beds for tuberculosis control. The allotment varies from as high as 1 bed per 1 500 inhabitants (Kuwait) to 1 bed per 273 000 inhabitants (Afghanistan). Recommendations that hospital treatment should not be expanded even in countries experiencing a considerable shortage of beds are being attended to promptly but no co-ordinated efforts have been made to extend and organize ambulatory treatment. On the other hand the excess in tuberculosis beds in some countries due to the decreasing tuberculosis problem (Lebanon, Libyan Arab Republic) is compensated up to 50% by treatment of chronic lung-diseased patients. Although the average hospital treatment of tuberculosis patients has been shortened to 1 to 2 months in four countries, it is still unnecessarily long in the majority of countries, averaging 3 to 6 months in eleven countries and 7 to 18 months in four.

It is also obvious that priorities of treatment are not being adhered to. Only two member countries are strictly pursuing treatment of bacteriological proven cases, though sputum negative suspects are being treated in all other countries too. Taking into account that the proportion of cases/suspects is often 1:4 or 1:6, an unnecessary lot of additionally treated suspects lays considerable burden on the scarce services and meagre resources in many countries.

Although not quite strictly relevant to the scope of this paper, it would be worthwhile mentioning some additional important problems for consideration:

- staff in specialized or general health services is decreasing in some countries owing to the great drain on manpower. There is also a rapidly decreasing interest among doctors for specialization in tuberculosis.
- Training is insufficient and inadequate and the situation is aggravated by frequent transfer of trained personnel to non-tuberculosis activities.
- Programme implementation is often suffering owing to total absence of supervision at all levels or because of managerial difficulties in programme implementation. Managerial teams have yet to be established.

- Investment policy. Many governments have stopped investment into construction and consolidation of tuberculosis clinic networks without undertaking proper compensation on the side of development of integrated rural programmes.

- International assistance is critically decreasing (assistance in drugs, equipment, technical advice, etc.) to some countries still needing such assistance.

SUMMARY TABLES ON COUNTRIES IN WHO EMR
(latest available data)*
POPULATION AND VITAL STATISTICS

Country	Area (sq. km.) 000	Population estimates (latest - 000)	Density per sq. km.	Birth rate o/oo	Death rate o/oo	Average annual increase %	Infant mortality o/oo	Illiteracy rate %
AFGHANISTAN	647	18 294	28	49.2 ^a	23.6 ^a	2.3	182	92
BAHRAIN	0.6	232	373	43	18.5	3.4	138	50 M, 71 F
CYPRUS	9	695	71	19.1	9.1	1.0	33.3	5
DEM. YEMEN	287	1 597	6	49.5 ^a	20.3 ^a	3.0	152	46.3
EGYPT	1 001	35 619	36	34.1	14.4	2.5	116	52 M, 79 F
ETHIOPIA	1 222	26 076	21	45.1 ^a	22.9 ^a	1.9	181	95
FTAI	22	201	9	38.4	9.9	-	51.6	-
IRAN	1 648	32 215	20	47	14	3.0	139	67 M, 87 F
IRAQ	435	10 765	25	49.0 ^a	13.6 ^a	3.1	69	63 M, 84 F
ISRAEL	21	3 252	157	27.8	7.2	2.9	21.3	-
JORDAN	98	2 646	27	45.3	13.7	3.2	99	-
KUWAIT	18	860	48	45.5	5.2	9.8	44.1	36 M, 58 F
LEBANON	10	3 055	294	24.5	9	3.0	59	31
LIBYA	1 759	2 257	1	45.2 ^a	13.6 ^a	3.7	72.7	53 M, 94 F
OMAN	212	717	3	49.9 ^a	18.5 ^a	3.0	138	-
PAKISTAN	804	66 749	83	50.3 ^a	16.2 ^a	3.4	136	-
QATAR	22	170	8	49.9 ^a	18.5 ^a	12.5	42	90
S. ARABIA	2 149	8 443	4	49.5 ^a	20.3 ^a	2.8	152	95
SOMALIA	637	3 003	5	47.4 ^a	21.8 ^a	2.3	177	95
SUDAN	2 506	17 324	7	49	21	2.7	96	87
SYRIA	185	7 114	38	47.3 ^a	13.2 ^a	3.3	93	34 M, 73 F
TUNISIA	163	5 641	34	35.2	13.9 ^a	2.2	120	62 M, 89 F
UAE	83	310	4	49.9 ^a	18.5 ^a	11.5	138	73 M, 91 F
YEMEN	195	6 096	32	49.5 ^a	20.3 ^a	2.7	152	90

* According to "Basic Country Information", WHO EMRO Health Statistics Unit, circulated 10 January 1975

^aUN estimates.

TABLE II

SUMMARY TABLES ON COUNTRIES IN WHO EMR
(latest available data)*

HEALTH ESTABLISHMENTS AND PERSONNEL

Country	Physicians		Medical auxiliaries	Hospital beds		National income per cap. (US \$)	Government expenditure on health (%)
	No.	One per No. pop.		No.	One per No. pop.		
AFGHANISTAN	937	19 000	1 542	3 322	5 300	83	2.1
BAHRAIN	148	1 570	1 038	1 025	226	-	15.3
CYPRUS	562	1 150	1 658	3 488	186	868	5.0
DEM. YEMEN	138	11 600	1 107	2 414	660	96	5.0
EGYPT	23 501	1 500	44 426	76 611	460	202	3.5
ETHIOPIA	350	73 000	3 817	8 415	3 000	79	5.9
ETIOPIA	37	2 270	332	1 048	191	-	15.6
IRAN	10 053	3 100	15 920	42 000	700	494	4.5
IRAQ	4 130	2 525	9 425	21 767	478	294	3.6
ISRAEL	8 453	364	18 854	17 369	170	2 014	2.9
JORDAN	678	2 500	2 396	1 892	1 300	334	2.3
KUWAIT	1 100	818	3 941	4 151	207	4 375	7.1
LEBANON	2 300	1 330	2 806	10 750	285	521	4.1
LIBYA	1 736	1 300	6 750	9 778	230	1 850	11.8
OMAN	122	9 000	260	819	875	-	4.0
PAKISTAN	14 061	4 300	9 043*	33 401	2 000	102	-
QATAR	105	1 600	292	-	250	-	-
S. ARABIA	2 600	3 000	4 444*	9 974	850	578	2.5
SOMALIA	193	15 500	1 097*	5 087	590	62	7.4
SUDAN	1 279	13 000	13 986	-	980	125	2.0
SYRIA	1 914	3 500	3 400*	6 854	1 030	295	1.4
TUNISIA	847	6 300	8 174	-	420	365	8.0
UAE	211	1 500	874	-	210	-	1.8
YEMEN	245	24 900	710	3 975	3 975	101	5.2

* According to "Basic Country Information", WHO EMRO Health Statistics Unit, circulated 10 January 1975

TABLE III

SUMMARY TABLES ON COUNTRIES IN WHO EMR
(latest available data)*

TUBERCULOSIS SERVICES AND PERSONNEL

Country	Physicians & specialists		Medical auxiliaries (incomplete)	TB beds		TB clinics	BCV vaccinations
	No.	One per No. pop.		No.	One per No. pop.		
AFGHANISTAN	18	1 016 000	79	67	273 000	22	641 587
BAHRAIN	2	116 000	27	80	2 900	1	5 803
CYPRUS	-	-	-	115	6 000	-	-
DEM. YEMEN	2	748 000	6	20	74 800	2	6 758
EGYPT	350	110 000	2 305	8 120	3 140	88	2 172 479
ETHIOPIA	7	3 725 000	32	808	220 000	3	316 212
FTAI	-	-	-	104	1 900	-	5 380
IRAN	281	114 000	621	2 725	11 800	27	-
IRAQ	57	188 800	132	3 203	1 150	17	121 292
ISRAEL	-	-	-	273	11 000	-	611 419 ¹
JORDAN	11	240 000	33	116	22 000	6	-
KUWAIT	22	39 000	149	574	1 500	7	43 578
LEBANON	-	-	-	1 220	2 500	4	-
LIBYA	69	32 700	229	518	4 350	16	1 033 477 ²
OMAN	-	-	-	0	-	2	-
PAKISTAN	-	-	-	3 223	20 700	33	1 234 288
QATAR	-	-	6	63	2 700	-	-
S. ARABIA	57	148 000	164	1 104	7 600	7	95 278
SOMALIA	2	1 501 000	17	1 977	1 500	2	570 079
SUDAN	19	911 000	-	1 793	9 660	7	-
SYRIA	19	376 000	91	932	7 660	12	225 094
TUNISIA	39	144 600	-	1 845	3 050	14	-
UAE	-	-	-	-	-	-	-
YEMEN	18	338 000	31	267	22 800	1	31 776

* According to "Basic Country Information", WHO EMRO Health Statistics Unit, circulated 10 January 1975

¹ Mass Campaign Dec. 1971 - June 1973

² Mass Campaign 1970 - 1973

TABLE 1

RESULTS OF TUBERCULIN TESTING, EMR
PERCENTAGE OF TUBERCULIN POSITIVES AMONG
NON-VACCINATED CHILDREN ACCORDING TO AGE

Country	AGE (years)			Date (year)	Source
	0 - 4	5 - 9	10 - 14		
Afghanistan	8	20	42	1950/54	{ WHO UNICEF National Others
	10	19	39	1955/60	
	10	21	34	1961/65	
	5	11	21	1966/72	
Bahrain	2	7	16	1969	Nat.service
Cyprus	-	4.3	12	1955	WHO/UNICEF
Democratic Yemen	-	36	52	1952	WHO/UNICEF
Egypt	9	25	37	1952	ITC/UNICEF Gharabli, National
	2.6	9.4	20.5	1974	
Ethiopia	11	26	45	1953/55	WHO/UNICEF WHO WHO
	12	26	61	1965	
	6	16	33	1965	
Iraq	18.5	- 42.2	-	1952/55	WHO/UNICEF WHO National
	2.7	12.5	24.3	1961	
	2.0	11	-	1965/67	
Iran	13.5	29	35	1958	WHO
Jordan	5	13	21	1949/51	UNICEF National
	8	10.5	16	1970	
Kuwait	1.6	10.7	24	1963	National
Lebanon	2.5	4.	12	1956	WHO/UNICEF National
	1.8	3.7	9.7	1964/73	

TABLE 2
BCG VACCINATION
(in 1974 or latest available data)

Country	No. vaccinated	% covered in age groups ^a				Remarks
		0	1-4	5-14	15-	
Afghanistan	276 985 (+ 364 600)	6.6	3.1	2.5	..	+ 364 600 vaccinated without indication of age group
Democratic Yemen	6 758	6.7	0.4	0.2	..	
Egypt	2 172 479	79.3	1.9	10.9	..	In 1974
Ethiopia	316 212	5.4	2.8	1.8	..	
Iraq	121 292	10.8	1.2	1.2	..	
Jordan (East)	611 419	38.0	67.0	83.0	..	Mass campaign Dec.71-June 73
Kuwait	43 578	2.7	6.9	9.4	..	
Libya	1 033 477	26.0	33.6	77.5	..	Mass campaign 4 yrs, 1970-73
Pakistan	1 234 288	1.5	3.5	2.8	..	
Somalia	570 079	22.3	47.0	27.4	..	Mass campaign Aug.74-Feb.75
Syria	225 094	0.0	0.0	10.1	..	In 1974 after M.C.1966/72

^a to be evaluated with regard to different vaccination policies

.. not evaluated

TABLE 3

SUMMARY OF REPLIES TO QUESTIONNAIRE
ON NATIONAL TUBERCULOSIS CONTROL SERVICES

1. National Tuberculosis Control Programme

Country	Type of programme			Adminis- tration		Specialised institutions					Personnel in TB services			
	Special- ised	Inte- grated	Not intro- duced	Central office	Other	National TB Inst.	Treat./Dem. centres	TB chest centres	TB hospi- tals and beds	TB wards and beds	Physi- cians	Nurses/ san.	Lab. techn.	X-ray techn.
Afghanistan	.	+	.	+	.	1	1	22	$\frac{2}{200}$	.	18	62	9	8
Bahrain	+	.	.	+	.	.	.	1	$\frac{1}{80}$	.	2	23	3	1
Cyprus	+	.	.	.	+	.	.	4	$\frac{1}{115}$	.	3	24	1	5
Democ. Yemen	.	+	.	.	+	.	1	1	$\frac{.}{20}$	.	2	4	2	?
Egypt	+	.	.	+	.	.	.	88	$\frac{54}{10\ 000}$	$\frac{250}{.}$	350	2000	155	150
Ethiopia	.	+	.	.	+	.	2	1	$\frac{3}{345}$	$\frac{24}{300}$	7	18	8	6
Iran	.	+	.	.	+	.	1	?	$\frac{12}{2\ 500}$	.	281	294	183	144
Iraq	+	.	.	+	+	1	.	17	$\frac{10}{2\ 800}$	$\frac{.}{200}$	57	55	35	42
Jordan	.	+	.	+	.	.	1	5	$\frac{2}{137}$	.	11	6	18	9
Kuwait	+	.	.	+	.	.	.	7	$\frac{?}{458}$	.	22	134	6	9
Lebanon	+	.	.	.	+	.	.	4	$\frac{4}{870}$	.	?	?	?	?
Libya	+	.	.	.	+	.	2	16	$\frac{3}{529}$	$\frac{1}{50}$	69	150	34	45
Oman *	.	.	+	.	+	.	.	2	.	$\frac{2}{37}$?	?	?	?
Pakistan	.	+	.	+	.	.	1	33	$\frac{17}{2\ 568}$	$\frac{52}{2\ 049}$?	?	?	?
Qatar	.	+	.	.	+	.	.	.	$\frac{1}{61}$	.	?	4	1	1
Saudi Arabia	+	.	.	+	.	.	1	7	$\frac{1}{850}$	$\frac{6}{360}$	57	116	19	29
Somalia	.	+	.	+	.	.	.	2	$\frac{?}{1\ 570}$	$\frac{?}{407}$	2	12	1	4
Sudan	.	+	.	+	.	.	1	.	$\frac{2}{430}$	$\frac{.}{1\ 363}$	19	?	?	2
Syria	+	.	.	+	.	.	2	10	$\frac{3}{625}$	.	19	60	15	16
Tunisia *	+	.	.	+	.	1	1	11	$\frac{9}{1\ 530}$	$\frac{.}{.}$	39	?	?	?
U.A.E.	.	.	+	.	+	.	.	.	$\frac{3}{127}$	.	7	?	?	?
Yemen	.	.	+	.	+	.	.	.	$\frac{3}{268}$	$\frac{.}{118}$	18	13	11	7

* Completed with data available in EMRO/WHO

TABLE 4

EVALUATION OF QUESTIONNAIRE
ON NATIONAL TUBERCULOSIS CONTROL SERVICES

1. National Tuberculosis Control Programme (cont.)

Country	Training in			Legislation				Participation of Institute				Record Reporting		Supervision	Assessment
	Nat.TB.Inst. Train/Dem/ centres	TB centres	Non-TB centres	Compulsory notification	Paid sick leave	Free Diagn./ Amb.Treatment	Free Hosp. Treatment	Bas.Hlth.Serv.	Gen.Hosp.	MCH Centres	Others	In operation	Not introduced		
Afghanistan	+	+	.	.	.	+	.	+	+	.	+	+	.	+	+
Bahrain	.	+	.	.	.	+	+	+	+	+	+	+	.	+	.
Cyprus	.	+	.	+	+	.	+	.	+	.	+	+	.	.	.
Democratic Yemen	+	+	.	.	.	+	+	+	+	+	.	+	.	+	.
Egypt	+	+	.	+	+	+	+	+	+	+	+	+	.	+	.
Ethiopia	+	+	.	.	.	+	+	+	+	+	+	+	.	+	.
Iran	+	+	+	.	+	+	+	+	+	+	+	+	.	+	.
Iraq	+	.	+	.	.	+	+	+	.	+	.
Jordan	+	.	.	+	+	+	+	+	+	+	+	+	.	+	+
Kuwait	.	+	.	+	+	+	+	+	.	+	.
Lebanon	.	+	.	+	+	+	+	.	.	.
Libya	+	+	.	+	+	+	+	.	.	+	.	+	.	+	+
Oman *	.	+	.	.	.	+	+	.	+	.	.	.	+	.	.
Pakistan	+	+	.	.	.	+	+	+	+	.	.	+	.	+	+
Qatar	.	.	+	+	.	+	+	+	.	+	.	.	+	+	.
Saudi Arabia	+	+	+	+	.	+	.
Somalia	.	+	.	.	+	+	+	+	+	.	.	+	.	+	+
Sudan	+	+	.	.	+	+	+	+	+	+	.	.	+	+	.
Syria	+	.	.	.	+	+	+	+	.	+	.
Tunisia *	+	+	.	+	+	+	+	+	+	.	.	.	+	+	.
U.A.E.	.	.	+	.	+	+	+	.	+	.	.	.	+	.	.
Yemen	.	.	.	+	.	.	.	+	+	+	.	+	.	+	.

* Completed with data available in WHO/EMRO

TABLE 5

EVALUATION OF QUESTIONNAIRE
ON NATIONAL TUBERCULOSIS CONTROL SERVICES

2. Epidemiology and 4. Case finding

Country	Epidemiological information			Diagnosis and case finding								
	Infected (%) 5 - 9 years age	Sputum positive cases (%)	X-ray positive suspects (%)	Diagnostic tuberculin test	MMR		Sputum - Microscopy				Number of Laboratories	
					Number of Units	Number of persons examined	Bas. Hlth. Service	Gen. Hospitals & O.P.D.	TB Clinics & Hospitals	Others	for Culture examination	for sensitivity tests
Afghanistan	11.0	0.3	1.7	.	.	..	+	+	+	.	1	1
Bahrain	7.0	.	.	+	.	..	.	.	+	.	1	1
Cyprus	.	<0.1	0.4	+	2	2 500	.	+	+	.	1	.
Dem. Yemen	.	0.3	1.5	+	.	..	+	+	+	+	.	.
Egypt	9.4	0.2	1.0	+	25	..	.	+	+	.	12	12
Ethiopia	16.0	0.4	5.0	+	1	6 844	+	+	+	+	3	1
Iran	.	.	.	+	?	217 354	+	+	+	+	15	15
Iraq	11.0	.	.	+	21	250 000	.	.	+	.	4	1
Jordan	10.5	0.3	1.5	+	2	4 841	+	+	+	+	1	.
Kuwait	.	0.1	0.5	+	4	?	.	+	+	.	1	1
Lebanon	2.7	<0.1	0.4	+	1	?	.	+	+	.	4	4
Libya	7.5	0.2	1.8	+	9	42 692	.	.	+	.	2	2
Oman*	6.5	.	.	.	2	..	+	+	+	.	1	1
Pakistan	12.0	0.4	2.5	+	1	..	+	+	+	.	5	5
Qatar	.	.	.	+	.	..	.	.	+	.	.	.
Saudi Arabia	9.3	.	.	+	5	13 199	.	.	+	.	1	1
Somalia	35.0	1.0	6.0	+	0	..	+	+	+	.	1	.
Sudan	18.0	0.6	2.5	+	.	..	+	+	+	.	1	1
Syria	4.0	0.1	0.8	+	.	..	.	+	+	.	1	1
Tunisia*	.	0.3	2.0	+	3	?	+	+	+	.	2	2
UAE	7.0	.	.	+	2	..	+	+	+	.	1	1
Yemen	28.0	0.5	4.0	+	.	..	+	+	+	.	7	3

* Completed with data available in WHO/EMRO

TABLE 6
EVALUATION OF QUESTIONNAIRE
ON NATIONAL TUBERCULOSIS CONTROL SERVICES

3. BCG Vaccination

Country	Type of Programme			Participating Institutions					Method		Age groups				Type of vaccine		vaccine source	
	Mass Campaign	Integrated	BCG/Smallpox	Maternity Wards + MCH	School Services	TB Services	Bas. Hlth. Services	Others	With Tub. Test	Direct vaccination	0	1 - 4	5 - 14	15 <	Liquid	Freeze-dried	National	Imported
Afghanistan	+	.	+	+	+	+	+	+	.	+	+	+	+	.	+	.	+	
Bahrain	.	(+)	.	.	+	+	+	.	.	+	+	
Cyprus	.	+	.	.	+	+	.	.	+	+	
Dem. Yemen	+	+	+	+	+	+	+	.	.	+	+	+	+	
Egypt	+	+	+	+	+	+	+	.	.	+	+	.	+	.	.	+	.	
Ethiopia	.	+	+	+	.	+	+	+	.	+	+	+	+	.	.	.	+	
Iran	+	+	+	+	+	+	+	.	+	.	.	+	+	+	+	+	+	
Iraq	+	+	+	+	+	+	+	.	.	+	+	+	+	+	+	.	+	
Jordan	+	.	.	+	+	+	.	.	.	+	.	.	+	.	.	.	+	
Kuwait	+	+	.	.	+	+	.	.	+	.	.	+	+	.	.	.	+	
Lebanon	
Libya	+	+	.	+	+	+	.	.	.	+	+	+	+	.	.	.	+	
Oman*	.	(+)	.	.	+	+	.	.	.	+	+	.	+	.	.	.	+	
Pakistan	+	+	.	.	.	+	+	.	.	+	+	+	+	
Qatar	.	(+)	.	.	+	+	+	+	
Saudi Arabia	+	+	.	.	.	+	.	.	+	.	+	+	+	.	.	.	+	
Somalia	+	+	+	+	.	+	.	.	.	+	+	+	+	.	.	.	+	
Sudan	+	+	+	+	+	+	+	+	.	+	+	+	+	.	.	.	+	
Syria	+	+	.	+	.	+	.	.	.	+	.	.	+	.	.	.	+	
Tunisia*	.	+	.	+	+	+	+	.	.	+	+	+	+	.	.	+	+	
UAE	+	.	.	+	.	+	.	.	.	+	+	+	+	
Yemen	.	+	.	+	.	.	+	.	.	+	+	+	+	

*Completed with data available in WHO/EMRO

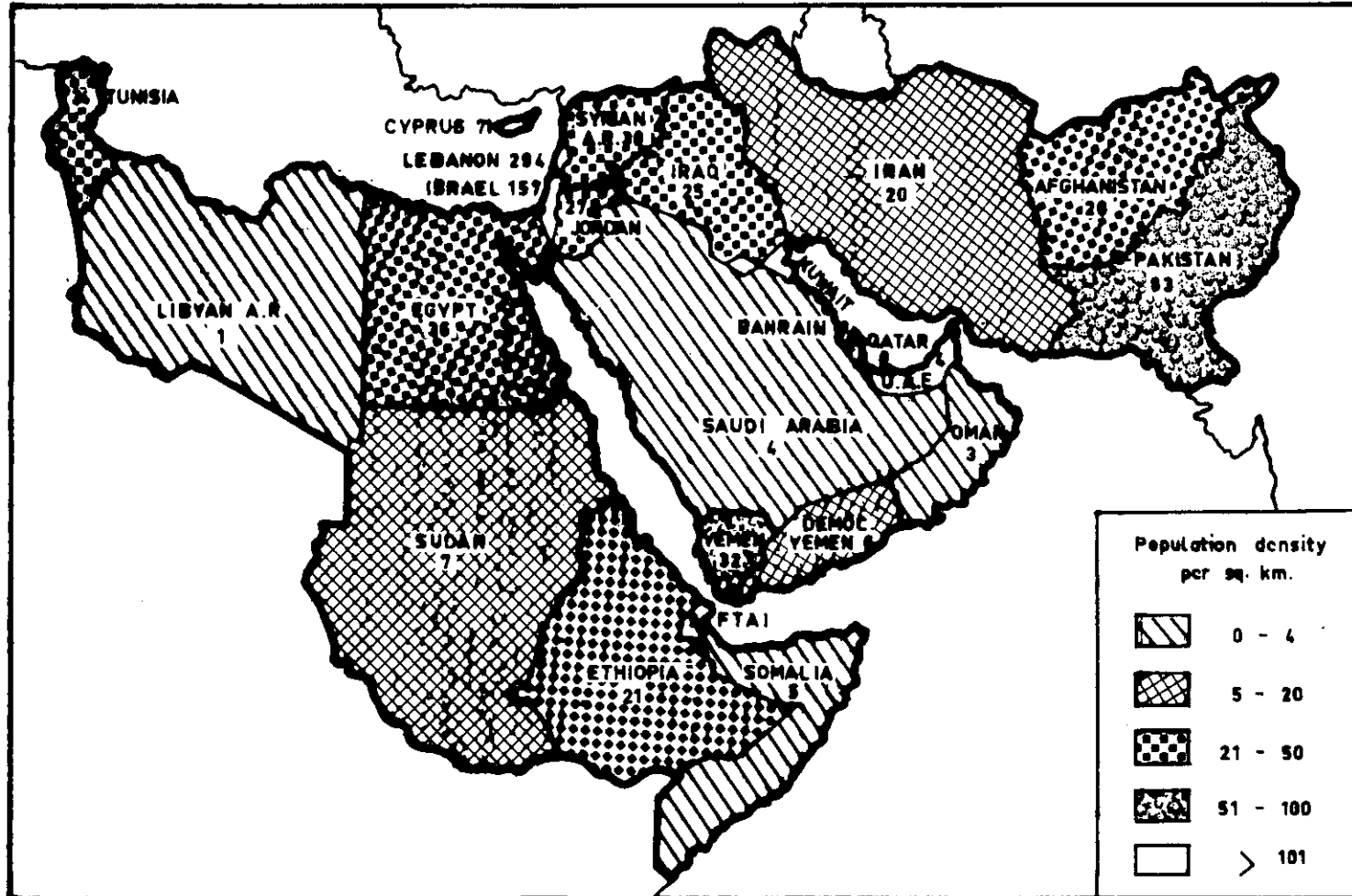
TABLE 7

EVALUATION OF QUESTIONNAIRE
ON NATIONAL TUBERCULOSIS CONTROL SERVICES

5. Treatment

Country	Ambulatory treatment		Drug regimen applied							Average hospital treatment (in months)
	Sputum positive only	Sputum negative	INH + TH	INH + PAS	INH + TA + SM	INH + PAS + SM	INH alone	INH + SM 2xW	Sec. line drugs	
Afghanistan	+	+	+	.	+	.	+	+	.	3
Bahrain	+	+	.	+	.	+	.	.	+	4-6
Cyprus	+	+	.	+	.	+	.	.	+	5
Dem. Yemen	+	.	+	.	+	.	.	.	+	1-2
Egypt	+	+	+	+	+	+	.	.	+	8
Ethiopia	+	+	+	.	+	.	+	.	.	1.5
Iran	+	+	+	+	+	+	+	.	+	12
Iraq	+	+	.	.	.	+	.	.	+	6
Jordan	+	+	.	.	+	+	.	.	+	3
Kuwait	+	+	.	.	.	+	.	.	+	3.5
Lebanon	+	+	.	+	.	+	.	.	+	8-16
Libya	+	+	.	.	+	5
Oman	+	+	.	+	.	+	.	.	+	3
Pakistan	+	+	+	+	+	+	+	.	.	2
Qatar	+	+	.	+	.	+	.	.	+	3
Saudi Arabia	+	+	.	+	+	+	.	.	+	6
Somalia	+	+	+	.	+	.	+	.	.	4-6
Sudan	+	+	+	+	+	+	.	.	+	1.5
Syria	+	+	.	+	.	+	.	.	.	6-18
Tunisia	+	+	.	+	.	+	.	.	+	3-6
UAE	+	+	.	.	+	+	.	.	+	3-9
Yemen	+	+	.	.	+	+	+	.	+	1-3

POPULATION DENSITY IN MEMBER COUNTRIES
WHO EASTERN MEDITERRANEAN REGION



ESTIMATED PROPORTION OF INFECTED CHILDREN
AGE GROUP 5-9 YEARS IN SAMPLE POPULATION
TUBERCULIN SURVEYS 1965 - 1975

