

# CHOLERA EPIDEMIC IN EGYPT (1947)

## A Preliminary Report

Sir ALY TEWFIK SHOUSHA, Pasha, M.D.

Under-Secretary of State, Ministry of Public Health, Cairo, Egypt

	Page
1. Outbreak of the 1947 epidemic. . . . .	354
2. Sanitary and administrative measures . . . . .	357
3. Scientific aspects. . . . .	365
4. Cholera hysteria . . . . .	368
5. Conclusion . . . . .	369
Tables . . . . .	371-381

---

As the centre of the old world, Egypt is connected by sea, by land and also by air with the three surrounding big continents, becoming a meeting-centre of East and West. It was often ravaged during the nineteenth century by destructive epidemics of cholera, but after the outbreak of 1902 the country remained free from the disease. The epidemic under consideration occurred after a period of quiescence of about half a century which had followed a prolonged cycle of recurring outbreaks. During the nineteenth century and up to the year 1902, nine outbreaks of cholera occurred in Egypt. Their relation to the six well-known pandemics was as follows :

The first great pandemic, which seems to have commenced about 1817 in Bengal and extended by way of the Caspian Sea to Astrakhan, did not reach Egypt.

The second pandemic, which commenced in 1826 in Bengal and extended to Russia, Europe and America, attacked Egypt twice. In 1831 it was widely diffused in the country. Altogether this epidemic claimed 150,000 lives (*i.e.*, nearly 6% of the population

at that time). In Cairo upwards of 36,000 deaths occurred, while over 3,000 daily deaths occurred in the whole country. A second outbreak followed in 1834, ending, according to Clot Bey, with a similar number of victims.

During the third pandemic, which commenced in 1846, Egypt was attacked thrice : in 1848, in 1850, and in 1855 ; but no information is available in regard to essential details and victims.

During the fourth pandemic, which commenced in 1863, the disease was imported into Egypt in 1865. According to statistics, the mortality exceeded 60,000. The mortality-rate in different towns was as follows : nearly 100 per thousand in Rosetta, 42 per thousand in Damietta, 22 per thousand in both Cairo and Alexandria.

During the fifth pandemic, Egypt suffered somewhat severely, with 36,300 deaths in Lower Egypt and 12,170 deaths in Upper Egypt, in the outbreak of 1883 ; and with 20,320 cases and 17,270 deaths in the two successive outbreaks of 1895 and 1896.

In the sixth pandemic, which began in 1902, an outbreak gained ground in the same year in Egypt, and the total cases eventually reached 40,613 with 34,595 deaths. The disease was widely diffused in the country, with 2,026 infected towns and villages. Apart from a small focus of eight cases in Alexandria in 1903, the epidemic of 1902 was the last of the nine epidemics which occurred during the past hundred years.

Summarizing, it will be noted, as regards the share borne by Egypt in these six pandemics, that it escaped the first altogether, but was involved in the remaining five, with more than one outbreak in three of them.

### 1. OUTBREAK OF THE 1947 EPIDEMIC

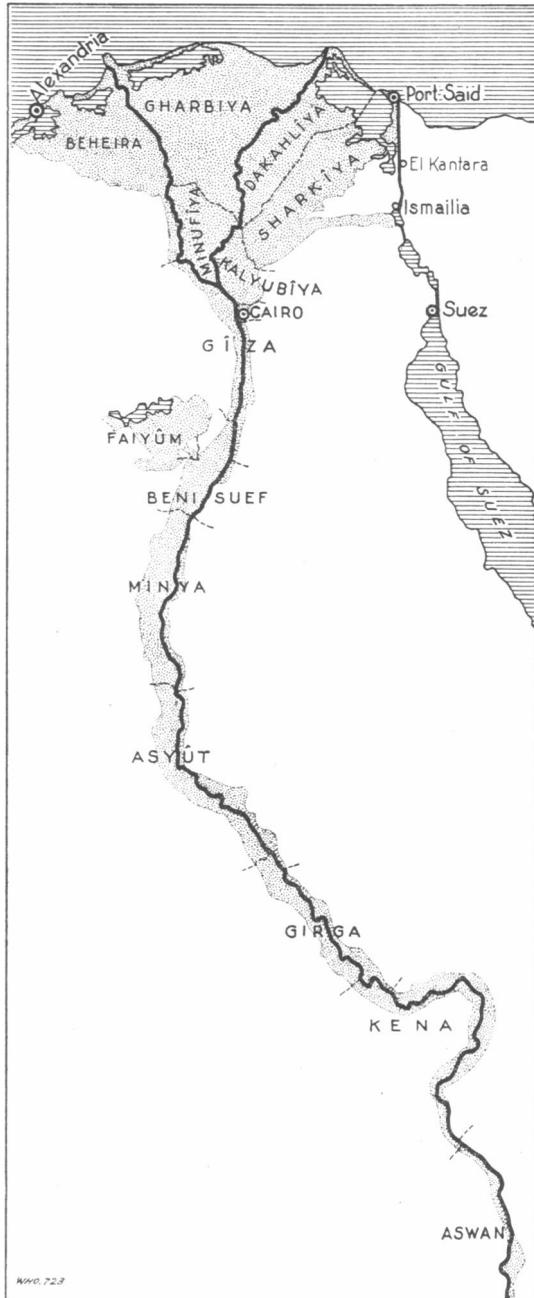
Until 22 September 1947, the general mortality all over the country was within the limits of the normal rate, and notifications of epidemic diseases were quite ordinary. But on 22 September the first suspicion of cholera occurred.

On Friday, 18 September, two patients with vomiting and diarrhoea were seen by a doctor at Fakus (Province of Sharkiya), the chief town of the district. Their general condition was good, and a diagnosis of food poisoning was made. These two patients came from El Korein, seven kilometres from Fakus.

On the next day, two more cases of vomiting and diarrhoea were seen at Fakus. Their condition was rather severe, so they were advised to enter the general hospital for treatment.

On the next day, Sunday, the medical officer of health of El Korein was rather perplexed about the reporting of ten deaths during that day. On Sunday evening, he saw a case of vomiting and diarrhoea. Next morning he saw another case, and deaths began to be reported from seven till noon.

He at once communicated with his senior medical officer of health, who in turn reported to the Director of the Epidemic Section of the Ministry of Public Health. That was about 4 p.m. on 22 September 1947. The last-mentioned officer consulted the Director-General of the Department of Preventive Medicine, and it was agreed that three senior members of the medical staff of the Epidemic Section should at once proceed to El Korein for investigation, as the



information gave the impression of something more than "food poisoning".

At 8 p.m. that evening, cholera was suspected and the following action was taken :

1. Orders to surround the village by police to prevent exit from and entry to the village were given and executed at 2 a.m. on 23 September.
2. The market to be held on 23 September was prohibited.
3. Personnel were ordered that night to proceed at once to El Korein. At the same time equipment and medicaments were sent during the night to the village health unit in El Korein.

On the morning of 23 September the village of El Korein was searched for cases. Samples were taken and sent to the laboratory in Cairo. During the afternoon of the same day, a telephone message was received, from the senior medical officer of another province (Kalyubiya) farther south, that suspicious cases of vomiting and diarrhœa followed by death had occurred in the village of Mostorod.

It is worth noting that this observation was unrelated to the same observation made at El Korein, because until the receipt of this telephone message from the former no statement about cholera had been made. However, the cases in both villages proved afterwards to be cholera. The sanitary authorities were soon in close touch with these villages. An army of doctors, sanitary officials, nursing staff and disinfectors was engaged in the campaign.

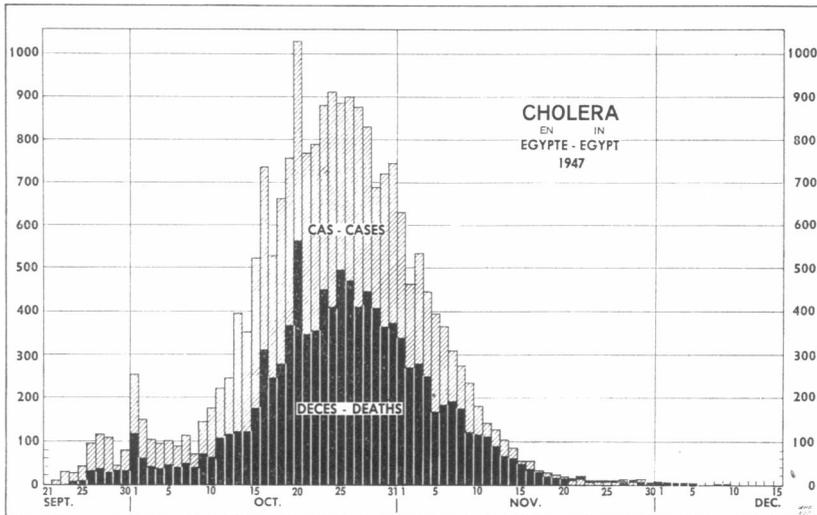
Unfortunately, all these efforts did not eradicate the disease from these villages, or prevent the invasion of other localities. Eventually, the disease began to appear in other villages in the same provinces, and later in other provinces.

There is no need to give a detailed account of the mode of spread and diffusion of the epidemic in the various parts of the country in chronological order, as the principal data have been published in the *Weekly Epidemiological Record*<sup>1</sup> of WHO.

In the measures adopted to counteract the epidemic, the object in view was not only a limitation of its spread, but also its speedy termination.

---

<sup>1</sup> *Wkly epidem. Rec.* 1947, **22**, 317, 322, 332, 358, 383. See also *Epidem. Vital Stat. Rep.* 1947, **1**, 141



The details of the epidemic, expressed in daily cases and deaths, are diagrammatically represented in the chart, while Table I shows the total number of cholera cases and deaths as distributed in the provinces and governorates. The weekly distribution is given in Table II.

A study of these data is of interest, as the march of the epidemic can easily be deduced from them.

The total number of cases was 20,804, with 10,277 deaths. The fatality rate was therefore about 50%.

## 2. SANITARY AND ADMINISTRATIVE MEASURES

It is not intended to give here a detailed account of the sanitary and administrative measures taken to localize and eradicate the outbreak, but to give only a brief general summary and then to deal more fully with some of them.

1. Isolation of patients in hospitals and isolation-camps.
2. Disinfection of houses of sick and suspected cases.
3. Isolation and bacteriological examination of contacts of patients. If proved negative after two consecutive examinations, they are discharged.
4. Immediate inoculation of contacts at the beginning of the epidemic, followed by mass inoculation of the entire population.

5. Control of the purity of the water-supplies and their protection :
  - a.* Increase of the amount of chlorine in the waterworks of all towns and cities.
  - b.* Installation of sanitary water-pumps for water-supply where no such supply is available and where it is possible to erect such pumps.
  - c.* Chlorination of water taken from the river and canals in the infected area.
  - d.* Prohibition of drawing water from any source other than those approved by the sanitary authorities.
  - e.* Prohibition of washing clothes or bathing in the Nile or in any canal.
  - f.* Closure of fountains destined for public use, as well as wells and tanks exposed to the risk of contamination, even if they belong to individuals.
  - g.* Prohibition of the mooring of boats in an area within 500 metres from the boundaries of any town situated on the banks of the Nile or its canals.
  - h.* Closure of any drain or water-closet connected with the Nile or with its canals.
  - i.* Prohibition of open praying-places situated on the banks of the Nile or any of its canals.
6. Closure of public swimming-pools.
7. Closure of out-patient departments in all health-ministry units in the infected districts.
8. Prohibition of fairs and public markets.
9. Prohibition of the sale of refreshments, cold drinks, and any food or fruit suspected of contamination.
10. Closure of any factories for aerated beverages, of ice-factories, and of any dairies liable to be dangerous to public health.
11. Prohibition of transport of vegetables or fruits from infected areas before washing them in chlorinated water.
12. Closure of any public kitchen or any kitchen belonging to a restaurant or café, if found liable to facilitate the contamination of food or drink served in that establishment.
13. Immediate disposal of rubbish or other fly-breeding sources.
14. Anti-fly campaign with DDT, sprayed manually or mechanically (including use of jeeps and aircraft).

15. Administrative measures controlling traffic and communications, including buses, railways, and river and canal navigation.
16. Suppression of outgoing movement of pilgrims from Egypt.

Table III shows the number of specimens examined in the Laboratories Department during the epidemic, the total of which amounted to 119,079.

Table IV gives statistical data regarding the staff and means of transport before and during the epidemic, while Table V gives the number of treatment centres in each infected province. These three tables will show that the anticholera campaign was undertaken on a scale unprecedented in the history of Egypt.

It may be of interest to describe in more detail some of the measures taken.

### 1. *Isolation of patients*

All cases were isolated in the nearest infectious-diseases hospital. This was the routine adopted at first, but, as the epidemic progressed, every hospital and every health centre was utilized for the purpose. One hospital only in every province was left for emergencies and accidents. Later, tent-hospitals, wooden huts, schools, maternity centres, etc. were utilized.

### 2. *Contacts*

Two procedures against contacts were adopted in the villages :

*a.* When the cases were sporadic and if accommodation was available, house contacts were isolated at once.

*b.* If the number of cases was large and no accommodation for isolation was possible, surveillance for the incubation period was the routine. In the cities and towns, and with cases occurring among labourers and non-resident hired farmers, procedure (*a*) was the rule.

### 3. *General Vaccination*

Vaccination of the whole population exposed to risk of infection was carried out on a large scale. It was naturally slow at first, but with the increasing output of vaccine prepared in the Serum and Vaccine Institute, Cairo, and the receipt of vaccine from abroad, immunization of the whole of Egypt was effected in a comparatively short time.

The usual immunizing dose was 1 ml., but staff working in cholera were given a first dose of  $\frac{1}{2}$  ml. and, in a week's time, a second dose of 1 ml. One ml. of vaccine contained 8,000 million vibrios.

#### 4. *Water*

Superchlorination of public water-supplies was ordered.

As regards villages, all Abyssinian pumps and open wells were closed. Sites on canals were chosen for the villagers to draw their water from, and wherever possible, either chlorine water or bleaching powder was added to the raw water. In some villages, new sanitary pumps were installed, and in other instances piped water-supplies were extended to suburbs of towns or cities, or to near-by villages. Again, in big towns or cities, where taps were installed in slum areas the practice of selling water from these taps was prohibited.

#### 5. *Pilgrimage*

As the pilgrimage season had already started at the beginning of October, about 7,000 pilgrims had already been transported to Jeddah. On 25 October, a pilgrimage ship was due to leave Suez. This was stopped and an *arrêté* was passed to suppress the pilgrimage, while those pilgrims coming from infected areas to Suez were quarantined in Moses' Wells for six days, inoculated, and allowed to return to their homes. The Egyptian medical mission which usually accompanies the pilgrims was notified of the situation. Ships carrying pilgrims from other countries were allowed to pass through the Suez Canal under quarantine with examination at Port Said and Suez.

Foreign pilgrims travelling by air through Egypt were allowed to leave the country if they had been vaccinated six days before their arrival.

#### 6. *Other measures*

a. *Administrative supervision*: To facilitate control over anti-cholera measures, provinces were divided into divisions, and in each division a senior officer was installed. In the chief town of the province a controller, or a liaison officer, supervised arrangements for the whole province, received orders for equipment, medicaments, and junior staff, and attended to co-ordination between the different divisions.

b. *Flying squads*: In certain localities it was found useful to have a sort of "flying squad" to search the villages for cases and to control the condition of cleanliness of the villages, the disinfection of premises, the water-intakes, and other aspects of the cholera work.

c. *Convalescents*: Convalescents were tested on the 5th day of convalescence (which is about the 9th–10th day of the disease) and three days later. If both specimens were negative the patient was discharged—at about the 19th or 20th day of the disease. If a positive result was reported, three consecutive negative samples, with three days' interval between each two, were regarded as imperative before discharge.

d. *Contacts*: Two consecutive negative samples, taken on the 2nd and 4th days of isolation, were required for the liberation of contacts. If one was positive, three consecutive negatives, as in convalescents, were required for discharge.

Sulfaguanidine, alone or with sulfadiazine, was given as a routine for both categories. The usual period of administration was five days, to be repeated if one of the samples was returned positive. The dosage was 6–8 g. of sulfaguanidine as a first dose (adults) and thereafter 3 g. every four hours. If sulfadiazine was also given, the usual dose was half that of the sulfaguanidine. No ill-effects from such dosage were noticed. Sulfadiazine was not administered except when the urine was free from albumen.

#### Major Administrative Measures

The broader administrative steps taken by the health authorities were as follows:

1. As soon as the first cholera cases at El Korein were discovered, the village was cordoned by police, then by an Egyptian Army force.
2. Drastic measures were directed against the spread of infection from one zone to another. Thus, the isolation of infected provinces from the other provinces and governorates was carried out by the prohibition of any intercourse between their inhabitants. The latter were prohibited from proceeding from infected to uninfected localities unless they had been inoculated and six days had elapsed since the date of inoculation. Later it was found necessary to isolate Upper from Lower Egypt.
3. Immediate and drastic measures were taken to protect Cairo from infection. Military forces were posted on all the inlets to the

city. No person or vehicle was allowed to proceed, unless the person, or all the passengers in the vehicle, were in possession of official inoculation-certificates bearing their photographs. Even those crossing the Nile in ferries were examined. Vegetable cargoes were disinfected in basins specially provided for the purpose at the entrance of the city. Similar measures were taken in other infected localities.

4. River navigation was put under control, all ferries and other river-craft in infected localities being detained. All crews and boatmen in Egypt were inoculated from the very beginning of the outbreak.

5. Railway communications in infected areas were controlled, all passenger trains being stopped. To separate completely Upper from Lower Egypt, trains were stopped for six days to allow for the vaccination of all inhabitants of Lower Egypt. After this interval, travelling was allowed, provided passengers were in possession of six-day-old inoculation certificates with photographs. These measures were maintained until free travelling was gradually authorized on the termination of inoculation of inhabitants.

#### **Legislation**

Urgent promulgation of certain laws was necessary to regulate and control the campaign. To this end, the following decree-laws were issued :

1. A Decree-law conferring on the Minister of Public Health certain powers relating to requisition of supplies.
2. A Decree-law imposing certain restrictions for protection against cholera.
3. A Decree-law relative to dealing in anticholera vaccine.
4. A Decree-law providing penalties for offences against requisition orders issued for the purpose of cholera epidemic control.
5. A Decree-law providing measures for the protection of public health on the appearance of epidemics of cholera or plague.
6. An *arrêté* relating to precautions to be taken in provinces and localities considered infected with cholera.

#### **Vaccination**

The handicap at the onset of the epidemic was the shortage of cholera vaccine. The Vaccine and Serum Institute used to prepare

this vaccine only before the pilgrimage season, mainly for the inoculation of pilgrims. The few thousands of millilitres of vaccine that were in stock were used for inoculating the contacts and the medical staff. Urgent orders were given to firms producing vaccine in different countries. Other countries showed their sympathy by donating considerable quantities of vaccine.

Of the cholera vaccine received from foreign countries, 5,816,510 ml. was received as donations and 10,724,775 ml. was supplied by business houses on payment. The Vaccine and Serum Institute, Cairo, produced 6,727,295 ml. from 28 September to 2 November 1947. The normal daily output of the Institute was 40,000 ml. This increased gradually till it attained 400,000 ml.

#### Anti-fly Campaign

An anti-fly campaign was started from the very beginning. Apart from the usual routine measures, DDT was used on a very large scale for this purpose. The work was undertaken by two sections of the Ministry of Public Health, namely, the Insect Eradication Section and the Malaria Section. The use of DDT among the measures taken is an innovation as far as anticholera measures are concerned.

Various methods of application were tried :

1. *Fogging* with a 20% solution of DDT in Velsical. The fogging was done by B.T.13 aircraft.
2. *Spraying* with a 10% solution of DDT in kerosene. The spraying was carried out by C/47 aircraft.
3. *Jeep-fogging* with a 7% DDT solution in Malariol.
4. *Spraying* DDT solution by hand-guns and mechanical pumps inside houses and establishments.
5. "*Flitting*" cars, buses and other vehicles at certain road-block stations.

Furthermore, an evaluation of the effectiveness of the B.T.13 aircraft for the control of flies was undertaken by the Insect Eradication Section in four Egyptian villages. As the final report of this experiment is long, only a few of the results obtained can be quoted :

1. There was a general decrease in the fly-population in the treated villages as compared with the control village.
2. The frequency of spraying had little effect on the ultimate reduction of the fly-population.

3. The effect of the spray on the flies was not apparent until approximately 45 minutes after treatment.
4. In open spaces, a kill of 72% of all flies exposed was obtained.
5. In narrow lanes and alleys, a kill of 24.4% of all flies exposed was obtained.
6. In shops and houses, a kill of 44% of all flies exposed was obtained.
7. 48% of all flies exposed were killed.
8. There is a definite correlation between atmospheric temperature and the circulating fly-population.

### Donations

The evils of the cholera epidemic mostly affected the poor. These were already in dire need, and the application of the sanitary measures, *i.e.*, burning of their clothes and destruction of their effects, added to their misery. Hence, many people were sensitive to the affliction of their countrymen and contributed funds, food-stuffs, clothes, etc. for the cholera-stricken. Donations were distributed as follows :

#### 1. *Convalescents and their Families*

(a) A pecuniary grant was given to the convalescent on his discharge from the isolation camp, sufficient to maintain him until he could resume work (about 10 days). Clothes were distributed to him and his family, according to his social status and the decision of the committee concerned.

(b) A pecuniary grant was also given in compensation for any personal effects damaged during disinfection.

#### 2. *Families of the Deceased*

The same arrangement was applied as above, plus a sum equal to one month's income of the deceased.

#### 3. *Patients and their Families*

A pecuniary grant equal to the patient's average daily income was given to his family for the duration of his sickness. On his recovery he was treated as a convalescent.

#### 4. *Burial of the Deceased and Repatriation of Aliens*

Pecuniary grants were paid for the burial of the deceased. Aliens,

on discharge as convalescents, were paid a return passage to their homes, if they so desired.

#### Alert Measures

Once the cholera outbreak abated, a series of alert measures was taken which will continue for a long period. It is not intended here to give more than a brief sketch of these measures :

1. All cases of vomiting and diarrhoea must be dealt with as cholera, until bacteriological examination proves the contrary.
2. All deceased must be examined by a medical officer of health or a sanitary inspector. A swab is to be taken from the rectum in every case.
3. General cleanliness of villages and houses must be enforced.
4. Fever hospitals and isolation units must be ready, on the alert, to receive and treat any case.
5. A continuous search for carriers is to be undertaken.
6. All inhabitants of Egypt to be vaccinated for the second time beginning 15 February 1948.
7. Prevention of pollution of streams is to be insisted upon. The addition of bleaching-powder or chlorine-water is to be carried out in emergencies.

It is interesting to note that the number of swabs taken from deceased persons and examined for cholera during the period from 16 December 1947 to 12 January 1948 was 13,739, and the number of positive findings was 43.

A summary of the scheme of organization is shown in Table VI. It gives the number of medical, sanitary, and nursing staff in each governorate and province in the normal period, the alert state, and in case of emergency, respectively. The table shows also the number of cars, ambulances, isolation and treatment centres, etc., in the three different phases.

### 3. SCIENTIFIC ASPECTS

#### Viability of Cholera Vibrio

The Department of Laboratories carried out researches on the viability of cholera vibrio on different articles and foodstuffs, using fæces from cholera cases in one set of the experiments and cultures in another. The results are shown in Tables VII and VIII.

### Evidence in regard to the Value of Vaccination

While it is difficult to believe that vaccination alone accounts for the complete suppression of the epidemic, there is no doubt that it was of great importance in modifying the general trend of the outbreak and in reducing incidence and mortality. The findings suggest that the epidemic of cholera was finally ended by the large-scale vaccination. Although the autumnal decline characteristic of each previous cholera outbreak in Egypt might have been responsible for the termination of the epidemic, there was convincing evidence that the vaccination had been strikingly successful :

1. Though the present population in Egypt is almost double that of 1902, the recent outbreak produced 20,805 cases with 10,276 deaths and a fatality rate of about 50%, in contrast with 40,613 cases, 34,595 deaths, and an 85% fatality rate in 1902. This means that, in 1947, the gross morbidity-rate was 4 times less and the mortality-rate 7 times less than in 1902, when no vaccination was undertaken.

Moreover, it is desirable to point out that the density of population in 1947 is almost double that of 1902, as the area of inhabited land has not been materially increased.

2. Not only did the over-all incidence begin to fall as soon as the population of the country had been inoculated, but this phenomenon has also shown itself in each individual province or district, in the order of the corresponding date of vaccination.

3. Of interest also is the fact that vaccination partially accounts for the amelioration of the disease in Upper Egypt, where the incidence was much lower than that in Lower Egypt.

4. The final result of the 1947 epidemic was entirely contrary to what might have been expected in view of the easy and rapid means of communication now existing.

5. Finally, the following observation may well be mentioned :

Among 3,648 cases of cholera in eight different fever-hospitals, 396 (*i.e.*, 18.7%) were inoculated and 1,721 (*i.e.*, 81.1%) were non-inoculated. The fatality rate was 26.5% among the inoculated and 42.9% among those non-inoculated. This observation is illustrated in Table IX.

The possible significance of this table is the effect of vaccination in lowering the fatality rate. Indeed, it would seem that there is no reason to doubt the value of vaccination.

#### Carriers

*Convalescent carriers* : Observations were made on a total of 463 cases isolated in four different fever-hospitals, and the following results were obtained :

Minimum period from beginning of illness to last positive specimen, 7 days.

Maximum period from beginning of illness to last positive specimen, 42 days.

There was a wide range of variation in the different groups of patients. Only 0.4% of the cases attained the maximum period (42 days). The extremes of the negative period ranged from 1 to 23 days. The usual negative period was 3–6 days.

Such observations as these are of paramount importance for evaluating properly the epidemiological importance of the carrier problem. Their significance should not be overlooked. The consistently reliable results from this work are in striking contrast to the belief of most workers.

As regards response of convalescent carriers to sulfonamides, observations showed that sulfaguanidine was more effective than sulfacetamide.

*Contact carriers* : 288 carriers were found among 13,702 contacts, giving a rate of 2.1%. Those who developed cholera numbered 95, *i.e.*, 0.6% of the total number of contacts.

For further data on convalescent carriers, contact carriers, and sulfonamides, reference should be made to Tables X–XIII.

*Early isolation* : Table XIV shows the relationship of fatality rate to dates of onset and isolation. The data are based on a study of 691 cases admitted to the Cairo Fever Hospital. Early isolation had a more favourable effect on patients, and this is undoubtedly attributable to early treatment.

#### Relation between Incidence and Sanitation

It is interesting to observe that cholera prevalence as measured by morbidity-rates coincides very closely in distribution and severity of infection with sanitation. It is evident that the disease has failed to establish itself in any of the towns provided with satisfactory sanitary accommodation.

In Alexandria, the very crowded old quarter, where a large number of poor and middle-class people resides, suffered much. The houses in this quarter, which contain the worst slums in the city, leave much to be desired. On the other hand, it is interesting to note that practically no cholera cases occurred in Ramleh, which is the best quarter in the city and mostly the residence of the rich and more enlightened. Its sanitation attains a very high level.

The incidence of cholera was highest in farms and lowest in towns. This was due to higher standards of living and education, and better hygienic conditions, in towns as compared with villages and farms. Absence of administrative machinery in the case of small farms also played a part.

#### 4. CHOLERA HYSTERIA

During the epidemic, restrictive measures far exceeding the provisions of the international sanitary conventions were taken. Certain countries, and not always those at risk, actually closed their frontiers to all passengers and goods coming from Egypt. One country, after a short interval, abruptly forbade admittance to passengers and even mail from Egypt. Another, after requiring sea and air traffic from Egypt to call at specified places, ended by suspending all such traffic. A third country prohibited the importation of all foodstuffs, not only from Egypt, but from eight countries "threatened" with cholera. Other countries prohibited not only foodstuffs, but also Egyptian cotton, forgetting the fact that they had been importing for years jute from Bengal and rice from China and Indo-China, the main endemic and epidemic centres of cholera, without any evil consequence.

It seems that what had happened was not an application of existing conventions, but a partial return to the "quarantine of the jungle", as the *Lancet* called it.

International control, as provided for in the conventions, ought not to be set at naught and disregarded on the principle of each country for itself. This lesson must be studied carefully when the Interim Commission's Expert Committee on International Epidemic Control comes to revise the conventions.<sup>1</sup>

---

<sup>1</sup> The Expert Committee on International Epidemic Control held its first session in Geneva from 12 to 17 April. Its report was issued for consideration by the First World Health Assembly. — ED.

The problem of primary importance in the epidemiology of cholera is the existence of areas in which cholera is permanently present. These endemic centres form a menace to adjoining areas, for which they constitute a continuous reservoir of infection. The areas in which cholera is endemic are few in number and limited to certain parts of India and China. The major true endemic centres are lower Bengal and the Yangtse Valley. Other probable endemic areas are a portion of central and southern Madras, Burma and the Philippines.

Cholera is eminently a controllable disease. A high degree of success has been attained in preventing its spread from the endemic areas by the application of quarantine and other sanitary measures. Formerly epidemics were frequent, but they are now much rarer, although sometimes a breakdown of control occurs, as in the case of Egypt's recent epidemic.

It is obvious that the point at which preventive measures should be applied is the area from which infection is primarily derived—that is, in the endemic areas.

The application of a long-term policy of sanitary improvement in the known endemic areas, especially directed towards dealing with the factors concerned in the maintenance and spread of cholera, would in time result in a great reduction of risk, and might even succeed in eventually eliminating infection altogether. If such a policy were adopted by the World Health Organization, cholera might be eradicated in the same way as certain species of vectors have been eradicated from some countries.

## 5. CONCLUSION

It was inspiring to witness the generous responses made by States and private organizations, in many cases unsolicited, to the needs of Egypt during the emergency.

The American National Red Cross generously donated 2,500 litres of blood plasma and the United States War Assets Administration made available one million sulfaguanidine tablets at a cost of 4.5 dollars, instead of 7.85, per 1,000 tablets. Through the courtesy of the Mayor of the City of New York, 3,000 syringes were made available on loan.

The British Government presented 12 ambulances, a great help in the outbreak. Many other donations were made by foreign institutions.

A tribute of homage should be paid to the World Health Organization Interim Commission. The aid given by this Commission is beyond all praise. Its New York Office was able to make all purchases at very low prices, and thereby saved the Government of Egypt a considerable amount of money without sacrifice of quality of materials or rapidity of shipment. The initial price of cholera vaccine quoted in the USA was between 8 and 10 cents per ml. In Europe it ranged up to 10 cents, the lowest price quoted being 3½ cents, but the Interim Commission was able to bring the price down to 2 cents per ml. The first price quoted by the commercial air-lines for transportation was 1.5 dollars per pound (0.45 kg.) of cargo, and this was later reduced to one dollar. Such details deserve to be mentioned so as to put before the entire world a demonstration of international goodwill and aid. People discouraged by reports of dissension among different States may thus become more aware of the tremendous potentiality of the World Health Organization and of the great opportunities of progress through international co-operation.

---

**Table I**  
**TOTAL NUMBERS OF CHOLERA CASES AND DEATHS AND ISOLATION HOSPITALS**

Province or governorate	Population (1947 Census)	Cholera cases	Cholera deaths	Isolation hospitals
Cairo . . . . .	2,100,486	126	32	4
Alexandria . . . . .	928,237	183	78	3
Frontiers . . . . .	216,872	5	3	—
Port Said . . . . .	178,432	37	4	1
Suez . . . . .	108,250	31	5	1
Ismailia . . . . .	132,810	234	149	2
Damietta . . . . .	124,104	302	156	2
Deheira . . . . .	1,242,478	1,470	764	17
Gharbiya . . . . .	2,316,619	4,599	1,958	39
Minufiya . . . . .	1,168,777	1,816	644	22
Dakahliya . . . . .	1,366,085	4,939	2,955	27
Sharqiya . . . . .	1,290,890	4,089	2,141	12
Kalyubiya . . . . .	687,169	1,099	385	7
Giza . . . . .	822,424	260	70	3
Faiyûm . . . . .	671,885	512	296	6
Beni Suef . . . . .	613,365	676	389	7
Minya . . . . .	1,061,417	10	8	—
Asyût . . . . .	1,379,875	35	13	3
Girga . . . . .	1,288,425	131	70	5
Kena . . . . .	1,106,296	250	157	5
Aswan . . . . .	285,551	—	—	—
<b>Total . . . . .</b>	<b>19,090,447</b>	<b>20,804</b>	<b>10,277</b>	<b>166</b>

**Table**  
**WEEKLY DISTRIBUTION OF**  
(C= Cases ;

Province or governorate	Population	Number of cholera cases									
		39		40		41		42		43	
		C	D	C	D	C	D	C	D	C	D
Cairo .....	2,100,486	11	2	21	7	32	7	23	6	16	7
Alexandria .....	928,237	—	—	—	—	—	—	39	20	59	23
Frontiers .....	216,872	—	—	2	2	—	—	—	—	—	—
Port Said .....	178,432	—	—	2	—	3	2	9	—	10	1
Suez .....	108,250	6	1	4	—	—	—	1	1	8	1
Ismailia .....	132,810	36	21	45	36	47	20	50	35	31	21
Damietta .....	124,104	—	—	—	—	17	7	112	39	97	58
Beheira .....	1,242,478	—	—	—	—	10	5	267	84	435	212
Gharbiya .....	2,316,619	—	—	4	4	117	26	979	363	1,703	674
Minufiya .....	1,168,777	2	—	8	—	31	6	505	150	688	222
Dakahliya .....	1,366,085	25	7	56	24	611	243	1,619	866	1,650	1,126
Sharqiya .....	1,290,890	368	86	507	253	645	289	1,052	593	769	480
Kalyubiya .....	687,169	89	42	240	54	80	33	208	76	213	65
Giza .....	822,424	17	—	2	—	8	—	19	2	14	5
Faiyûm .....	671,885	—	—	—	—	—	—	—	—	—	—
Beni Suef .....	613,565	—	—	—	—	—	—	89	39	316	134
Minya .....	1,061,817	—	—	—	—	—	—	—	—	—	—
Asyût .....	1,379,875	—	—	—	—	—	—	—	—	17	2
Girga .....	1,288,425	—	—	—	—	—	—	—	—	—	—
Kena .....	1,106,296	—	—	—	—	—	—	7	—	6	3
Aswan .....	285,551	—	—	—	—	—	—	—	—	—	—
Total .....	19,090,447	554	159	891	380	1,601	638	4,979	2,274	6,032	3,034

II

CHOLERA CASES AND DEATHS

D = Deaths)

and deaths in weeks 39-52																		Total number of	
44		45		46		47		48		49		50		51		52		Cases	Deaths
C	D	C	D	C	D	C	D	C	D	C	D	C	D	C	D	C	D		
8	2	7	1	4	0	2	0	1	0	0	0	0	0	—	—	1	—	126	32
63	25	10	3	8	3	3	1	1	3	—	—	—	—	—	—	—	—	183	78
3	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	5	3
8	—	4	—	1	1	—	—	—	—	—	—	—	—	—	—	—	—	37	4
12	2	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	31	5
19	12	6	1	—	2	—	1	—	—	—	—	—	—	—	—	—	—	234	149
61	43	12	6	1	2	2	1	—	—	—	—	—	—	—	—	—	—	302	156
485	306	225	123	39	27	6	4	1	2	—	1	2	—	—	—	—	—	1,470	764
1,358	628	389	215	41	40	5	4	1	2	1	1	1	1	—	—	—	—	4,599	1,958
420	152	118	70	31	26	13	14	—	4	—	—	—	—	—	—	—	—	1,816	644
681	518	254	136	39	30	4	3	—	2	—	—	—	—	—	—	—	—	4,939	2,955
495	298	186	109	47	26	8	4	8	2	2	—	1	—	1	1	—	—	4,089	2,141
176	66	63	30	24	10	6	9	—	—	—	—	—	—	—	—	—	—	1,099	385
111	30	57	22	22	7	5	4	5	—	—	—	—	—	—	—	—	—	260	70
75	39	281	131	97	76	24	23	21	21	9	5	3	1	2	—	—	—	512	296
182	133	80	74	7	9	1	—	1	—	—	—	—	—	—	—	—	—	676	389
—	—	9	7	1	1	—	—	—	—	—	—	—	—	—	—	—	—	10	8
12	5	5	5	1	1	—	—	—	—	—	—	—	—	—	—	—	—	35	13
22	11	54	29	49	22	4	5	—	1	—	2	2	—	—	—	—	—	131	70
27	12	137	87	68	47	2	6	3	2	—	—	—	—	—	—	—	—	250	157
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
4,218	2,283	1,897	1,049	480	330	85	79	42	39	12	9	9	2	3	1	1	—	20,804	10,277

**Table III**  
**NUMBER OF SPECIMENS EXAMINED IN THE LABORATORIES**  
**DEPARTMENT**

Laboratory	Cases and deaths		Convalescents		Contacts	
	Positive	Negative	Positive	Negative	Positive	Negative
Central Laboratory . . .	3,518	16,895	262	11,562	237	19,779
Port Said Laboratory	103	359	10	776	5	667
Suez Laboratory . . . . .	44	129	17	27	30	623
Mansoura Laboratory ,	50	540	70	6,949	8	2,848
Tanta Laboratory . . . .	1,099	3,560	877	9,454	4	2,432
Faiyûm Laboratory . . .	337	865	17	987	176	10,029
Minya Laboratory . . . .	108	317	11	151	34	2,986
Asyût Laboratory . . . .	137	531	8	304	151	3,351
Luxor Laboratory . . . .	13	389	—	301	2	1,878
Fever Hospital Labor- atory . . . . .	269	4,505	6	375	34	7,873
Total . . . . .	5,678	28,090	1,278	30,886	681	52,466

Grand total : 119,079

**Table IV**  
**STAFF AND MEANS OF TRANSPORT BEFORE AND DURING**  
**THE EPIDEMIC**

**A. Staff**

Staff	Before	During
Doctors . . . . .	390	930
Veterinary doctors. . . . .	—	25
Sanitary inspectors . . . . .	288	479
Laboratory assistants . . . . .	8	384
Nursing staff . . . . .	90	820
Other personnel (disinfectors, etc). .	1,004	1,108

**B. Means of transport**

Type of transport	Before	During
Transport cars . . . . .	45	170
Lorries. . . . .	33	196
Ambulances . . . . .	39	177

**Table V**  
**NUMBER OF TREATMENT CENTRES IN INFECTED PROVINCES**

Province or governorate	September	October	November	December
Canal Governorate . . . . .	1	2	2	2
Damietta . . . . .	—	2	2	2
Suez. . . . .	1	1	1	1
Kalyubiya . . . . .	4	6	6	6
Sharqiya . . . . .	6	12	12	12
Dakahliya . . . . .	3	15	27	27
Minufiya . . . . .	—	15	22	22
Gharbiya. . . . .	—	29	39	39
Beheira . . . . .	—	10	17	17
Giza . . . . .	—	2	3	3
Beni Suef . . . . .	—	6	7	7
Faiyûm . . . . .	—	4	6	6
Asyût . . . . .	—	2	3	3
Girga . . . . .	—	3	5	5
Kena . . . . .	1	3	6	6
<b>Total . . . . .</b>	<b>16</b>	<b>112</b>	<b>158</b>	<b>158</b>

Table

## SUMMARY OF THE SCHEME

(N = Normal state ; A = Alert ;

Province or governorate	Population 1947 (census)	Villages	Health offices	Senior staff <sup>1</sup>			Medical officers of health			Sanitary inspectors		
				N	A	E	N	A	E	N	A	E
Cairo city . . . . .	2,100,486		22	4	8	9	28	28	44	34	49	59
Alexandria . . . . .	928,237		11	4	6	9	21	24	49	12	20	38
Beheira . . . . .	1,242,478	402	27	3	5	5	25	28	28	29	29	29
Gharbiya . . . . .	2,316,619	598	48	5	7	7	45	45	45	39	39	39
Minufiya . . . . .	1,168,777	320	25	5	3	4	25	25	25	29	29	29
Dakahlia . . . . .	1,366,085	425	30	5	4	5	24	24	31	27	26	30
Sharqiya . . . . .	1,290,890	401	32	4	4	4	28	32	32	29	29	29
Kalyubiya . . . . .	687,169	177	20	2	3	3	20	20	20	14	14	14
Damietta . . . . .	124,104	14	2	1	2	2	1	2	2	3	3	3
Port Said and Ismailia	311,242	36	5	2	2	2	5	5	5	5	6	6
Suez . . . . .	108,250	2	2	1	1	2	1	2	3	2	2	6
Giza . . . . .	822,424	176	19	5	3	4	16	19	19	18	18	23
Faiyûm . . . . .	671,885	164	10	4	4	4	10	10	14	7	10	12
Beni Suef . . . . .	613,365	187	12	4	3	3	9	12	12	10	20	20
Minya . . . . .	1,061,417	303	21	2	3	3	21	22	22	19	21	21
Asyut . . . . .	1,379,875	349	33	2	4	4	26	34	34	24	24	34
Girga . . . . .	1,288,425	276	20	3	4	4	20	20	20	9	16	16
Kenâ . . . . .	1,106,296	215	22	3	4	4	18	22	22	11	13	13
Aswan . . . . .	285,551	78	10	1	3	3	8	10	10	6	7	7
Total . . . . .	18,873,575	4,123	371	60	73	81	351	384	437	327	375	428

<sup>1</sup> In case of epidemic, senior staff from the central administration are delegated to supervise certain areas

VI

OF ORGANIZATION

E = during an epidemic)

Cars			Lorries			Ambulances			Isolation and treatment centres			Disinfectors			Areas		Units <sup>2</sup>	
N	A	E	N	A	E	N	A	E	N	A	E	N	A	E	A	E	A	E
7	7	53	18	18	40	10	10	30	2	2	6	80	80	200	8	9	—	—
3	7	30	26	26	46	10	10	30	1	1	7	61	61	302	6	9	—	—
2	45	61	5	5	30	5	5	35	11	11	32	60	60	220	5	5	53	53
3	54	84	13	13	53	16	16	48	29	29	44	141	141	334	7	7	76	76
3	30	58	9	9	15	10	10	24	11	11	23	57	57	100	3	4	46	54
7	10	56	11	11	23	25	25	30	6	6	27	132	132	250	4	5	46	61
6	34	61	6	6	16	7	7	30	19	19	28	133	133	250	4	4	48	57
2	25	35	4	4	10	6	6	26	3	3	12	62	62	145	3	3	33	33
1	3	6	0	0	3	3	3	4	2	2	3	16	16	25	2	2	4	4
2	3	10	1	1	4	6	6	7	4	4	6	33	33	50	2	2	8	8
1	2	11	1	1	4	2	2	5	1	1	4	13	13	40	1	2	4	9
1	15	32	3	3	10	4	4	16	8	8	16	40	40	120	3	4	19	27
3	8	30	9	9	14	13	13	22	9	9	20	51	51	112	4	4	20	26
3	18	35	10	10	10	8	8	16	5	5	16	71	71	140	3	3	32	32
8	28	46	10	10	17	8	8	16	14	14	32	29	29	172	3	3	43	43
1	25	47	12	12	20	6	6	16	11	11	30	34	34	190	4	4	43	43
0	17	36	15	15	15	4	4	24	13	13	30	59	59	273	4	4	36	36
1	26	40	4	4	14	5	5	20	14	14	33	20	20	120	4	4	35	35
2	14	23	1	1	6	5	5	10	3	3	9	13	13	75	3	3	17	17
56	371	754	158	158	350	153	153	409	166	166	378	1,105	1,105	3,118	73	81	563	614

<sup>2</sup> Health districts are divided into units for supervision of deaths and cases

Table VII

**VIABILITY OF CHOLERA VIBRIO ON DIFFERENT ARTICLES  
CONTAMINATED WITH FÆCES FROM PATIENTS**

Article	1 hour	3 hours	7 hours	1 day	2 days	3 days	4 days
Cotton (pure) . . . . .	+	+	+	+	+	—	—
„ (raw) . . . . .	+	+	+	+	+	+	—
Onion (outside) . . . . .	+	+	+	+	+	—	—
„ (inside) . . . . .	+	+	+	+	+	+	—
Garlic (outside) . . . . .	+	+	+	+	—	—	—
„ (inside) . . . . .	+	+	+	+	+	—	—
Orange (skin) . . . . .	+	+	—	—	—	—	—
„ (inside) . . . . .	+	—	—	—	—	—	—
Lemon (skin) . . . . .	+	+	—	—	—	—	—
„ (inside) . . . . .	+	—	—	—	—	—	—
Coin . . . . .	+	+	+	—	—	—	—
Postage stamp . . . . .	+	+	+	+	—	—	—
Bank-note . . . . .	+	+	+	+	+	—	—
Cloth . . . . .	+	+	+	+	+	+	—
Sugar . . . . .	+	+	+	+	+	+	—
Rice . . . . .	+	+	+	+	+	—	—
Lentils . . . . .	+	+	+	+	+	—	—
Grapes (outside) . . . . .	+	+	+	+	+	—	—
Dates (outside) . . . . .	+	+	+	+	+	—	—
„ (inside) . . . . .	+	+	+	+	+	+	—
Bread . . . . .	+	+	+	+	+	—	—

Table VIII

**VIABILITY ON DIFFERENT ARTICLES OF CHOLERA  
VIBRIO FROM CULTURES**

Article	1 hour	2 hours	7 hours	1 day	2 days
Sour milk . . . . .	+	—	—	—	—
White cheese . . . . .	+	+	—	—	—
Rice . . . . .	+	+	+	—	—
Lentils . . . . .	+	+	+	—	—
Honey . . . . .	+	+	+	+	—
Halwa . . . . .	+	+	+	+	—
Milk in refrigerator . . . . .	+	+	+	+	+
Butter . . . . .	+	+	+	+	+

**Table IX**  
**FATALITY RATES OF INOCULATED AND NON-INOCULATED**  
**CHOLERA CASES IN EIGHT FEVER HOSPITALS**

Fever hospital	Total cases	Total deaths	Percentage of deaths	Inoculated				Non-inoculated			
				Cases	% of total cases	Deaths	Percentage	Cases	% of total cases	Deaths	Percentage
Cairo . . . . .	569	83	14.5	158	27.7	12	7.6	411	72.3	71	17.2
Tanta . . . . .	889	319	35.8	113	13.4	48	42.5	730	86.6	342	46.8
Damanhour . . . . .	843	390	46.2	35	29.2	8	22.8	85	70.8	36	42.3
Minya . . . . .	120	44	36.6	47	16.5	8	17.0	237	83.5	160	67.5
Fayûm . . . . .	642	276	42.9	23	38.3	9	39.1	37	61.7	23	62.2
Ismailia . . . . .	284	168	59.2	20	8.3	20	100.	221	91.7	107	48.4
Beba . . . . .	60	32	53.3								
Beni Suef . . . . .	241	107	44.3								
<b>Total . . . . .</b>	<b>3,648</b>	<b>1,419</b>	<b>38.8</b>	<b>396</b>	<b>18.7</b>	<b>105</b>	<b>26.5</b>	<b>1,721</b>	<b>81.3</b>	<b>739</b>	<b>42.9</b>

**Table X**  
**DURATION OF CARRIER-STATE IN CONVALESCENTS**

Positive up to	Cairo		Zagazig		Tanta		Alexandria		Mean %
	Number	%	Number	%	Number	%	Number	%	
5 days of illness . . .	66	26.4	5	17.2	0		44	45.8	24.8
10 days of illness . . .	98	39.2			6	6.8	41	42.7	31.3
15 days of illness . . .	51	20.4	15	51.7	15	17.0	6	6.3	18.7
20 days of illness . . .	19	7.6	5	17.2	25	28.4	2	2.1	11.0
25 days of illness . . .	13	5.2			19	21.6	0	0	6.9
30 days of illness . . .	2	0.8	4	13.8	14	15.9	2	2.1	4.7
35 days of illness . . .	1	0.4			5	5.7	0	0	1.3
40 days of illness . . .					2	2.3	1	1.0	0.6
42 days of illness . . .					2	2.3	0	0	0.4
<b>Total . . . . .</b>	<b>250</b>		<b>29</b>		<b>88</b>		<b>96</b>		

*Observations :*

Minimum period : 3 days (in Alexandria)

Maximum period : 42 days (in Tanta)

**Table XI**  
**RESPONSE TO SULFONAMIDES OF 88 CONVALESCENT CARRIERS IN TANTA**

Treatment	Number treated	Positive once only		Positive more than once	
		Number	%	Number	%
Sulfaguanidine . . . . .	49	38	77.6	11	22.4
Sulfacetamide . . . . .	8	2	25.0	6	75.0
No sulfonamides . . . . .	31	4	12.9	27	87.1

*Observations :*

Minimum period from beginning of illness to last positive specimen . . . 7 days

Maximum period from beginning of illness . . . . . 42 days

Minimum negative period . . . . . 1 day

Maximum negative period . . . . . 23 days

Usual negative period . . . . . 3-6 days

**Table XII**  
**CONTACT CARRIERS IN NINE FEVER HOSPITALS**

Fever hospital	Number of contacts	Number developing cholera	Percentage developing cholera	Number of carriers	Percentage of carriers
Cairo . . . . .	2,037	0	0	84	4.1
Embaba . . . . .	600	0	0	16	2.6
Alexandria . . . . .	4,720	0	0	57	1.2
Beheira . . . . .	176	3	1.7	2	1.1
Ismailia . . . . .	350	18	5.1	0	0
Zagazig . . . . .	230	0	0	5	2.1
Faiyûm . . . . .	4,596	63	1.3	112	2.4
Beni Suef . . . . .	728	0	0	12	1.6
Beba . . . . .	265	11	4.1	0	0
Total . . . . .	13,702	95	0.6	288	2.1

**Table XIII**  
**DURATION OF CARRIER-STATE IN CONTACTS**

Positive	Cairo		Alexandria		Mean %
	Number	%	Number	%	
5 days . . . . .	42	50	51	89.5	65.9
10 days . . . . .	35	41.7	4	7.0	27.7
15 days and upwards . . . . .	7	8.3	2	3.5	6.4
Total . . . . .	84		57		

*Observation* : Maximum period (in Alexandria) : 19 days

**Table XIV**  
**FATALITY RATE IN RELATION TO DATES OF ONSET AND ISOLATION**  
(Cairo Fever Hospital)

	Cases	Deaths	Percentage
Total . . . . .	691	119	17.2
Days of illness before isolation :			
1 day . . . . .	300	28	9.3
2 days . . . . .	168	30	18.0
3 days . . . . .	101	26	25.7
4 days . . . . .	74	28	37.8
More than 4 days . . . . .	48	7	14.6