



WORLD HEALTH ORGANIZATION
ORGANISATION MONDIALE DE LA SANTÉ

WHO/SE/78.122 Corr.1
Global Commission WP/78.39

ENGLISH ONLY

CORRIGENDA

REPORT TO THE GLOBAL COMMISSION
FOR CERTIFICATION OF SMALLPOX ERADICATION
SAUDI ARABIA



Page 4, paragraph 1.4, line 5

"King Khaled ibn Abdulaziz" should read "King Khaled ibn Abdul Aziz"

Page 6, paragraph 2.1, line 8

"deisnged" should read "designed"

Page 8, Fig. 3, footnote ^a

"^aMedina, Jeddah and El Taif form the Eastern Division" should read "^a Medina, Jeddah and El Taif form the Western Division"

Page 11, paragraph 3.1, lines 1 and 2

"The number of cases reported during the last twenty years in shown in Table 4." should read "The number of cases reported during the last twenty years is shown in Table 4."

Page 17, Table 9, Serial No. 7

"Central Rassim" should read "Central Qassim"

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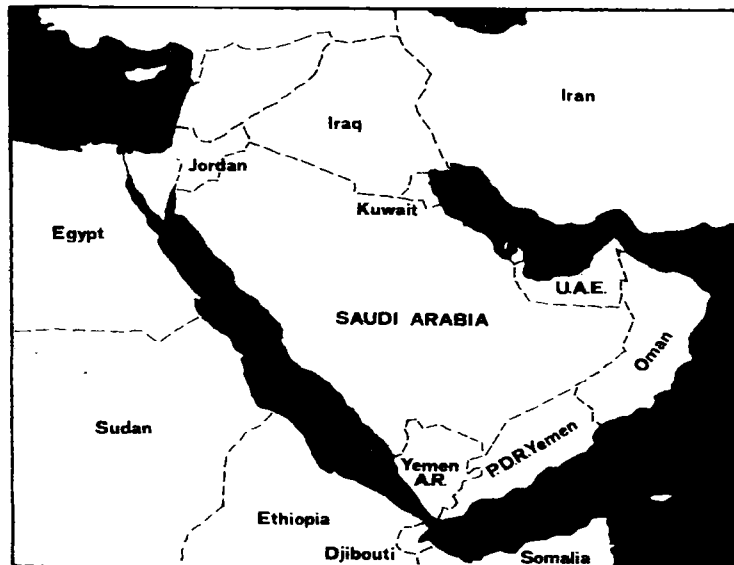
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INDEXED

REPORT TO
THE GLOBAL COMMISSION
FOR CERTIFICATION OF
SMALLPOX ERADICATION



SAUDI ARABIA

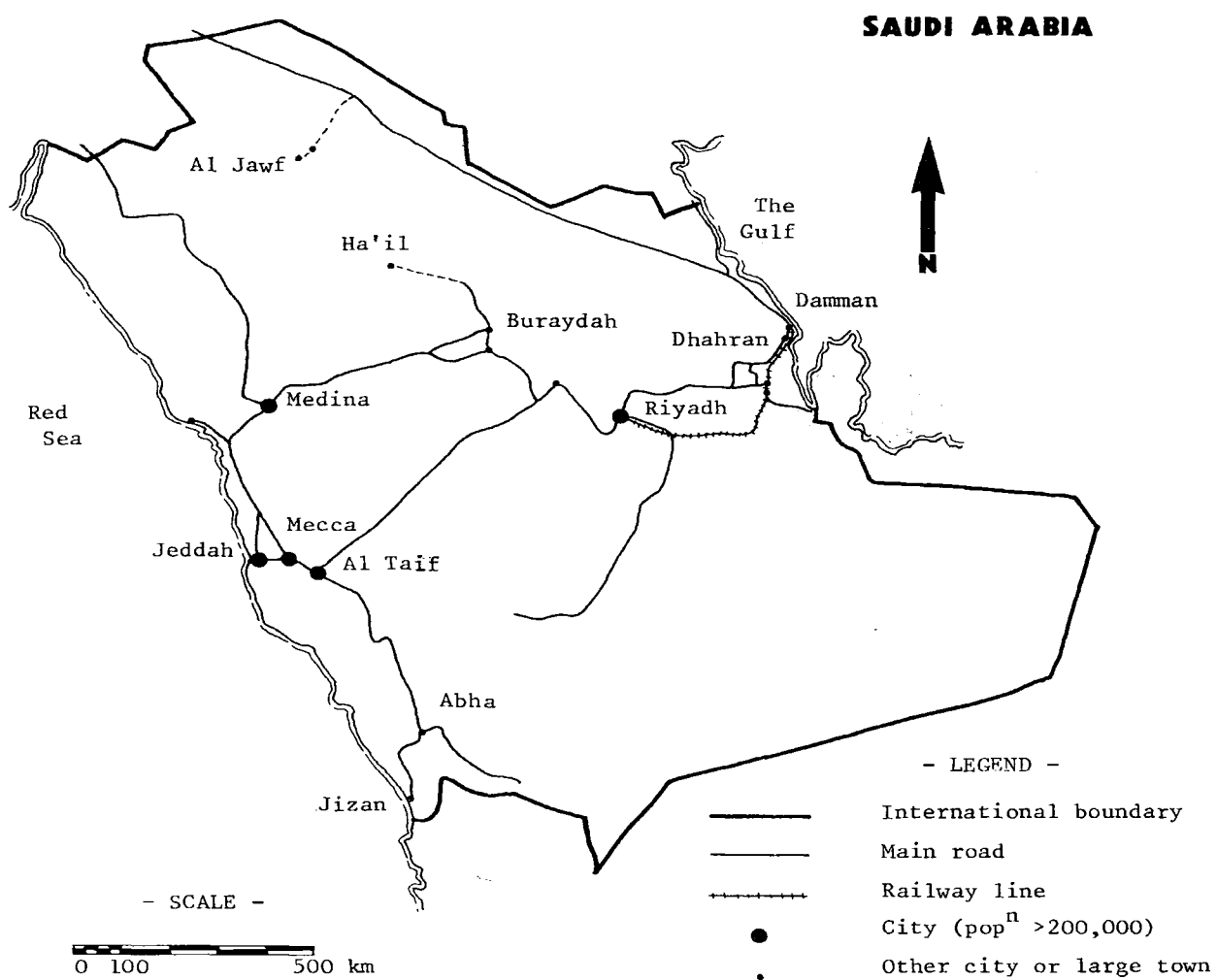


MINISTRY OF HEALTH
SAUDI ARABIA

WORLD HEALTH ORGANIZATION

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SAUDI ARABIA

1. BACKGROUND INFORMATION

1.1 Geography

The Kingdom of SAUDI ARABIA occupies about four-fifths of the Arabian Peninsula, with the Yemen Arab Republic and the Red Sea to the west and the Persian Gulf and the United Arab Emirates to the east. Jordan, Iraq and Kuwait are to the north and Oman and the People's Democratic Republic of Yemen to the south.

The Arabian Peninsula has an area exceeding two and a half million square kilometres of which Saudi Arabia possesses over 2 149 690 kilometres, populated by about seven million people.

Most of the country is desert, but where permanent water springs can be found oases often flourish.

1.2 Climate

The climate is predominantly hot and dry. In summer temperatures range from 38° to 49°C in coastal regions and humidity is high. Temperatures sometimes reach 54°C in the interior. Winters are mild except in the mountains. Rainfall averages only 75 mm a year in most areas, but occasional heavy rain storms may occur in the winter months.

1.3 Population

Instrumental to the diffusion of the Islamic faith were the nomadic inhabitants of the Peninsula, the hardy people whose simple way of life was until very recently synonymous with the name of Arabia, called Saudi Arabia since 1932. It was they who led increasing numbers of pilgrims across the deserts to the Holy places in the Hejaz and it was they who virtually ruled in tribal alliances even when foreign powers nominally held the handful of permanent settlements.

In less than five decades, with the abruptness reminiscent of the magic tales in one thousand and one nights - the dominant culture has passed from the Pastoral to the Urban, with scarcely a trace of transitional ruralism. This phenomenal material progress has been accompanied with no lessening of the religious and moral fervour inherited from the ancestors.

The great majority of the population are sunni muslims, and in the Najd there is a preponderance of members of the Wahabi sect.

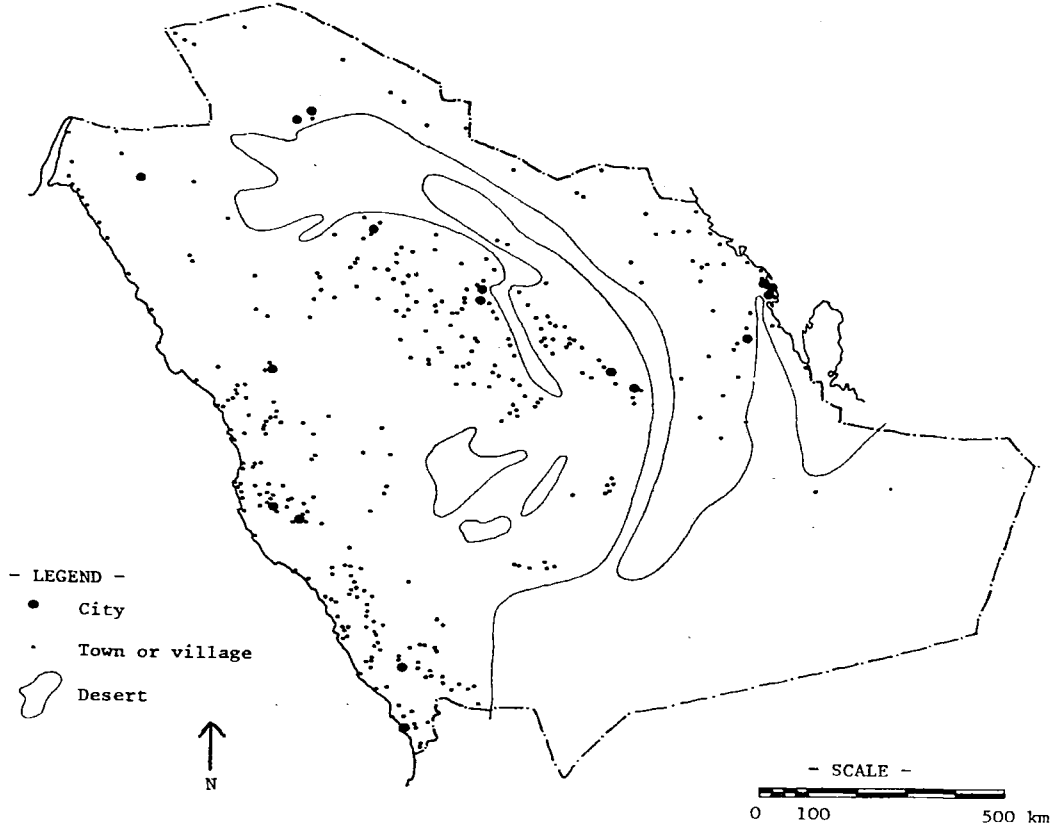
The total population recorded in the 1974 census was 7 012 642 of which 5 128 655 were categorized as settled and 1 883 987 as nomadic. Two years later in 1976 the population was estimated to be 7 855 00 of which only about 340 000 were considered to be nomadic. The distribution of the settled population is shown in Figure 1.

The principal cities of the Hejaz are Mecca, 366 801; Jeddah, 561 104; Medina, 198 186; and Taif, 204 857. Taif, about 3 800 ft above sea-level and some 50 miles from Mecca, is a summer resort.

The principal cities of the Najd area are: Riyadh, the capital (666 840), Buraida (69 940) Anaiza, Hail, Jauf and Sakaka.

The language is Arabic.

FIG.1. DISTRIBUTION OF SETTLED POPULATION



1.4 Government

The constitution of Saudi Arabia is firmly rooted in religion, as it is based on the Holy Quran and the Sunna (Tradition of the Prophet). Since its foundation in 1932 by King Abdul Aziz, Saudi Arabia has been following the Sharia or religious law in running the country's affairs.

Saudi Arabia is ruled at present by one of the founder's sons, King Khaled ibn Abdulaziz. The King heads the Government as Prime Minister. The Council of Ministers has full executive power, direct administrative responsibility and financial control. Each Ministry has a full complement of supporting staff and services to ensure the smooth fulfilment of the overall national development plan.

The country is divided into several administrative provinces which include: the Central Province, historically known as Najd, with Riyadh as its capital, also the national capital; the Western Province, historically known as Hijaz, its major cities being Mecca, Medina, Taif and Jeddah; the Eastern Province, historically known as Al-Hasa, Dammam being its capital; the Southern Province, historically known as Asir, its capital being Abha; and the Northern Province.

The nation's oil wealth, judiciously used within an overall economic plan, has proved to be crucial to the nation's prosperity. Not so long ago, revenues from the pilgrimage were important to balance the national budget; now, by contrast, Saudi Arabia expends huge sums on its honoured pilgrims' reception and welfare. To give an idea of the magnitude of the commitment, it is estimated that all government employees spend four months of their annual working time on matters connected with the pilgrimage.

Saudi Arabia was the largest producer of crude petroleum in the Middle East and the second largest in the world in 1976. It is also the world's leading oil exporter, its output in 1976 averaging 8.4 million barrels per day. The huge oil revenues have encouraged Saudi Arabia to embark on a five year plan on which the total expenditure in the period 1975-80 will be 498 000 million Rials. Much attention is being given to underground water resources and desalination projects.

1.5 Education

Administration is by educational districts (23 in 1969). Schooling is in three stages, elementary, intermediate and secondary, which is to prepare older pupils for college. Education is free in all these stages; monthly scholarships are paid to students in higher education. Girls' education is separate. The numbers of schools, teachers and pupils in 1974/75 are shown in Table 1. There are also adult literacy schools, special schools, commercial, agricultural and industrial schools including the Royal Vocational Institute in Riyadh which can take 8 000 students on two daily shifts.

There were 34 teacher-training schools in 1969.

The University of Riyadh (founded 1957) has faculties of arts, science, pharmacy, commerce, agriculture, engineering, education and medicine. The Islamic University at Medina was founded in 1961. The King 'Abdal-Aziz' University in Jiddah opened in 1967. Other universities are the Imam Muhammad bin Saud University in Riyadh (for training in Islamic law and theology), the King Faisal University in Dammam and the University of Petroleum and Minerals in Dhahran.

TABLE 1. SCHOOLS, TEACHERS AND STUDENTS, 1974/75

	Schools	Teachers	Pupils
Kindergarten	88	n.a.	13 903
Primary	3 028	29 756	634 498
Post-primary	939	11 212	205 613
Higher	7	1 741	19 093
Technical	13	394	3 408
Adult	n.a.	n.a.	99 673

1.6 Communications

There are asphalted roads from Jeddah to Mecca, to Medina, to Taif and to Riyadh. There is also a track from Mecca eastward through Riyadh to Uqair and Dhahran on the Persian Gulf, a distance of 1 328 kilometres, which is used for motor transport. Motor cars can travel between Riyadh and Kuwait, Riyadh and Hail, Jauf and the northern frontier towns, Jiddah and Hail, and between Jiddah, Jizan and Sabya. In 1970 there were 64 900 cars in use and 50 400 commercial vehicles.

There is a railway from Dammam on the Persian Gulf to Riyadh via Dhahran, Hofuf and Al-Kharj.

Saudia (Saudi Arabian Airlines) operate internal and external air services.

The principal ports are Jiddah, on the Red Sea, and Ras Tanura and Dammam on the Gulf.

Jeddah, Mecca, Taif and Dammam are linked by telephone; Jeddah and Cairo by radio-telephone. An international radio-telephone station at Riyadh was opened in 1956. The number of telephones in 1974 was 84 650. In 1970 there were 700 post offices and in 1971 there were 87 000 radio receivers and 18 000 television receivers.

2. HEALTH SERVICES

2.1 General

The free medical services, including free hospitalization, offered by Saudi Arabia to all its citizens - indeed to all its residents - is the envy of the world. So is the parallel Freedom from Want Campaign, aimed at eradicating poverty, guaranteeing a permanent income to the aged, the disabled or resourceless widows and orphans.

For the welfare of citizens and pilgrims, hospitals and health units have been established in all strategic locations. The Saudi Government has also established a protective cordon along the frontiers of the Kingdom which includes 33 quarantine posts at all the recognized points of entry for pilgrims and which is designed to afford adequate protection against the risk of epidemics.

While considerable attention is given to preventive measures as an international health necessity and to assure the safety of pilgrims visiting the Holy Places, great efforts are being exerted in the field of preventive medicine to raise the local health standards. For this purpose, a number of preventive medicine facilities have been established, and campaigns for immunization against smallpox and tuberculosis have been conducted in the whole Kingdom, with special attention paid to children of school age. Anti-cholera campaigns are carried out twice a year and seven specialized centres at different locations in the Kingdom strive to eradicate any vestiges of malaria from the country.

Perhaps the most spectacular achievement of world medicine in 1975 was the completion of the \$ 200 000 000 King Faisal specialist hospital in Riyadh. In the past it was the multiplicity of effective small rural clinics that caught the imagination, now it must be the King Faisal Hospital, with its computerized information network. Its advanced equipment enables the hospital to treat as many patients as several conventional hospitals at a lower cost per patient.

A similar hospital, specializing in tropical diseases, is planned for the city of Jeddah.

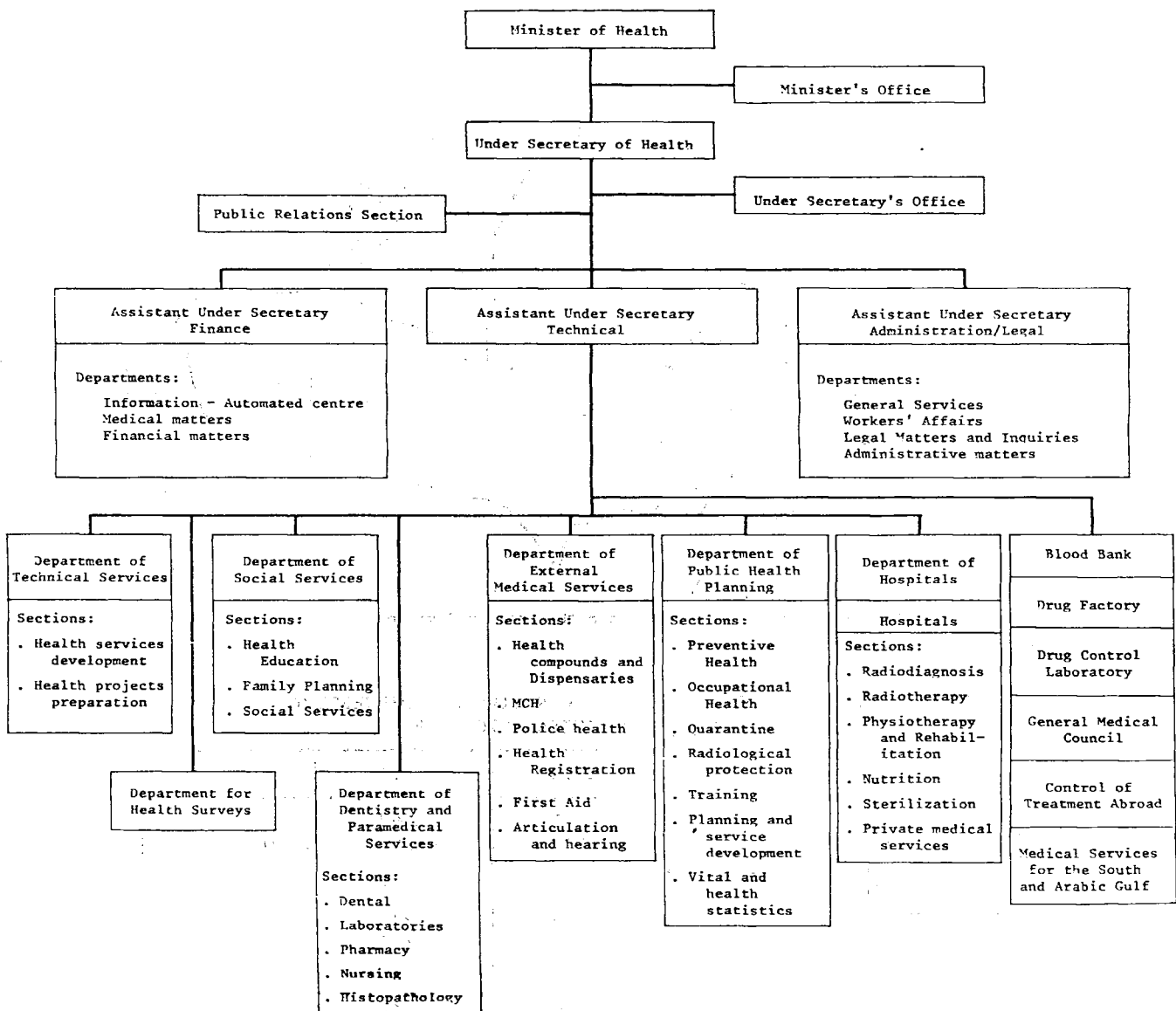
2.2 Health Structure (Figure 2)

The Ministry of Health is responsible for 10 administrative districts, serving both Saudi citizens and pilgrims (Figure 3).

At present there are 75 hospitals with just over 10 000 beds. In addition, there are more than 400 clinic-dispensaries and a further 372 health centres (Table 2 and Annex 1).

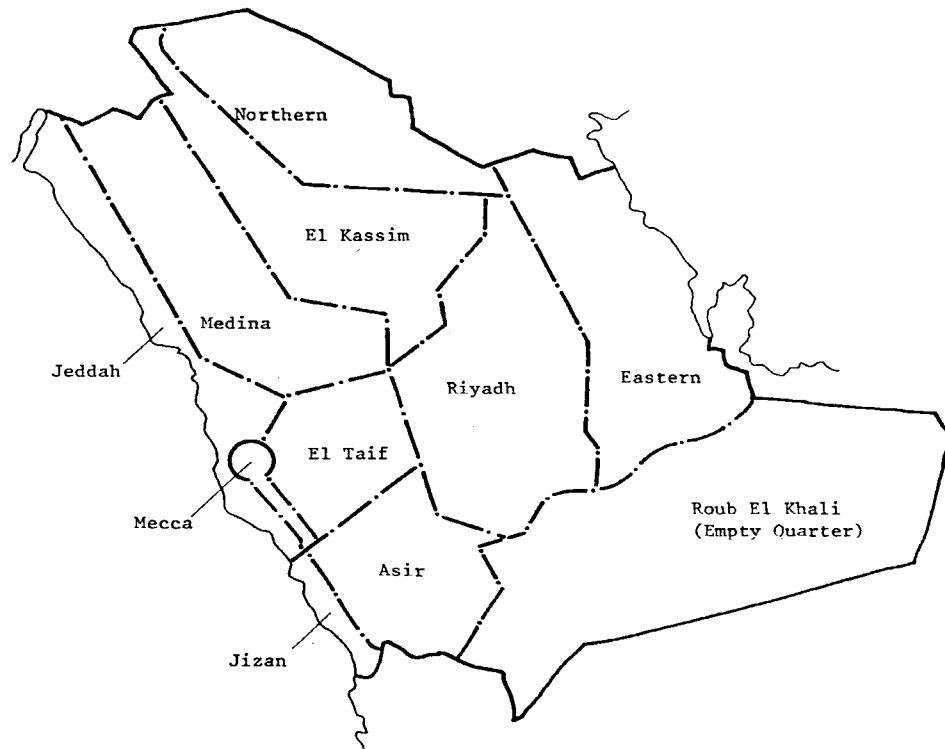
The Jeddah Quarantine Centre, designed by WHO and primarily for pilgrims, can take 2 400 patients. This and the country's other quarantine facilities are shown in Figure 4.

FIG. 2: HEALTH MINISTRY ORGANIZATIONAL STRUCTURE ^a



^a Simplified to include only the more relevant details.

FIG. 3: ADMINISTRATIVE DIVISION FOR HEALTH SERVICES ^a



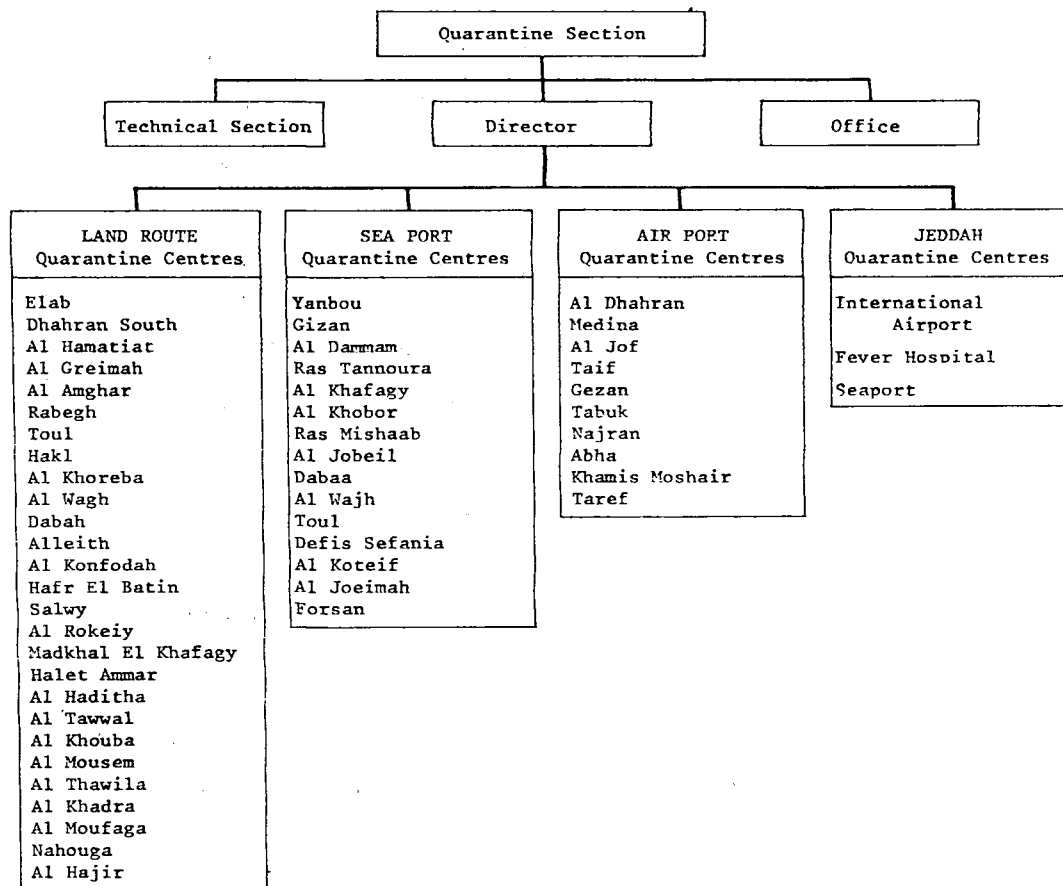
^a Medina, Jeddah and El Taif form the Eastern Division

TABLE 2: DEVELOPMENT OF CURATIVE AND PREVENTIVE HEALTH FACILITIES 1970-1978

	1970	1974	1978
Hospitals	47	62	75 ^a
Hospital beds	7 165	9 250	10 957 ^a
Neighbourhood clinics	-	-	45
Rural clinics	187	175	400+
Health units	332	346	372
Dental clinics	39	55	146
Psychiatry clinics	1	8	17
Regional laboratories	1	3	5
TB clinics	4	7	15
Public health offices	7	17	48
Anti-malaria stations	5	7	10
Anti-Billarziens stations	-	8	-
MCH clinics	-	4	24
Border health surveillance stations (quarantine)	24	29	39

^a There are a further 11 hospitals and around 1 400 beds administered by other government authorities and 15 private hospitals with around 1 250 beds.

FIG. 4: QUARANTINE FACILITIES AND ADMINISTRATION



However, the Ministry of Health is not the only institution running hospitals in Saudi Arabia. The Ministry of the Interior, the Ministry of Defence, the Ministry of Education and the Presidency of Girls' Associations all have hospitals of their own which are open to the general public. The military and security forces, for instance, employ another 520 doctors in their hospitals.

2.3 Health Manpower

Health services depend on three main pillars: manpower, material and money. In Saudi Arabia money is available to buy material in the form of hospitals, clinics, equipment, etc., and it is also available to buy expertise in the form of expatriate health manpower to staff these hospitals and clinics.

But Saudi Arabia cannot and will not depend always on expatriate health manpower. It must and it has already started to develop its own Saudi manpower in all fields of health, medical and paramedical practices, parallel to the development of a network of health facilities and programmes to cover all parts of the kingdom. Three health education training institutes in Riyadh, Jeddah and Safwa, have been established to provide qualified medical aids, health supervisors and male nurses. The study course takes three years and, although the institutes were established only a few years ago, many students have graduated already in various field of specialization.

Four schools for female nurses have also been opened in Riyadh, Jeddah, Hofuf and Jizan: the last one being the Jizan School, which was opened in December 1972.

In an accelerated medical education programme at university level, the nation has several hundreds of students in the faculties of medicine and pharmacy of Riyadh university, King Abdul Aziz University and King Faisal University, while several hundreds are studying medicine overseas.

Table 3 shows the great increase in the number of physicians and certain paramedicals, commensurate with the increase in the number of health facilities. The present health manpower situation in the health sector is also shown in Table 3, together with the percentage distribution of the different categories of health manpower among the various components of the health sector. It also shows the percentage of Saudis to total workers in the health sector. As can be seen, Saudi physicians are very few in number. Saudi doctors tend to specialize rather than remain in general practice and Saudi male nurses and assistant technicians are increasingly taking the place of expatriates. This is due to the graduation, within Saudi Arabia, of a large number of such staff from the health training institutes of the Ministry of Health. Difficulty is seen with the Saudi female nurses, but it is hoped that with time and upgrading of the nursing profession socially and materially, their percentage will increase to the desired level.

TABLE 3. DEVELOPMENT AND DISTRIBUTION OF HEALTH MANPOWER
UNDER THE MINISTRY OF HEALTH 1959-1978

Category	1959	1970	1978		% of Total Health Manpower ^d in Category
	Number	Number	Number	% Saudis	
Physicians	249	789	4 161	8	63
Dentists	^a	^a	224	10	42
Pharmacists and Chemists	^a 15	^a 56	737 ^b	14	51
Male Nurses	342	1 473	2 842	42)
Female Nurses	290	780	5 127	6)
Assistant Pharmacists	66	497))	69
Assistant Laboratory Technicians	30	197) 4 705 ^c	49)
Assistant X-Ray Technicians	22	109)))

^a Not listed.

^b Listed as "University grade health workers" - presumably includes pharmacists and chemists.

^c Listed as "Assistant technicians" - may include other categories in addition to those above.

^d Totals include staff employed by other government agencies and privately.

2.4 Communicable Diseases Control

The Public Health Department in the Ministry of Health is responsible for the Communicable Diseases Control. It has many sections under it to assist in this activity, including those of Quarantine, Epidemiology and Research.

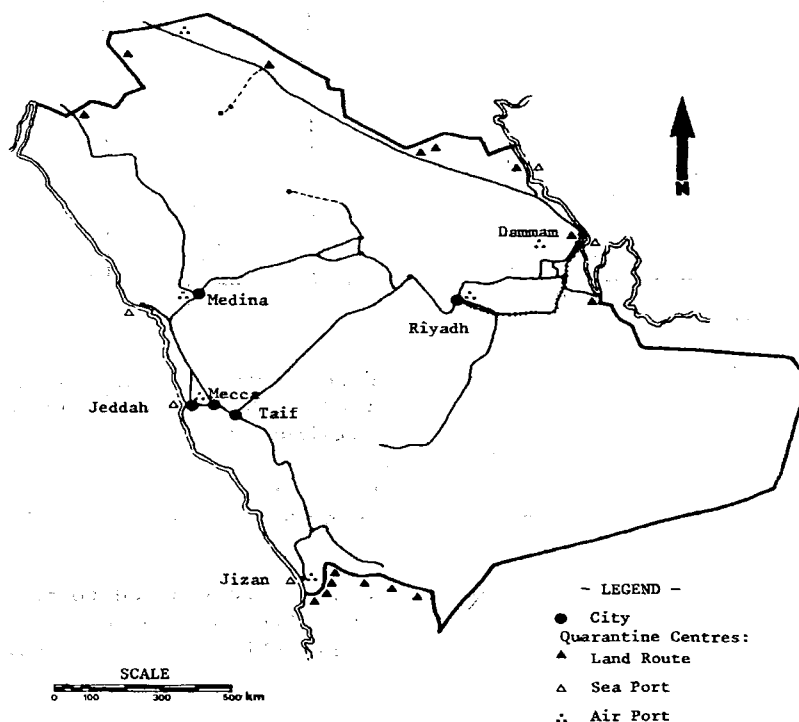
Reporting of communicable diseases is an integral part of the Public Health system in the country. Dispensaries, health centres, general and communicable diseases hospitals and quarantine stations report weekly (see reporting form in Annex 2) and monthly to provincial or zone health offices which refer regularly to the Preventive Medicine Section of the Health Ministry.

There are two Infectious Diseases Hospitals: one in Jeddah and the other in Riyadh. As a supporting diagnostic measure, laboratory examinations are performed at the Central Laboratory in Riyadh.

A good quarantine organization exists in the country. All the quarantine stations (Figure 5) are well manned and equipped. In fact, during the pilgrimage season the staff are doubled. The vaccination status of every individual entering the country is checked and any case of fever and rash is strictly isolated and thoroughly investigated.

The plan of action followed in 1977 for smallpox surveillance is shown in Annex 3.

FIG. 5: LOCATION OF MAIN QUARANTINE CENTRES



3. SMALLPOX INCIDENCE

3.1 General

The incidence of smallpox was quite high in 1958 and 1959. The number of cases reported during the last twenty years is shown in Table 4. No cases are said to have occurred in Saudi Arabia since 1963, the 1970 and 1973 outbreaks having been considered as of external origin and confined to pilgrims.

No information is available as to age, sex and the vaccination status of the cases before 1962.

In the past, the disease was introduced into the country from Yemen, Qatar, Muscat and Oman through nomads and labourers' movements.

TABLE 4. SMALLPOX CASES REPORTED FROM 1957 to 1977

Year	No. of Cases	Deaths
1957	65	0
1958	156	0
1959	115	2
1960	32	1
1961	17	1
1962	1	0
1963	0	0
1964	0	0
1965	0	0
1966	0	0
1967	0	0
1968	0	0
1969	0	0
1970	12	0
1971	0	0
1972	0	0
1973	0	0
1974	0	0
1975	0	0
1976	0	0
1977	0	0

3.2 The Outbreak of 1970

Two suspected cases of smallpox were reported on board the ship "Safinah Arafat", arriving from Pakistan in Jeddah Harbour on 9 February 1970. The patients were examined by the Port Health staff and clinically diagnosed as smallpox cases.

The ship was carrying 1 453 passengers and the number of the crew was 178. Most of the passengers were from East Pakistan. No passengers were taken from countries other than Pakistan.

The source of infection of the two initial cases was considered to be an unknown case in a Hajji camp in Chittagong (East Pakistan). As these two cases were initially diagnosed as chickenpox by the ship's physician, no isolation or preventive measures were taken in the ship.

All the passengers were therefore isolated in the Quarantine Station at Jeddah, under strict control, and the crew was quarantined on board the ship itself. This was done on 14 February 1970. All the passengers and the crew, of course, were immediately vaccinated. By the end of February, ten more cases occurred among the passengers, three of whom died.

Following a lapse of two weeks after the last case, the passengers were released and allowed to proceed with their pilgrimage, and the ship was simultaneously released from quarantine.

A detailed account of this outbreak, prepared by the WHO Regional Adviser at that time, is attached as Annex 4.

3.3 Smallpox case on board the Indian Ship S.S. Mohamedi - 1973

A case suspected as smallpox was discovered by the ship's surgeon on board the ship "S.S. Mohamedi" on 28 December 1972. The ship was on its way from Chittagong to Jeddah. The patient was isolated immediately and all precautionary measures were taken to prevent the spread of the disease among the other passengers.

On arrival at Jeddah on 5 January 1973, the ship was held off the port and the suspected patient was examined by a WHO epidemiologist. The patient had almost recovered from the disease; the clinical diagnosis of smallpox was considered correct. The diagnosis of smallpox was supported by a strongly positive serological test which, however, could not rule out the remote possibility of generalized vaccinia.

No further case occurred among the passengers, who were allowed to disembark after a further 14 days' quarantine on board the ship.

The patient boarded the ship on 21 December 1972 at Chittagong, which was considered to be the source of infection. A detailed account of this episode is given in Annex 5.

4. SMALLPOX VACCINATION ACTIVITY

The smallpox eradication programme was said to have been started in 1968, when a central surveillance team consisting of 17 sanitarians, 20 nurses, 49 vaccinators and 14 drivers (for the same number of cross-country cars) was established in Riyadh. The team was put under the direction of an epidemiologist (Chief, Smallpox) in the Ministry of Health.

For climatic reasons the kingdom was divided into four zones in each of which the team performed its activities for one year and thereby covered the whole country in four years. Vaccinations were apparently performed on a house to house basis and a special assessment team checked the results achieved by the vaccinators. The number of vaccinations performed in this first round was:

1969	480 595
1970	596 487
1971	584 398
1972	634 725
Total	<u>2 296 205</u>

All age groups were vaccinated.

From 1972-1976, a second round took place, with the following results:

1973	649 876
1974	698 387
1975	759 872
1976	785 390 (including 137 338 primary vaccinations)
Total	<u>2 893 525</u>
Grand Total	<u>5 189 730</u>

Again all age groups were vaccinated. According to the assessment results, eighty per cent of the population were covered.

In addition to vaccinations performed within the scope of the Smallpox Eradication Programme, Saudi Arabia established an expanded vaccination programme which was made obligatory for newborn and school children. It comprises vaccinations for DPT, polio, smallpox, measles and BCG. Most of the vaccinations are given by health centres and dispensaries.

During 1977, the central vaccination team operated mostly in the western part of the country and performed the following number of vaccinations:

Primary vaccinations	69 769
Revaccinations	1 075 436
	<hr/>
Total	1 144 205

5. SPECIAL OPERATIONS CARRIED OUT FOR CERTIFICATION OF SMALLPOX ERADICATION

5.1 General

To intensify the existing surveillance system and to improve confidence in the non-existence of smallpox in the country, the Ministry of Health ordered the following activities during the period January to July 1978:

- (1) All the health facilities in the country (Directorates of Public Health, quarantine hospitals and stations, health centres, general and communicable diseases hospitals, dispensaries and private clinics) were asked to report each and every case of chickenpox immediately to the nearest health office, using a special form. This written report was to be made in addition to the weekly and monthly routine reports for communicable diseases.
- (2) The health facilities were also asked to collect specimens for laboratory examination from chickenpox cases which were severe, associated with death, unvaccinated against smallpox, or with lesions on palms and soles.
- (3) Cases suspect of smallpox were to be seen immediately by an experienced Public Health officer who would make epidemiological investigations and collect samples for laboratory examination to confirm the diagnosis or otherwise.
- (4) A facial smallpox survey was to be carried out on samples of children of 0-10 years of age in different parts of the country, through the central mobile teams as well as through the School Health Service wherever feasible.

5.2 Chickenpox Surveillance

This activity was carried out by all the health units, as indicated by the Ministry. Altogether, 841 cases were reported in the country during 1 January to 31 July 1978. Complete epidemiological details were available for 644 of these; particulars such as name, sex and address, though not of previous smallpox vaccination status, were provided for 187; and for only 10 cases no information was available.

Classification of these cases by place of origin and by month, and by age, sex and vaccination status are shown in Tables 5 and 6 respectively.

As has been mentioned already, chickenpox has been a notifiable disease all along, as have other diseases with fever and rash (including smallpox and measles). However, during this year, every case diagnosed as chickenpox was critically examined to rule out smallpox.

Incidentally, there has not been even a single case which was suspected as smallpox.

TABLE 5. NOTIFIED CHICKENPOX CASES BY PLACE OF ORIGIN
AND BY MONTH (JANUARY - JULY 1978)

Area	January	February	March	April	May	June	July	Total
Northern	-	-	-	11	29	24	14	78
Al Qassim	-	-	-	9	5	2	1	17
Eastern	5	2	39	176	84	32	-	338
Riyadh	35	18	5	22	8	21	7	116
Asir	-	-	-	-	2	8	1	11
Jizan	1	2	-	9	-	-	-	12
Mecca	-	-	-	2	-	-	-	2
Al Taif	-	-	-	-	6	11	5	22
Medina	-	-	-	1	1	-	-	2
Jeddah	40	25	52	64	27	13	12	233
Total	81	47	96	294	162	111	40	831

Note: There was no information for ten cases. Altogether, 841 cases were reported during the period.

TABLE 6. NOTIFIED CHICKENPOX CASES BY AGE, SEX AND
VACCINATION STATUS, JANUARY - JULY 1978

Age Group in Years	Male			Female			Total
	Vaccinated	Unvaccinated	No Record	Vaccinated	Unvaccinated	No Record	
< 1	5	10	-	5	9	-	29
1 - 4	38	19	6	33	33	-	129
5 - 14	106	58	21	103	27	12	327
15 - 34	95	56	90	26	17	13	297
35 - 54	5	5	15	2	3	11	41
55+	3	3	-	2	-	-	8
Total	252	151	132	171	89	36	831

Note: No particulars are available for 10 cases. Altogether, 841 cases were reported during the period.

5.3 Laboratory Examinations of Specimens from Chickenpox Cases

There is a Central Laboratory with a Virology Section in Riyadh. This laboratory has been examining specimens from suspect cases of smallpox in the country. Only the CAM inoculation test is being done.

The laboratory examined 160 specimens from chickenpox cases of the specified categories during the period 1 January to 31 July 1978, and all were found negative for variola. These specimens had come from different parts of the country. No details of the cases were immediately available.

On WHO insistence, duplicates of specimens collected from the Eastern Region, which was of epidemiological importance, being the entry for the majority of pilgrims during the Haj and also being adjacent to the most recent endemic area in East Africa, were sent for examination by a WHO designated laboratory for reconfirmation of the diagnosis.

Ninety specimens were thus sent during the period January - July 1978; all were found to be negative for smallpox. 54 showed herpes varicella on electron microscopy. Analyses of the chickenpox cases from which these specimens were taken, by place of origin and by age, sex and vaccination status, are shown in Tables 7 and 8. A line listing of the cases is in Annex 6.

TABLE 7. DISTRIBUTION OF CHICKENPOX CASES FROM WHOM LABORATORY SPECIMENS WERE COLLECTED, BY AREA AND BY MONTH, JANUARY - JULY 1978

Area	January	February	March	April	May	June	July	Total
Medina	2	-	-	-	-	-	-	2
Mecca	-	2	-	-	3	2	-	7
Jizan	-	-	1	2	-	-	-	3
Jeddah	12	7	12	13	14	11	9	78
Total	14	9	13	15	17	13	9	90

TABLE 8. DISTRIBUTION OF CHICKENPOX CASES FROM WHOM LABORATORY SPECIMENS WERE COLLECTED, BY AGE, SEX AND VACCINATION STATUS

Age Group in Years	Male			Female			Total
	Vaccinated	Unvaccinated	No Record	Vaccinated	Unvaccinated	No Record	
< 1	1	2	-	-	-	-	3
1 - 4	-	-	-	-	-	-	-
5 - 14	3	1	-	1	1	-	6
15+	23	17	10	9	12	10	81
Total	27	20	10	10	13	10	90

5.4 Facial Smallpox Survey of Children 0-10 Years of Age

This activity was carried out by the utilization of the central mobile teams. They were deployed in the various regions to carry out the scar survey, mostly among the school children in the area. Their work was supervised by the local medical district Public Health Officer.

Throughout the country 1 335 schools were visited and 158 075 children in the specified age group were examined. No one was found to have any smallpox scars. The numbers of children seen in each area are shown in Table 9.

Again, as a special activity in the Jeddah area, because of its epidemiological importance, school health medical officers were additionally utilized to carry out a separate scar survey. They examined 21 270 children from 60 schools and 17 villages in Jeddah and its environs. No child was found with scars suggestive of smallpox.

TABLE 9. SMALLPOX POCKMARK SURVEY OF CHILDREN 0-10 YEARS OF AGE

Serial No.	Date	Region/Area	No. of Schools	No. of Children Examined	No. found with Pockmarks
1	May and June 1978	<u>Northern</u>	81	8 157	0
2	"	<u>Western Jeddah</u>	200 ^a	52 258 ^a	0
3	"	<u>Western Mecca</u>	121	15 466	0
4	"	<u>Western Taif</u>	198	111 121	0
5	"	<u>Southern Jizan</u>	269	11 263	0
6	"	<u>Eastern</u>	105	37 978	0
7	"	<u>Central Rassim</u>	138	19 281	0
8	"	<u>Central Riyadh</u>	78	6 156	0
9	"	<u>Central Wadi As Sabha</u>	114	3 783	0
10	"	<u>Southern Wadi Ad Dawasir</u>	91	13 882	0
	Total		1 335	158 075	0

^a Includes special survey of 60 schools by school health medical officers.

6. CONCLUSION

The country has been reportedly free of smallpox since 1963. In 1970 and 1973 there were importations of the infection through passenger ships from Pakistan, but the disease did not spread among the local population.

Cases of fever and rash have been notifiable in the country all along. Specimens have been taken from all suspect cases and examined at the Central Laboratory, Riyadh, to rule out smallpox.

Because of the Haj pilgrimage, a good quarantine organization has been developed. Visitors at all entry points are checked for smallpox vaccination scar, and vaccinated where indicated. In recent years the practice has been to vaccinate all people from Somalia, Ethiopia, Sudan and Yemen, irrespective of their previous vaccination status.

Mass vaccination of the population has been carried out area-wise every four years.

Health institutions exist in all population settlements and the people are hospital oriented and present even for minor illnesses.

Recent intensification of surveillance and sample facial smallpox scar surveys throughout the country did not reveal any evidence of smallpox infection, either current or in the recent past.

LIST OF HOSPITALS IN SAUDI ARABIA ADMINISTERED BY MINISTRY OF HEALTH

HOSPITAL	BEDS	HOSPITAL	BEDS	HOSPITAL	BEDS	HOSPITAL	BEDS
<u>CENTRAL AREA</u>		Eye Hosp Medina	50	<u>NORTHERN AREA</u>		Malik Taif	511
Mat. Children Riyadh	200	Tabuk	50	Central Al Jouf	107	Belgurshi	86
Otayca Isolation, Riyadh	159	Al Ivajh	50	Arar	90		5365
Central Hosp Riyadh	720	Psych Hosp Medina	50	Malik Purrayat	36	<u>SOUTHERN AREA</u>	
Nassiriyah Hosp	100	Chest Hosp Medina	50	Ha'ih	108	Abha	206
Malik Hosp Al Kharg	100		1000		341	Khamis Mushiat	100
Dawaduri	75	<u>QASSEM AREA</u>		<u>WESTERN AREA</u>		Mahail	100
Artega	71	Buraidah	205	Al Zahir Mecca	460	Abha San	100
Majma'ah	70	Unayzah	86	Shisha Mecca	350	Dahran Gen.	80
Shaqra	65	Al Rass	77	Mat. Mecca	250	Sarat Halida	-
Wadi-Al Dausasar	50	Isolation Hosp	60	Hada Mecca	200	Jizan	100
Hota Sider	50		428	Meua Mecca	200	Sebia	100
Zuefi	45	<u>EASTERN AREA</u>		Aiyad Mecca	100	Abou Arish	50
Quwaiyah	40	Malik Hufuf	273	Arafat Mecca	100	El Khoussaia	50
Aflag	30	Central Dammam	254	Jebel Al Rahma Mecca	50	Najran	100
Huraimala	25	Al Fatif	129	Malgar Isolation Jeddah	450	Bisha	100
	1800	Isolation Alhazia	60	Central Jeddah	275	SOUTHERN	1086
<u>Medina AREA</u>		Jubail	50	Mater. Jeddah	101	CENTRAL	1800
Malik Medina	300	Al Khobar	50	Eye Hosp. Jeddah	75	MEDINA	1000
Mater. Medina	250	Safwa	50	Rabegh	52	QASSEM	428
Yaubu	100	Chest Hosp Dammam	26	Malik Jeddah	41	EASTERN	937
Isolation Medina	50	Tarout	25	Psych Hosp Taif	1300	NORTHERN	341
Al Ula	50	Moberas	20	Sadah San Taif	764	WESTERN	5365
			937				10957

POPULATION, HOSPITALS AND BEDS IN SAUDI ARABIA, 1978 ^a

Region	Population	No. of Hospitals	Hospital Beds	Ratio per 1 000 Population
Central	1 425 000	15	1 800	1.26
Medina	581 600	10	1 000	1.72
Qaseem	355 000	4	428	1.21
Eastern	850 000	10	937	1.10
Northern	542 700	4	341	0.63
Ing Hail				
Western	2 389 800	18	5 365 ^b	2.24
			4 065	1.70
Southern	1 380 000	14	1 086	0.79
Bedouins	330 900	-	-	-
Total	7 855 000	75	10 957	1.39

^a Relates only to Ministry of Health hospitals. Does not include university hospitals, Ministry of Defence hospitals or hospitals provided by other Ministries or privately.

^b Includes 1 300 beds at Taif Psychiatric Hospital.

COMMUNICABLE DISEASES WEEKLY REPORTING FORM

المملكة العربية السعودية
وزارة الصحة
المديرية العامة للطب الوقائي
المكاتب الصحية

الرقم :
التاريخ :
مديرية الشؤون الصحية
مستشفى / مستوصف / مركز صحي
نموذج ط . و . ١

اصابات ووفيات الأمراض السارية المبلغ عنها خلال الاسبوع المنتهي في يوم السبت
١٣٩ هـ الموافق / / ١٩٧ م

Communicable Diseases Report for week ending - - 139
corresponding - - 197

الرقم	اسم المريض	Disease	اصابات			وفيات		
			بالغ	طفل اقل من ١٢ سنة	المجموع	بالغ	طفل اقل من ١٢ سنة	المجموع
			Adult	Child ١٢ سنة	Tot.	Adult	Child ١٢ سنة	Tot.
١	الحنانق	Diphtheria						
٢	التيفويد والباراتيفويد	Typhoid and Para-typhoid						
٣	التهاب كبدى معوي	Viral hepatitis						
٤	شلل الأطفال	Poliomyelitis						
٥	الجدري المائى	Chickenpox						
٦	الكزاز	Tetanus						
٧	الحصى الدماغية الشوكية	Cerebrospinal Fever						
٨	التهاب الدماغ النومى	Encephalitis						
٩	الحصى الطفولية	Perpueral Fever						
١٠	حصى التيفوس	Typhus Fever						
١١	الحصى الراجعة	Relapsing Fever						
١٢	داء الكلب	Rabies						
١٣	النكاف	Mumps						
١٤	الحصى القرمزية	Scarlet Fever						
١٥	السعال الديكى	Whooping Cough						
١٦	الحمرة الخبيثة	Anthrax						
١٧	الحمرة	Erysipelas						
١٨	الجزام	Leprosy						
١٩	الحصبة	Measles						
٢٠	الزحار الاميبى	A. Dysentry						
٢١	الانفلونزا	Influenza						
٢٢	الملاريا	Malaria						
٢٣	السل الرئوى	Pul. T.B.						
٢٤	الأمراض التناسلية زهري رجال زهري حريم سيلان رجال سيلان حريم							

سعادة مدير الشؤون الصحية / المكتب الصحي / المستشفى
بعد التحية: نرسل لكم أعلاه اصابات ووفيات الأمراض السارية . ولكم تحياتي،،
التوقيع مدير مستشفى / مستوصف / مركز صحي الاسم

PLAN OF ACTION
PILGRIMAGE SMALLPOX SURVEILLANCE
Saudi Arabia 1977

Introduction

Smallpox is present in Somalia. Reports of suspected cases have been received from south-eastern Ethiopia which, because of the prevailing political situation, have not yet been investigated. Also Kenya and the Republic of Djibouti, because of their proximity and uncontrolled communications with Somalia, are presently undertaking severe surveillance activities.

The Pilgrimage in Saudi Arabia will offer an ample opportunity for dissemination of the disease to other parts of the world, should any smallpox be imported during the Haj season (November and December this year). Over a million Moslems from over 40 countries normally visit the holy towns of Mecca and Medina in Saudi Arabia at that time.

This plan of action, if enforced and complemented with the precautions suggested to be taken for pilgrims before their departure from Somalia, Ethiopia, Kenya and Djibouti, may minimize the chances of importation, as well as increase the probability of finding any case rapidly should it occur.

Places of importance: JEDDAH, MEDINA, MECCA, MONA and ARAFAT.

Timing: During entire Pilgrimage season (November - December 1977)

Action to be taken:

I. By Saudi Arabian health authorities
For arrivals at Jeddah air and sea ports

1. For all arrivals:
 - Checking promptly vaccination certification which should be valid.
2. For arrivals from Somalia, Ethiopia, Kenya and Djibouti:
 - Checking physically for vaccination scar. A successful vaccination scar should be present.
3. For arrivals from Somalia and Ethiopia only:
 - Recording as much as possible their intended itinerary and intended address.
 - Recording name of their guide if any.
 - Recording their number, date of arrival, province/region of origin.
 - Asking them if smallpox was prevalent in their village/town during last 3 months.
4. For arrivals from Somalia only:
 - Vaccinate, regardless of previous vaccination history.
5. Ask them specifically if they develop rash and fever to report immediately:
 - A. To their medical mission if any.
 - B. To the Saudi Arabian health authorities (Name, telephone number and address to be mimeographed and distributed to everyone on arrival.)

II. By Medical Officers in Charge at Jeddah, Mecca and Medina

1. Arrange for briefing of all foreign medical missions/national dispensaries/ health centres/hospitals on:
 - Existence of active smallpox cases in Somalia and suspected cases in Ethiopia.
 - To report every rash and fever/chickenpox case immediately to the designated address or telephone number.
 - Record all such matters in a specified form.

2. Appoint and train a surveillance team of 2-3 members with driver and car to perform the following:
 - a) Visit hospitals and dispensaries/health centres in town and foreign medical missions regularly (at least twice a week).
 - b) Enquire about presence of any rash and fever/chickenpox case and collect their reports.
 - c) Visit Somalian and Ethiopian camps regularly (at least twice a week) enquiring about occurrence of any possible case of fever and rash/chickenpox.
 - d) Epidemiological investigation and collection of specimens from any rash and fever/chickenpox case.
 - e) Record all fever and rash/chickenpox cases so investigated on specified form.

III. Action by foreign medical missions

1. Inform his country's pilgrims about presence of smallpox cases in Somalia and possible cases in Ethiopia.
2. Ask individual pilgrims to report to him any rash and fever/chickenpox case.
3. Arrange a regular enquiry from individuals in the pilgrim population from his country by their official guide as to the occurrence of any rash and fever/chickenpox case.
4. Record and report any such cases to the Saudi Arabian health authorities.

IV. Action by WHO consultant

1. Participate and contribute in special briefing session with Saudi Arabian health authorities in Jeddah, Mecca, Medina as early as possible concerning their duties.
2. Participate in briefing and training of surveillance teams in Jeddah, Mecca and Medina towns.
3. Participate and contribute in briefing session with foreign health missions as early as possible, explaining their role.
4. Participate with national health authorities in general supervision of these surveillance activities in air and sea ports to ensure proper practice is being carried out.
5. Participate with national health authorities in general supervision of surveillance activities in holy towns.
6. Participate in collection and compilation of data in relation to number of rash and fever/chickenpox cases, number of specimens collected and analysis by country of the pilgrims' age/sex, diagnosis, etc.
7. Assist in submission of specimens to Geneva for onforwarding to WHO reference diagnostic laboratories.
8. If any smallpox case or suspect case happens to be identified, active assistance immediately in initiation of isolation, containment vaccination, contact tracing, and related activities according to standard practice and report through the national health authority to WHO.

REPORT ON OCCURRENCE OF SMALLPOX CASES ON "SAFINAH
ARAFAT", JEDDAH HARBOUR, FEBRUARY 1970

by WHO Regional Adviser, Smallpox Eradication, EMRO

On the day of my arrival in Saudi Arabia, 12 February 1970, I was informed by the Government Health Authorities of the presence of two suspected cases of smallpox on board a ship which had arrived from Pakistan in Jeddah Harbour on 9 February 1970. The next day, 13 February 1970, arrangements were made to pay a visit to this ship, anchored about 7 miles outside the harbour. The patients were examined and clinically diagnosed as smallpox cases.

The ship

The ship, "Safinah Arafat", flying the Pakistani flag, left Chittagong on 24 January and arrived in Jeddah on 9 February 1970. Her itinerary was as follows: Chittagong - 24.1.70; Colombo - 28.1.70; Karachi - 2.2.70; Aden - 7.2.70; Jeddah - 9.2.70.

The ship was carrying 1 453 passengers, comprising 198 cabin passengers and 1 255 deck passengers. The number of crew was 178, which brought the total to 1 631. Most of the passengers were from East Pakistan. No passengers were taken from countries other than Pakistan.

The cases

The cases were examined and specimens collected on 13 February 1970.

Case No.1: A 68 year-old man named Khondoker Sharafat Ali who fell sick on 30.1.70. He was seen by the ship's physician and diagnosed on 31.1.70 as a case of chickenpox.

On examination, he was in the crusting stage. He had a mark on his forearm which he claimed was the reaction to the vaccination he had received recently on 17.1.70. No other scar which could be related to previous smallpox vaccination was evident. He had not contracted smallpox or chickenpox before and denied having seen any similar case during the last month. He had no relatives on board the ship. (This case died on 19.2.70 and was buried in the cemetery of the Jeddah Quarantine Station under very special care.)

Case No.2: A 55 year-old man, named Mohamad Nayeb Ali who was seen by the ship's physician on 2.2.70 and diagnosed as chickenpox. Again he had a mark on his forearm which was related to the vaccination he had received on 17.1.70, before embarking. No other scar was visible and no pockmarks indicating a previous attack of smallpox. He denied having seen any patient with smallpox during the last month (other than case No. 1).

Source of infection

Both cases No. 1 and 2 were from Chittagong, East Pakistan, and before embarking they had been kept for ten days in a Hajji Camp (special camp for pilgrims), possibly between 14 and 24.1.70. They admitted that they had been in the same building in the camp, but in separate rooms. Apparently all the campers had embarked on this same ship. Most of the passengers stated that vaccination had been given in the camp on 17.1.70.

Case No. 1 came from Jattara village, and case No. 2 from Makrai village, 20 miles away, both located in Tangai sub-division of Mememsingh district of East Pakistan.

Quarantine measures

The question arose as to what should be done with the ship and its passengers. From the religious point of view, all of these people had put their lifetime savings, as well as all

their hopes, in this pilgrimage, and naturally, from the epidemiological point of view, it was quite impossible to release so many close contacts who would represent a potential threat to the million pilgrims coming from all over the world.

The idea of release of even vaccinated contacts under surveillance was found to be quite impossible, due to the great number of pilgrims and the impossibility of keeping a constant account of their whereabouts and carrying out medical check-ups.

The solution which was finally agreed upon by all concerned was to put all the passengers in the Quarantine Station in Jeddah under strict health control. (The Quarantine Station is located outside of Jeddah town and pilgrimage areas). The crew was to be quarantined on board their ship. This was done on 14.2.70, on the same day of starting the pilgrimage.

Development of new cases

During the next ten days, six more cases developed in the Quarantine Station. Epidemiological information in relation to these cases is given in the attached table (cases No. 3 to No. 8).

As to the reporting of the incidence to WHO, and the submission of the collected specimens for laboratory testing in a WHO reference diagnosis laboratory, some discussions were carried out with high-ranking officials concerned, and as a result the Government agreed to submit a written report about this incidence.

After the pilgrimage was over, the specimens which I collected were handed to me personally to be tested, and the results were to be sent confidentially to the Government through this Office. All this was done (result negative for variola virus isolation).

On my departure on 26.2.70, the passengers were still in quarantine. The WHO epidemiologist assigned to the smallpox eradication project Saudi Arabia 0030, was requested to follow up the situation closely and report accordingly.

Discussions

The index case, unknown, should have been a contact of cases No. 1 and No. 2, some time between 14 and 21 January 1970, in the Hajji Camp in Chittagong. The first generation of cases on board the ship developed within the incubation period of about 14-16 days (cases No. 1 and No. 2). The vaccination offered in the camp on 17 January 1970, which probably was of poor quality, did not prevent these cases.

They were initially diagnosed as chickenpox by the ship's physician, and it is possible to assume that at the beginning no isolation or preventive measures of any kind were taken.

The close contact on board the ship between the cases and the passengers was all in favour of a few more exposures to the development of six more cases (second generation). The onset for this second generation of cases occurred some time between 12 and 14.2.70, and were all diagnosed in the first few days when they had been quarantined at Jeddah.

Apparently vaccination which was offered on board the ship on 10.2.70 could not be of much preventive value for this group of cases. Among this group were case No. 4 (wife of case No. 2) and case No. 3, a ship's servant who served food to cases No. 1 and No. 2.

A third generation of cases may occur some time by the end of February 1970.

The patients, all Pakistanis coming to perform the rites of the pilgrimage, were all above 35 years of age, and more than half over 50 years of age; 75% of them were male.

As to the scar of previous smallpox vaccination, four patients had old scars, three had no scar at all, and one could not be determined. Among them, only one death was observed, indicating a case fatality rate of 12.5%.

The patients have been hospitalized, and medically cared for. Contacts (all persons on board the ship) were quarantined and every possible precaution was taken by the Saudi Arabian Government Authorities to eliminate the chances of spreading the disease.

The passengers are still in quarantine.

P.S. At the time of writing this report, further information has been received from the Saudi Arabian Government indicating the development of two more cases:

Case No. 9 was diagnosed on 23.2.70, and case No. 10 on 27.2.70. No detailed information as regards these two cases has been received as yet. The period of quarantine has been extended for 14 days beyond 27 February 1970. No single case occurred outside Jeddah Quarantine Station.

Laboratory tests were carried out in Jeddah by the Saudi Arabian authorities in respect of cases No. 1, 2 and 3, and results were positive. Tests included CFT, Paul's test and intradermal injection of rabbits.

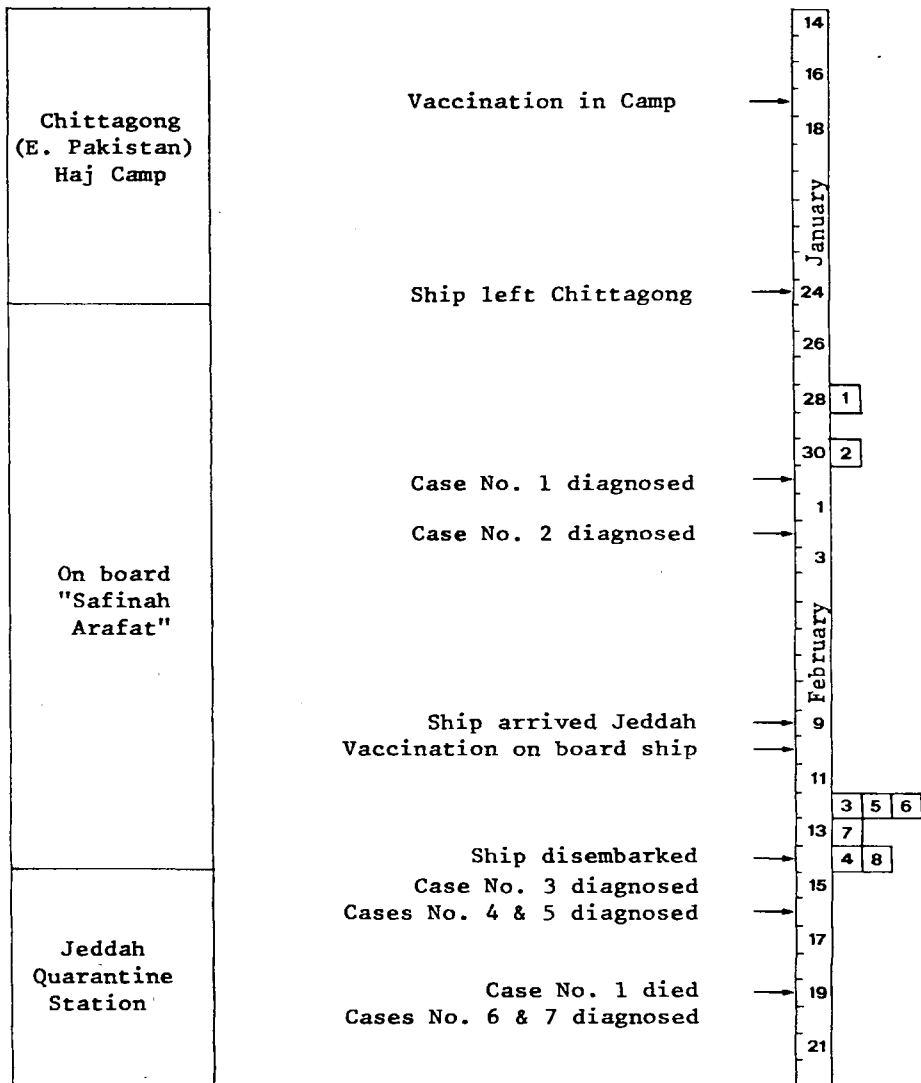
DISTRIBUTION OF 8 SMALLPOX CASES BY AGE, SEX
AND VACCINATION STATUS, FEBRUARY 1970

Age Group (years)	Sex		Vaccination Status			Total
	Male	Female	Scar Present	No Scar	Unknown	
35	0	0	0	0	0	0
35 - 50	2	1	2	1	0	3
50	4	1	2	2	1	5
Total	6	2	4	3	1	8

Epidemiological Details of Smallpox Cases on board "Safinah Arafat"
and in Jeddah quarantine station, February 1970

Case No.	Name	Sex	Age	Date of last vaccination	Old scar of vaccination	Probable date of onset	Date diagnosed and isolated	Date specimen collected	Stage of eruption (on date of sample collection)	Status of patient	Source of infection	Remarks
I generation	1 Khandoker Sharafat Ali	M	68	17.1.70	-	28.1.70	31.1	13.2.70	Scab.	Died on 19.2.70	Haji Camp Chittagong 14-16.1.70	No take for last vaccination
	2 Mohamed Nayeb Ali	M	55	17.1.70	-	30.1.70	2.2	13.2.70	Scab.	Recovering	Haji Camp Chittagong	No take for last vaccination
II generation	3 Abdul Badir Badshamia	M	35	25 years ago	+	12.2.70	14.2	21.2.70	Pustular	Uncertain	Case No. 1	Servant of ship's hospital
	4 Jambiatun Nesso	F	45	17.1.70	-	14.2.70	16.2	21.2.70	Pustular	Recovering	Case No. 2	Wife of Case No. 2 Vacc. on 10.2.70, no take
	5 Sarifun Nesso	F	60	Childhood	+	12.2.70	16.2	21.2.70	Pustular	Recovering	Case No. 2	Vacc. on 14.1.70, no take. A very mild case
	6 Sheikh Budhya Tale Hossain	M	53	15.11.69	+ ?	12.2.70	20.2	21.2.70	Pustular	Recovering	Case No. 1	Vacc. on 10.2.70, no take
	7 Fazal Ali Monsla	M	59	50 years ago	+	13.2.70	20.2	21.2.70	Pustular	Recovering	Case No. 1	Vacc. on 10.2.70, no take
	8 Noor-ul-Haq	M	35	Childhood	+	14.2.70	23.2	22.2.70	Pustular	Recovering	Case No. 1	Vacc. on 10.2.70, no take

ONSET OF SMALLPOX CASES "SAFINAH ARAFAT", JEDDAH
 FEBRUARY 1970



SPECIAL REPORT ON THE EPIDEMIOLOGICAL INVESTIGATION OF AN
IMPORTED SMALLPOX CASE ONBOARD S.S. MOHAMEDI, 5 JANUARY 1973

by WHO Epidemiologist, Saudi Arabia

1. INTRODUCTION

On 29 December 1972 the health authorities in Saudi Arabia received a cable from the master of Indian ship s.s. Mohamedi informing them that on 28 December a case of smallpox of 20 days' duration was detected on board the ship, and that all the passengers and crew were vaccinated immediately.

Another cable was also received later from WHO, EMRO, giving more detailed information which had been relayed from Djibouti Health Authorities.

Upon receiving this, we contacted the agents and found that the ship had sailed from Chittagong, Bangladesh, on 21 December 1972 and was expected to arrive at Jeddah on 5 January 1973. Several meetings have been held with the authorities and every aspect was studied, after which preparations for intensive preventive measures were decided upon.

It was agreed that on arrival the ship will be prevented from coming close to the port until the whole ship, its passengers and crew could be inspected and checked. The higher authorities have been informed about this decision and approval has been secured.

2. THE SHIP

The vessel, an Indian passenger ship of 7 026 gross tonnage, had left Chittagong on 21.12.72, called at Colombo on 26.12.72, Djibouti on 2.1.73, and finally arrived at its destination, Jeddah, at about 9 am on 5.1.73.

On arrival the ship was guided to an anchorage at a position about 1½ miles away from the port.

At the time of sailing from Chittagong, the ship was carrying 1 464 passengers from Bangladesh, with 160 crew members; all were adults. One woman gave birth to a baby girl one week before arriving at Jeddah.

3. INSPECTION OF THE SHIP

Immediately after arrival, a group of senior doctors, including the Director-General of Preventive Medicine, the Director of Quarantine and myself, went on board, and the ship's master and surgeon supplied all the information they had on the smallpox case.

We learned that only one case had been seen during the whole period of the trip and that all the necessary measures had been taken promptly, including vaccination of all the passengers and crew. We were also told that four passengers died during the voyage, the causes of death having been old age illnesses. Two men, aged 77 and 68 years, died on 23.12.72 of hypertension and coma; one 80 year-old man died on 30.12.72, having been diagnosed as acute myocardial infarction; and one man died on 5.1.73 at age 73 - the cause of death given was hypertension. All case sheets were checked to verify the statements given. We were told that the bodies had been buried at sea.

We were also informed that a 73 year-old man was suffering from fever and was under treatment in the ship's hospital.

4. DETECTION OF THE CASE

The ship's surgeon stated that he discovered the case on 28 December 1972, two days after the ship had left Colombo, when a 48 year-old woman complained of skin rash. He said that although he had never seen smallpox before, the general picture and distribution of the rash had made him suspect the disease. At that time the lesions were in the dry scabbing stage and he estimated that she was in the 20th day of illness. Some of the scabs had started to peel off from the face, which was puffy. He also saw a few lesions on the chest, abdomen and axillae. The master was informed, who in turn cabled the Saudi Arabian health authorities. The patient was isolated and vaccination of all people on board was carried out.

5. THE SMALLPOX CASE

The patient, a 48 year-old woman, Fatima Bibi, who is a native of Khulna Village, Tulshirbad, Bangladesh, was in isolation on the ship. She is married and was travelling with her husband on the same ship until her isolation on 28.12.72.

I have thoroughly examined her and found some dry scabs on the arms, hands, legs and feet, which were swollen and covered with thick scaly crusts. The lesions on the face must have been few in number and the pockmarks were superficial. There were also about 2-4 lesions on the palms and soles. A recent vaccination scar was seen on her left forearm, caused by the vaccination carried out on 11 December 1972. Another scar of an old vaccination was seen on her arm. The general condition of the patient was very good and her illness seemed a mild one.

The patient was not cooperative and did not give a proper detailed history of her illness. Therefore, the exact date of the onset of the disease could not be ascertained. However, it was obvious that she was ill when she boarded the ship at Chittagong on 21.12.72 and probably her illness had started between 12-14 December 1972. The patient denied any contact with a patient suffering from a similar disease during the two weeks prior to her illness.

A few pictures of the patient have been taken and scabs were collected for future laboratory examinations.

6. PREVENTIVE MEASURES TAKEN

- a) All the passengers and crew have been thoroughly examined to exclude the presence of another case or cases of smallpox among the rest of the passengers and crew.
- b) At the same time, everyone has been inspected for scars of recent vaccination. It was found that all of them carried valid International Health Certificates showing that vaccination had been carried out on 11 and 12 December 1972. We found that all showed recent scars, except for 17 passengers whose scars were doubtful and therefore they were revaccinated.
- c) Thorough disinfection of all the decks and cabins together with insecticide spraying have been carried out. Also, more strict disinfection procedures were ordered for the isolation room.
- d) Since the patient has been under isolation from 28.12.72, the health authorities decided that the ship should be kept under quarantine for a further period to complete 14 days, which they considered the necessary period to isolate all the contacts on board the ship. The health authorities did not think it was advisable to occupy the beds available at the quarantine station with over 1 620 contacts, in case these beds may be needed for more urgent conditions.

- e) It was agreed that should no other case of smallpox appear after fourteen days, and taking into account the successful recent vaccination, the health authorities might consider allowing all the passengers and crew to perform Haj.

7. LABORATORY EXAMINATION

Dr Bruno-Lubo, WHO Virologist, carried out two tests to assist in the confirmation of the diagnosis.

- a) Seriological test on the serum and scabs collected from the patient on 7.1.73. The following is a summary of the results he obtained.

Sera	Antigens	
	Vaccine	Pat. Serum
Standard serum	$\frac{1:128}{1:128+}$	$\frac{1:64}{1:128+}$
Patient's serum	$\frac{1:128+}{1:64}$	$\frac{1:64}{1:64}$
Normal serum	$\frac{1:8}{1:8}$	$\frac{0}{0}$

It was concluded that the highly positive seriological test agrees with the clinical diagnosis of smallpox. Generalized vaccinia might, however, be considered as a remote possibility.

- b) Gel-diffusion test. This was carried out in duplicate slides on the same antigen used for CF tests. It was conducted according to the WHO recommendation. A line of precipitation appeared showing positive result as well. These results were read by both Dr Bruno and myself.
- c) Virus culture on CAM could not be performed due to lack of facility.

8. EPIDEMIOLOGICAL REMARKS AND CONCLUSION

The detailed epidemiological investigation conducted could not reveal the exact source of infection due to lack of co-operation from the only patient detected on board S.S. Mohamedi, Fatimi Bibi, who completely denied any contact with another patient at any time before her illness.

The case was discovered on 28.12.72 and, as the ship's surgeon said, she was in the scabbing stage. Hence, it was obvious that she was suffering from the disease at the time the ship sailed from Chittagong on 21.12.72. When I examined the patient after the ship's arrival in Jeddah on 5.1.73, the lesions looked about 3 weeks old. Therefore, it can reasonably be assumed that the onset of the rash occurred about 14 December 1972, and we can also conclude that the onset of the fever, which the patient also denied having had, was sometime between 10-14 December. Accordingly, it can safely be concluded that the patient must have contracted the infection when she was in her home country, Bangladesh.

There is little doubt that the long duration of the illness, the distribution of the lesions and the pockmarks, although very superficial, together with the laboratory results, support the diagnosis of a modified smallpox. One can not help thinking, however, that the rash appeared three days after the patient has been successfully vaccinated. A virus culture would be a valuable test to carry out.

LINE LISTING OF SPECIMENS TESTED IN WHO COLLABORATING CENTRES IN 1978

SERIAL NUMBER	PATIENT			DATE		TESTING LAB. <u>a</u>	LABORATORY RESULTS	
	NAME OR CASE NO.	AGE	SEX	RECEIVED	DESPATCHED		HERPES VARICELLA (BY EM)	VARIOLA VIRUS
23A ^b	Garad Mohamed Hagoury	22	M	5.1.78	7.1.78	Moscow	negative	negative
24	Naser Mohamed Aree	20	M	"	"	"	"	"
25	Shouae Mohamed Hagoury	20	M	"	"	"	"	"
26	Mohamed Mesawy Ibrahim	25	M	"	"	"	"	"
27	Awad Mabrouk Aly	23	M	"	"	"	"	"
28	El Sheikh Abdulla Ibrahim	30	M	6.1.78	10.1.78	Atlanta	"	"
29	Saeed Shofayan	51	M	"	"	"	positive	"
30	Khadega Ismail Adam	25	F	"	"	"	"	"
31	Mohamed Moteb			"	"	"	negative	"
31A	Maatok Mohamed Omar	23	M	13.1.78	16.1.78	Atlanta	positive	"
32	Ahmad Abdo Roz	21	M	"	"	"	"	"
33	Yahyia Mousa Moh	14	M	13.1.78	16.1.78	Atlanta	"	"
33A	Aly Abdullah Mon'd	14	M	6.2.78	8.2.78	Atlanta	"	"
34	Johnson Banzal	38	M	"	"	"	"	"
35	Mohamed Aly Ibrahim	29	M	"	"	"	"	"
36	Roywaiged Bakiet	18	M	"	"	"	"	"
36A	Abdel Rakib Farea	7	M	13.2.78	15.2.78	Atlanta	"	"
37	Sherifa Ahmed El-Ghandy	22	F	17.2.78	21.2.78	Moscow	negative	"
38	Naser Aly Naser	5	M	"	"	"	"	"
39	Mouda Modkhal Metairy	16	F	24.2.78	28.2.78	Moscow	"	"
40	Mesfera Marhoom Autipy	35	F	"	"	"	"	"
40B	Ganer Iessa Yehya Taher	30	M	10.3.78	13.3.78	Atlanta	"	"
41	Ismail Ibrahim Yossef Ishak	24	M	"	"	"	positive	"
42	Saied Yehya Korany	1	M	"	"	"	"	"
43	Maryim Asaad Mohamed	25	F	"	"	"	"	"
44	Lanisi Ibrahim Suleman	9	F	"	"	"	negative	"
44A	Mohamed Aly Maarroof Yamani	1 m	M	28.3.78	29.3.78	Atlanta	positive	"
45	Fakera Ibrahim Maarroof Yamani	30	F	"	"	"	"	"
46	Deif Alla Mohamed El Tabeidy	18	M	"	"	"	"	"
47	Maghoud Abdaba Bahran	18	M	"	"	"	"	"
48	Hemdan Ahmed Harby	30	M	31.3.78	1.4.78	Moscow	negative	"
49	Abdulla Marie Aseri	23	M	"	"	"	positive	"
50	Hussein Ibrahim Mohamed	8	M	"	"	"	negative	"
51	Fatema Hassan Zomal	20	F	"	"	"	"	"
52	Kuttapan Harikumaran Nair	24	M	7.4.78	12.4.78	Atlanta	positive	"

a, b See footnotes, page 33

SERIAL NUMBER	PATIENT			DATE		TESTING LAB. a	LABORATORY RESULTS	
	NAME OR CASE NO.	AGE	SEX	RECEIVED	DESPATCHED		HERPES VARICELLA (BY EM)	VARIOLA VIRUS
53	Khadeqa Abdulla Salem	35	F	"	"	"	positive	negative
54	Maymoon Abdu Saghler	16	F	"	"	"	"	"
55	Fatma Mohamed Jamadi	15	F	"	"	"	"	"
56	Sefco Marona	25	M	17.4.78	19.4.78	Atlanta	negative	"
57	Rafaa Deif Alla Ally	20	F	"	"	"	positive	"
58	Marzouk Sobhi	18	M	"	"	"	"	"
59	Shokban Ahmed Zahrand	20	M	17.4.78	19.4.78	Atlanta	"	"
60	Mohamed Abdulla Aserle	18	M	"	"	Atlanta	"	"
61	Katab Gaber Ahmed	35	M	24.4.78	25.4.78	Moscow	negative	"
62	Ibrahim Kasem Mohamed	25	M	"	"	"	"	"
63	Aly Mobarek Yamany	25	M	"	"	"	"	"
64	Ayed Helal Harby	18	M	"	"	"	"	"
65	Shakaa Aly Olwy	45	F	"	"	"	"	"
66	Hassan Hussain Malash	25	M	"	"	"	"	"
67	Lefaya Gebtah Sagheer	25	F	1.5.78	5.5.78	Moscow	"	"
68	Gomaa Abkar Ibrahim	35	F	"	"	"	"	"
69	Osman Mohamed Hetati	35	M	"	"	"	"	"
70	Hemdan Saad Abdel Samad	1	M	5.5.78	10.5.78	Atlanta	positive	"
71	Somaya Hamed Saleh	10	F	"	"	"	"	"
72	Maryem Abdu Karaa	25	F	"	"	"	"	"
73	Salha Mohamad El Shaki	18	F	"	"	"	"	"
74	Mohamed Hady Omar	18	M	5.5.78	8.5.78	Atlanta	"	"
75	Aly Yehya Kasem	29	M	"	"	"	"	"
76	Shaheer Azm El Sylmy	30	M	"	"	"	"	"
77	Mohammed Yehya Abdulla	16	M	"	"	"	"	"
78	Afifa Hamdan Hommad	7	F	17.5.78	18.5.78	Atlanta	"	"
79	Hadia Abdulla Reda	59	F	"	"	"	"	"
80	Ali Hasina Al Harsi		M	"	"	"	"	"
81	Ibrahim Mossa Al Soliman	18	M	"	"	"	"	"
82	Mohammad Balkasem Zahrani		M	25.5.78	27.5.78	Atlanta	"	"
83	Lafa Manie Alla Akil	22	M	"	"	"	"	"
84	Ahmad Ali Al Karni	20	M	6.6.78	8.6.78	Moscow	negative	"
85	Moflehah Makhda Al Salmi	35	F	"	"	"	"	"
86	Aisha Zafer Al Shahi	12	F	"	"	"	"	"
87	Isa Ahmed Hassan	21	M	9.6.78	11.6.78	Atlanta	"	"
88	Abdulla Ali Al Malky	21	M	"	"	"	positive	"
89	Ali Ebrahim Mohammed	20	M	9.6.78	11.6.78	Atlanta	"	"
90	Khalil Hasean Ahmad	18	M	16.6.78	20.6.78	Atlanta	"	"

SERIAL NUMBER	PATIENT			DATE		TESTING LAB. ^a	LABORATORY RESULTS	
	NAME OR CASE NO.	AGE	SEX	RECEIVED	DESPATCHED		HERPES VARICELLA (BY EM)	VARIOLA VIRUS
91	Rihana Ali Al Malky	55	F	"	"	"	negative	negative
92	Saleh Eleash Harby	20	M	"	"	"	"	"
93	Saleh Mohammed Yaman	22	M	"	"	"	"	"
94	FadaaMohssen Al Yazidi	30	M	30.6.78	5.7.78	Atlanta	"	"
95	Khezma Ahmad Al Shantari	55	F	"	"	"	"	"
96	Mohamed Omar El Shahry	35	F	"	"	"	"	"
97	Hazzam Bargash Kahlan	28	M	19.7.78	22.7.78	Moscow	"	"
98	Hanan Ali Sofi	10	F	"	"	"	"	"
99	Mostafa Mahdi Shahri	27	M	"	"	"	"	"
100	Maeeda Mastoor Eld El Harthy	24	F	28.7.78	2.8.78	Moscow	"	"
101	Dief Alla Hemdan Metair	18	M	"	"	"	"	"
102	Aly Mohamed Atody	20	M	"	"	"	"	"
103	Mohamed Yehya Erssa Gohally	17	M	"	"	"	"	"
104	Darwish Mahdy El Sobhy	19	M	28.7.78	2.8.78	Atlanta	"	"
105	Mohamed Wally Yehya	50	M	"	"	"	"	"
106	Said Agran Al Mehwar	21	M	11.8.78	14.8.78	Atlanta	positive	"
107	Mohamed Alu Saleh Kabish	21	M	"	"	"	"	"
108	Ahmed Yehya El Gohaly	24	M	11.8.78	14.8.78	Atlanta	"	"
109	Ibrahim Abdu El Shaar	22	M	18.8.78	22.8.78	Atlanta	negative	"
110	Hassan Mohamed Gaafary	22	M	"	"	"	"	"
111	Osman Ahmed Osman	14	M	"	"	"	"	"
112	Belkasam Hassan Abkar	22	M	31.8.78	2.9.78	Atlanta	"	"
113	Abdo Salem Aly El Shehany	20	M	"	"	"	"	"
114	Thanajan Maayaid Elemiezy	26	M	"	"	"	"	"
115	Saoud Ayed Acherby	28	M	1.9.78	2.9.78	Moscow	"	"
116	Maayen Gazal El Eissy	20	M	"	"	"	"	"
117	Hadya Hamad	55	F	"	"	"	"	"
118	Laila Aly Saleh Kabsh	28	F	"	"	"	"	"
119	Hassan Aly Magrashy	19	M	1.9.78	2.9.78	Moscow	"	"
120	Mohamed Yehya Gehral	20	M	"	"	"	"	"
121	Ibrahim Ahmed Omar	24	M	"	"	"	"	"
122	Hassan Ahmed Darwish	25	M	"	"	"	"	"

^a Testing Laboratories are WHO Collaborating Centres in Atlanta (Viral Exanthems Branch, Center for Disease Control) and Moscow (Research Institute for Virus Preparations).

^b 23 specimens tested in 1977