ARAB REPUBLIC OF EGYPT

INVESTMENT AND FREE ZONES AUTHORITY

Sectoral Survey 5

PHARMACEUTICALS AND HEALTH CARE PRODUCTS IN EGYPT

1982

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PREFACE

This report is one of a series published by the General Authority for Investment and Free Zones and designed specifically to promote the participation of U.S. companies in investment projects in Egypt.

Funded by the U.S. Agency for International Development (U.S. AID) and prepared by the Chase World Advisory Group of Chase Trade Information Corporation, these reports focus on sectors of the Egyptian economy that offer the foreign investor specific investment opportunities in significant areas of the Egyptian economy ranging from pharmaceuticals and health care; the processing and distribution of food crops; the production and processing of livestock, poultry, and fish products; to construction materials, components, and systems; and electrical and electronic machinery.

There are ten reports in all. This fifth report, on the Egyptian pharmaceutical and health care industry, was prepared under the direction of Dr. Leland J. Kitchen, former Vice President, Technical Services, Health and Personal Care Division, Chase Manhattan Bank, N.A.

INTRODUCTION

The government of Egypt has a constitutional responsibility to provide health care services to its people at a cost they can afford. Accordingly, much of the country's health care system is under the direction of the Ministry of Health, including the manufacturing, packaging, purchasing, and distribution of many pharmaceuticals and health care and personal hygiene supplies as well as supplies and equipment for use by physicians, hospitals, and clinics.

The Ministry's basic goal is to provide "health for all by the year 2000." To achieve that goal will require substantial investments in all aspects of health and health care delivery systems. In many cases, foreign technology will be required and encouraged through joint ventures with Egyptian public and private sector organizations.

Following Chapter 1, an Executive Summary, Chapter 2 of this report examines the government health care program and its goals. Chapters 3 through 6 examine the pharmaceutical industry in Egypt: its structure, government regulatory policies and procedures, the market for pharmaceutical products, and opportunities for joint ventures to produce

pharmaceuticals in the country.

Chapters 7 and 8 examine, respectively, the supply and demand for hospital and medical supplies and for animal health products. A final chapter summarizes a number of potential joint-venture opportunities which may be of interest to U.S. investors.

1. EXECUTIVE SUMMARY

The Demand for Pharmaceuticals

The improvement of health and the country's health care delivery system has been given high priority by the Egyptian government. The objective is "health for all by the year 2000."

Demand for pharmaceuticals and medical products is growing rapidly. Sales of pharmaceuticals in 1980 were $385 million (L.E. 267 million, up from L.E. 60 million in 1973). On the basis of population and economic trends, strong growth is expected in the next several years and beyond if the goals for the year 2000 are to be met. Egypt's population by the end of 1981 is estimated at 43 million. Of this number, 51 percent is below age 20; 9 percent is over age 55; and 40 percent is between the ages of 20 and 55.

The entry of a growing percentage of the adult population into the work force and the improvement in job status and economic level of those already in the work force has contributed to the growing demand for pharmaceuticals in Egypt. Even so, almost all Egyptians are now consumers of pharmaceuticals because government programs make the basic "essential drugs" available either at low cost or free of charge.

Anti-infective agents--antibiotics, anthelmintics, sulfa drugs, and the like--account for 31 percent of the pharmaceutical market. This sector is likely to show very rapid growth in the near future as the Ministry of Health accelerates its program to combat bilharziasis (snail infection), diarrhea, and other infective diseases.

The Egyptian Pharmaceutical Industry

Egypt's well-developed pharmaceutical manufacturing industry has developed over the past 42 years. The industry is closely regulated by the Egyptian government, which is striving to make the country self-sufficient in the production of dosage forms.

Approximately 90 percent of Egypt's pharmaceutical needs are now produced domestically. Because almost all Egyptian plants are operating at close to capacity, satisfaction of the projected increased demand for pharmaceuticals will have to come from larger imports of finished dosage forms and from increased domestic production capacity and productivity, including the establishment of new plants.

The Egyptian government is receptive to the entry of foreign pharmaceutical companies that can provide

technology. Although, at present, it does not seem feasible for U.S. companies to establish wholly owned subsidiaries, technology transfer via licenses and joint ventures are welcome.

Despite the fact that Egypt has long been a country which consumes medicines and in which the self-administration of medicines is popular, the first company to manufacture dosage forms of conventional modern drugs was established only in 1939. The Egyptian pharmaceutical industry is now comprised of 15 companies, 12 of which manufacture dosage forms. Several new companies are in formative stages. Eleven of the 15 pharmaceutical companies are "public sector" companies--that is, government-owned. One of the four private sector companies is completely owned by the U.S. Squibb Corporation. The other three private companies are minority-owned by the government and local investors and 60 percent majority-owned by foreign companies, including Pfizer, Hoechst, and Sandoz and Ciba-Geigy, which participate jointly in Swiss-Pharma. A fourth joint-venture company, with Bayer as the foreign partner, is likely to be started in the near future.

The eight public sector companies which

manufacture dosage forms are:

- El Kahira
- Memphis
- The Arab Company
- C.I.D.
- Misr
- El Nil
- Alexandria Company
- El Nasr

Although El Nasr is predominately a chemical manufacturing company which produces pharmaceutical active ingredients, it also makes dosage forms.

Three other public sector companies are involved in the pharmaceutical industry:

- El Gomhouria Company, which imports the active ingredients used to manufacture dosage forms in Egypt
- Egydrug, a wholesale drug distributor which distributes many of the drugs manufactured in Egypt and imports finished drugs which are not manufactured in Egypt
- Medical Packing Company, which manufactures packaging materials used by the public sector firms

Government Regulation of the Pharmaceutical Industry

The pharmaceutical industry in Egypt is closely regulated by the government, particularly in regard to pricing. Prices were rolled back in 1962. In 1977, a 30 percent increase restored prices on established drugs almost to the 1961 level. The prices of older drugs, particularly those considered "essential drugs," are therefore low when compared to the pricing of similar items in the United States and Western Europe. Government policy requires that drugs be priced low in order to make them readily available to the public.

These limitations on pricing constitute the biggest problem facing foreign pharmaceutical companies operating or considering operation in Egypt. It should be noted, however, that, in recent years, some of the price allowances have been relatively liberal.

Despite the fact that the Egyptian pharmaceutical industry is, with limited imports of new drugs, in good shape to meet current demand, the anticipated future demand for pharmaceuticals in Egypt will require a significant increase in production capacity. This can be achieved by modernizing public sector facilities that are obsolete and inefficient and by organizing several joint-venture companies that would bring in new

foreign participants with modern technology.

Hospital and Medical Products

Supplies of hospital and medical products are inadequate. The quality of locally produced products is often below international standards. Imported products are expensive, often because of the excessively high tariffs that are imposed to protect local production.

Products, such as surgeon's rubber gloves, that are intended to be single-use disposables, are frequently reused or substituted for. Similarly, hypodermic needles are often reused, frequently causing infection from hepatitis.

What Egypt requires is an entirely new industry for the manufacture of hospital products, an industry that would utilize modern technology from the United States or Western Europe through joint ventures and/or through licensing arrangements. In order to engender confidence in all potential Egyptian markets as well as those of neighboring countries such as Sudan, it is essential that the manufacture of hospital items employ the latest technology and meet the highest production standards.

It should be noted that there are fewer price controls on hospital products than on pharmaceuticals.

Personal Care Products

Cosmetics and personal care products are popular in Egypt, and demand is growing. Because most of these products are considered nonessential items, the entry of foreign firms into this industry is not encouraged. Although this area does present attractive opportunities for the licensing of trade-name products for production by Egyptian firms, because of the limited number of joint-venture opportunities for production, this field has been excluded from this survey.

Animal Health Products

The market for animal and poultry health products is expanding as government veterinary programs expand and large-scale commercial poultry and livestock operations play a more important role in the economy. Although several Egyptian pharmaceutical factories are producing veterinary pharmaceuticals, antibiotics and other animal pharmaceuticals have a small and fragmented market.

The active ingredients used in the animal health field are now imported. It is possible that sufficient demand exists, or will soon exist, to support the local manufacture of several of these ingredients.

Although most veterinary vaccines are imported, some are produced in Egypt under the control of the Animal Health Research Institute of the Ministry of Agriculture. The quantities produced fall far short of requirements, however, and in some cases, quality control needs to be improved.

A Summary of Investment Opportunities

The "Open Door" policy and the government commitment to the improvement of health care provide numerous opportunities for U.S. companies to participate in the Egyptian health care industry. These include:

o Production of all types of hospital and medical supplies, particularly plastic and other disposable products

- Surgeon's rubber gloves
- Adhesive tape
- Plaster of paris bandages
- Sutures of all types
- Germicidal scrub solution
- Operating-room face masks
- Thermometers
- Splints, supports, and braces (elbow, back, shoulder, neck, abdominal, etc.)
- X-ray film
- Glass and plastic bottles (of quality suitable for machine filling)
- Needles of all types (hypodermic, suture, intravenous, blood-collecting)
- Hard gelatin capsules
- Plastic products: catheters, cannulas, intravenous infusion sets, blood-collecting bags, blood-transfusion

sets, urine-collecting bags, enema-administration sets, drainage sets, etc.
  - Condoms
  - Razor blades

- Production of medical-grade minerals from indigenous deposits (talc and plaster of paris)
- Hospital management
- Production of baby foods
- Production of new pharmaceuticals, particularly in joint ventures with public sector companies where the foreign partner can introduce new products and technology

2. THE GOVERNMENT HEALTH CARE PROGRAM

Government Goals and Strategy

The Egyptian government has placed a high priority on the improvement of the country's health and its health care delivery system. Under the 1980-1984 Five-Year-Plan, the Ministry of Health is investing L.E. 507.9 million for the improvement of health care services. This includes L.E. 90.0 million in subsidies to the public sector pharmaceutical companies.

The government's objective is "health to all by the year 2000." This objective and the strategy to implement it were developed in line with recommendations made in 1977 by the World Health Organization (WHO). In December 1979, in its Memo Number 7, entitled "The Strategy for Health in Egypt for the Year 2000," the Egyptian Ministry of Health announced that the implementation of its program would include an "Open Door" policy to encourage private-sector and foreign investment in the health care sector.

The following list of the strategy and goals for health care delivery in the year 2000 was updated in Publication No. 13 (April 1981), entitled "Health for All by the Year 2000:"

1. Adequate health care delivery is a human right

and must be within the reach of each individual, irrespective of any socio-economic or other constraints.

2. Health insurance should cover a broader sector of the population (at least 80 percent) in a practical way, modified for the needs of each sector.
3. Health care delivery is investment, and all plans, whether industrial or agricultural, should consider the health of participating manpower.
4. Local governorates will participate in the establishment of health services and their running expenses.
5. Preventive services are the responsibility of the government.
6. All facilities for health care delivery are potential sources for medical and paramedical education, training, and research. The various health care facilities should coordinate their activities with a view to more efficient utilization.
7. In view of the population problem, maternity and child health as well as family planning

have high priority.

8. Medical and paramedical practices should be regulated through adequate registration, control, and follow-up, with emphasis on medical professional ethics.
9. The planned and programmed budget system (P.P.B.S.), based on a study of health economics and management by objectives, should be used.
10. In health plans, priority should be given to:
    - o Basic health services
    - o Sectors and areas deprived of services
    - o Preventive, ambulatory, and emergency services
    - o Incomplete previous investments
11. A satisfactory data base of health statistics, with continuous updating through a national health profile, should be established.
12. There should be a continuous review of health legislation.

The goals and objectives of the nation's health strategy should therefore focus on:

- o Increasing health awareness, especially among vulnerable groups such as school children and

the target population for family planning and the control of communicable diseases. Leaders should be more aware of the importance of health to the national welfare.

- o A steady and continuous decline in the birth rate and the reduction of infant mortality rates.

Government Health Programs

To achieve the goals listed above, the government notes that the following programs must be implemented.

1. The prevention of communicable and infectious diseases
   - o Eliminating all quarantinable diseases
   - o Eradicating preventable diseases, especially tetanus, diphtheria, whooping cough, poliomyelitis, and measles, through mass vaccination
   - o Eliminating the three main endemic diseases--bilharziasis (snail infection), ankylostomiasis (disease of joints), and ascariasis (intestinal worms)--in endemic areas
   - o Lowering the rate of the incidence of tuberculosis to under one percent per year

2. Environmental sanitation

   - o Giving environmental health high priority among preventive health services
   - o Lowering the rate of incidence of industrial diseases, including those related to agriculture
   - o Controlling the safety of imported and locally produced food products with strict supervision of production, transportation, and consumption

3. Curative services, emergencies, and rehabilitation

   - o Improving the available curative services and achieving a bed occupancy rate of not less than 90 percent
   - o Improving the utilization of available services, preferably by using more than one shift per day
   - o Completing projects already underway
   - o Making first aid available at work, at home, and on the street; making available appropriate facilities for intensive care
   - o Providing care to the disabled and handicapped

- o Providing home ambulatory care for diseases with social impact, such as tuberculosis, leprosy, and mental illness

4. Developing health manpower
   - o Satisfying the nation's need for health manpower, with emphasis on quality and the efficient distribution of various medical specialties
   - o Providing continuous training and postgraduate education
   - o Documenting principles of medical and paramedical ethics
5. Developing a health information system
   - o Making health information available to all individuals interested and involved in health planning and management
6. Establishing health legislation
   - o Ensuring that health legislation states clearly the obligations and commitments of both supplier and consumer
7. Utilizing offers of foreign aid and cooperation
   - o Making full use of the present open policy to support the public and private sectors

8. Defining the role of the pharmaceutical industry

- o Encouraging the pharmaceutical industry and considering it a non-profit investment
- o Regulating methods of prescribing pharmaceuticals
- o Establishing a system to produce and import pharmaceuticals at reasonable prices

Hospitals and Health Care Delivery

The Ministry of Health, which has a strong presence in Egypt's health care delivery system, controls 75 percent of the country's hospital beds. As of mid-1981, the total number of beds had risen to 82,500, including 5,246 in the private sector and 4,000 in the health insurance organization. Medical services at nominal fees are available to all citizens in public government hospitals.

Table 2-1

AVAILABILITY OF HOSPITAL BEDS IN EGYPT, 1979

Location of Beds	Number of Beds
Ministry of Health hospitals	57,159
Other government hospitals	12,260
Public medical units and private hospitals	10,975
TOTAL	80,394

Source: Central Agency for Public Mobilization and Statistics, 1980.

Many Egyptian hospitals require expansion and modernization. There are therefore significant opportunities for the hospital management industry. For example, at the newly constructed 300-bed As-Salam Hospital in Maadi, Cairo, American Medical International has a development and long-term management contract. A similar arrangement exists at the Cairo Medical Center in Heliopolis.

The government program to improve the health care delivery system is aimed particularly at the country's rural areas. As of 1979, there were 2,361 clinics and treatment centers in rural areas, a total of 8,879 beds.

The rural health program, which is designed to combat bilharziasis, diarrhea, and other infectious and endemic diseases, as well as tuberculosis, provides free health services to all rural areas.

Health Insurance

At present, the government health insurance program, administered by the General Authority for Health Insurance, covers 20 percent of the labor force. Its ultimate objective is coverage of the entire population by gradually replacing the free medical care now provided in public sector hospitals and clinics.

Vaccines

In Egypt, almost all vaccines are distributed free by the Egyptian General Authority for Biologicals and Vaccines, which is not part of the Ministry of Health although it reports directly to the Minister of Health. Located on a 25-acre plot in Agouza, the organization has 1,700 employees. Of the 350 employees who are university graduates, 80 percent have advanced degrees. The facility conducts research and production operations and is responsible for procurement of vaccines. For the past five years UNICEF has been the exclusive contracting agency for procurement of vaccines from foreign sources.

Vaccines produced in Egypt include those for smallpox, rabies, cholera, typhoid, diphtheria, and tetanus. Vaccine production amounts to L.E. 3 million per year, the equivalent of L.E. 10 million at world prices. Although actual production comes to about 300 liters per week, the total potential capacity is 500 liters per week. Imported vaccines include those for measles and polio.

In January 1982, a new plant with a production capacity of 20 million doses per year of DPT trivalent vaccine (diphtheria-pertussis-tetanus) was put into operation. This 6.5 million guilder plant was financed mainly by a 5 million guilder donation from the Dutch government.

A cooperative program with the U.S. Merck Company is underway. Special Merck equipment is being imported for lyophilization (at 90°) of vaccines (measles-mumps-rabies). Initially, the vaccines will be supplied by Merck.

Rabies, transmitted in Egypt by dogs and wild rats, causes about 27 deaths per year. A tissue-culture vaccine, to be evaluated in the Netherlands, is now being developed.

About 300 horses are used to produce various

antisera, including snake venom antisera and monovolent serum for treatment of the bite of a dangerous desert snake.

Health Profile of Egypt

Compared with its Arab and African neighbors, Egypt has the best overall indicators of health and health care. As shown in Table 2-2, both male and female life expectancy is among the highest of the region; mortality rates are among the lowest; and the number of physicians and hospital beds per capita is high.

Table 2-2

COMPARISON OF HEALTH AND HEALTH CARE INDICATORS IN SELECTED DEVELOPING COUNTRIES OF THE MIDDLE EAST, AFRICA, AND THE USA: 1975, 1977

Country	Life Expectancy		Mortality Rate (deaths per 1,000) 1975	Physicians per 100,000 Population 1977	Hospital Beds per 100,000 Population 1977
	Male (years) 1975	Female (years) 1975			
EGYPT	54.1*	58.4*	11.4*	92	209
Algeria	52.9	55.0	15.4	19	263
Ethiopia	37.0	40.1	25.4	1	29
Iran	57.6**	57.4**	11.5	39	148
Iraq	51.2	54.3	14.6	44	199
Jordan	52.6‡	52.0‡	14.7	37	86
Libya	51.4	54.5	14.8	106	475

Table 2-2 (cont'd)

Country	Life Expectancy		Mortality Rate (deaths per 1,000) 1975	Physicians per 100,000 Population 1977	Hospital Beds per 100,000 Population 1977
	Male (years) 1975	Female (years) 1975			
Saudi Arabia	44.2	46.5	20.2	60	155
Somalia	39.4	42.6	21.6	3	179
Sudan	43.0	45.0	20.2	50	100
Syria	54.5##	58.7##	13.6	39	104
Tunisia	54.0	56.0	12.5	4	229
USA	68.7	76.5	8.9	176	530

* Data from Egyptian Ministry of Health.
** Data for 1976.
\# Data for 1963.
\## Data for 1970.

Source: The World Almanac and Book of Facts: 1982, Newspaper Enterprise Association, Inc., New York, N.Y.

When compared with the industrialized nations of Europe and North America, these statistics are less impressive. However, Egypt has made substantial strides in recent years. For example, as indicated in Table 2-3, in the five years between 1970 and 1975, male life expectancy jumped by nearly four years--from 50 years to 54 years. During the same period, the general mortality rate and the neonatal mortality rate fell by about 25 percent. The neomortality rate has continued to improve, falling another 7 percent by 1978. Figure 2-1 illustrates the drop in mortality rates between 1950-1980 and provides projections to the year 2000.

Table 2-3

SELECTED HEALTH AND HEALTH CARE INDICATORS IN EGYPT, 1970-1980

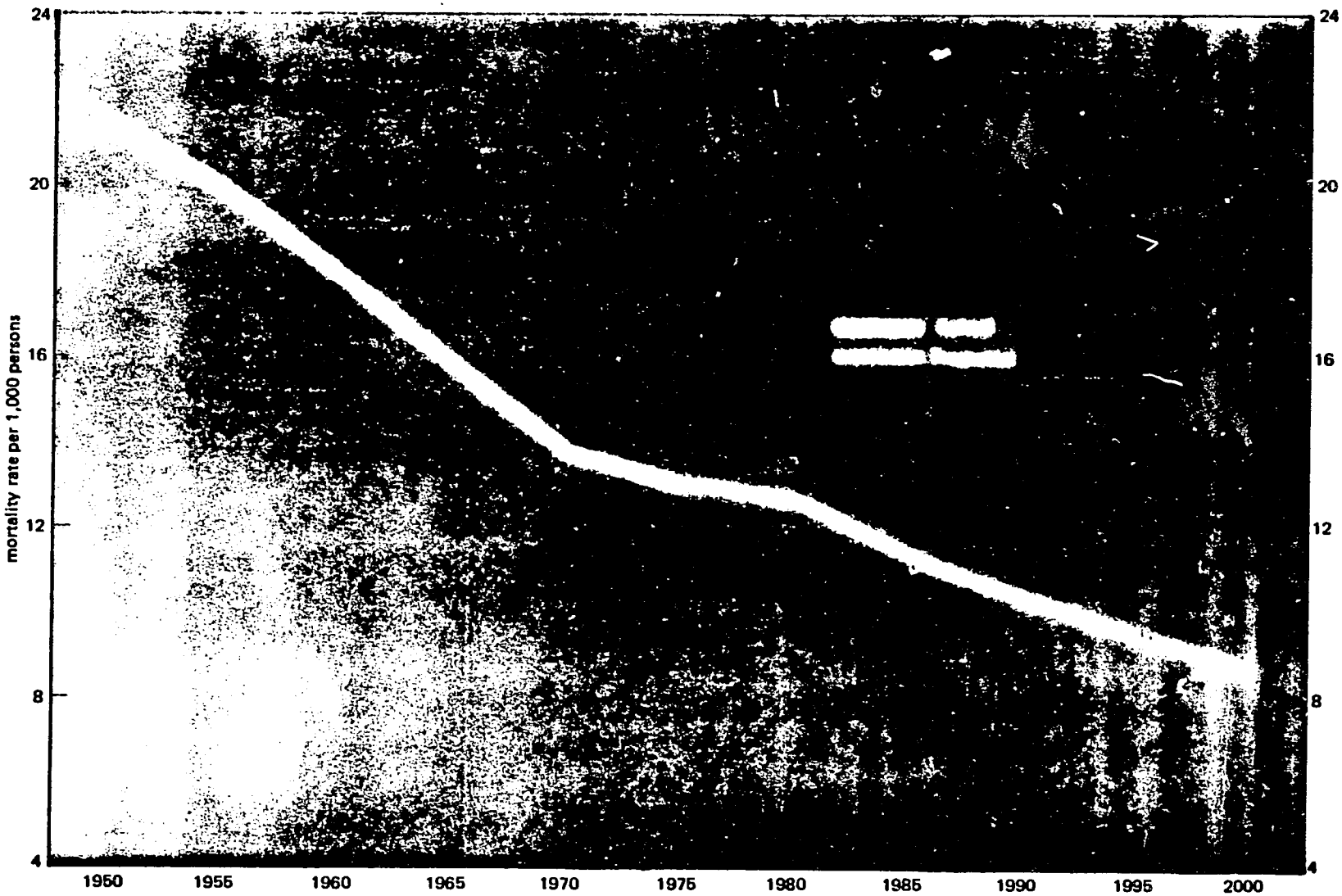
Indicator	1970	1975	1978
Neonatal morta'ity rate	112	89.2	83
Mortality rate (deaths per 1,000 population)	15.1	11.4	10.5*
Infant mortality rate (per 1,000 live births)	NA	101.3	89.2*
Life expectancy (years)			
Male	50.2	54.1	NA
Female	58.8	58.8	NA

* The World Almanac and Book of Facts: 1982, Newspaper Enterprise Association, Inc., New York, N.Y.

Source: Ministry of Health, except as noted.

In recent years, the government has initiated programs to collect and maintain improved information on the health situation in Egypt. Development of a computerized data base on health statistics in Egypt was started in July 1977 with a research agreement between the Egyptian Ministry of Health and the National Center for Health Statistics of the U.S. Public Health Service. The project, which conducts

Figure 2-1
HISTORICAL AND PROJECTED MORTALITY RATES IN EGYPT, 1950-2000



Source: Egypt: Economic Management in a Period of Transition, World Bank, 1978.

sample surveys of the Egyptian population through health examinations and interviews, publishes its results in a monthly newsletter, Health Profile of Egypt, which was initiated in 1980.

The Central Agency for Public Mobilization and Statistics, in Cairo; The High Institute of Statistical Studies and Research, Cairo University; and the American University in Cairo are also cooperating in development of the health profile of Egypt.

As in most developing countries, the principal causes of death in Egypt are infectious and parasitic diseases. The two most serious health problems are schistosomiasis and diarrhea. Major government programs are underway to combat both of these diseases.

3. THE STRUCTURE OF THE EGYPTIAN PHARMACEUTICAL INDUSTRY

Historical Development

The use of medications, cosmetics, fragrances, and other personal care products has been well accepted in Egypt for many centuries. Self-administration of medicines continues to be popular.

Up to 1962, most of the dosage forms of the newer trade-name drugs were imported, with many products, including quinine, coming from British trading companies. Many of the remedies manufactured locally were based on plant extracts or folklore, and were often of questionable efficacy. Various herbals were sold in shops, and extracts of medicinal herbs were sold to pharmacies and small laboratories which incorporated them into ointments, syrups, and other remedies. Ointments, pills, and capsules containing the older drugs were manufactured locally in pharmacies and in about 50 small laboratories.

The start of a modern pharmaceutical industry in Egypt began in 1939, when Misr Company, the first "modern" company, was started by Misr Bank. This was followed by Memphis Chemical Company, which was founded in 1940 by private investors for the purpose of

producing pharmaceuticals. Alexandria Company was founded as a small private laboratory soon afterwards.

In 1961-1962, the government nationalized the pharmaceutical industry, with the following objectives:

- To modernize the industry
- To make Egypt self-sufficient in pharmaceutical manufacturing
- To provide ample supplies of all types of essential drugs
- To provide essential drugs at prices the general public could afford to pay

When several of existing small companies--Misr Company, Memphis Company, and Alexandria Company--were nationalized and expanded, most of the remaining laboratories were closed. The larger ones were consolidated to form several new public sector companies, Kahira, Nile, and C.I.D. Kahira was formed by merging four laboratories: Alpha, Doche, Cepharm, and Bida. In 1963, Arab Drug Company was organized as a new public sector company.

Several private sector joint-venture companies also were organized. In each case, local investors took equity positions together with foreign companies, which provided products and technology. Thus, Pfizer-

Egypt was established in 1961, with Pfizer as the foreign partner; Hoechst-Orient, in 1962-1963 with Hoechst A.G. as foreign partner; and Swiss-Pharma in 1965, with the Swiss companies Ciba and Wander as joint foreign partners. The acquisition of Wander by Sandoz and the merger of Ciba with Geigy brought additional products to Swiss-Pharma.

Although the industry and the prices of pharmaceutical products have been rigidly controlled by the government for twenty years, there has been some liberalization of government policy in recent years. For example:

- In 1977, the prices of some drugs were increased by 30 percent.
- Since 1977, there have been relatively liberal price increases on certain new drugs which are not considered "essential."
- Government policy has been liberalized to allow the formation of wholly owned subsidiaries of foreign companies. One private sector company is completely owned by the U.S. Squibb Corporation. Organized in 1975, it started production early in 1977.

- Since 1980, the public sector companies have been permitted to borrow from commercial banks.

The Structure of the Pharmaceutical Industry

The Egyptian pharmaceutical industry is now comprised of 15 companies: four private sector companies (Pfizer-Egypt, Hoechst-Orient, Swiss-Pharma, and Squibb) and eleven public sector companies.

Eight public sector companies manufacture dosage forms: El Kahira, Memphis, The Arab Company, C.I.D., Misr, El Nil, Alexandria Company, and El Nasr. One of these companies, El Nasr, is predominantly a chemical manufacturing company which produces pharmaceutical active ingredients as well as dosage forms.

Three other public sector companies are involved in the pharmaceutical industry:

- The El Gomhouria Company imports the active ingredients used for the domestic manufacture of dosage forms. It also imports all the hospital supplies from foreign sources that are used in public sector clinics and hospitals.
- Egydrug is a wholesale distributor of many of the drugs manufactured in Egypt. It also imports the finished drugs manufactured abroad.
- The Medical Packing Company manufactures

packaging materials used by the public sector firms.

During the twenty years of their existence, the public sector companies have built up their product lines through licensing arrangements with the leading pharmaceutical companies of the world. To assure the promotion and distribution of their products and to obtain government approval for the introduction of new drugs, many of the foreign companies maintain offices in Egypt.

Egypt now has a well-developed pharmaceutical manufacturing industry. Nearly 90 percent of the drugs consumed in Egypt, in terms of turnover in Egyptian pounds, is manufactured in Egypt. In terms of dosage units, the figure for local manufacture is closer to 95 percent of the total. Brief descriptions of the existing pharmaceutical companies follow.

Public Sector Pharmaceutical and Medical Equipment Companies

There are eleven public sector companies in the pharmaceutical-medical equipment field. Established and owned by the Egyptian government, these include seven companies which manufacture dosage forms, one company (El Nasr) which manufactures pharmaceutical active ingredients and some dosage forms, one company

which manufactures packaging products, an importing company (Gomhouria) which purchases bulk drugs and chemicals in world markets, and an importing company (Egydrug) which purchases finished drugs in world markets and distributes both imported and locally manufactured drugs to pharmacies, hospitals, and clinics.

Public Sector Pharmaceutical Companies

The first modern Egyptian pharmaceutical manufacturing company, Misr Company for Pharmaceuticals, was formed in 1939. Seven other government-owned pharmaceutical companies were formed during the ten years following World War II. Brief descriptions of the eight public sector pharmaceutical manufacturing companies are given below after the following data on their respective 1981 sales.

Company	Sales: Fiscal Year 1981
C.I.D. (Chemical Industries Development Company)	L.E. 27 million
The Nile Company for Pharmaceuticals and Chemical Industries	L.E. 24 million
El Kahira Pharmaceuticals and Chemical Industries Company	L.E. 22 million
Misr Company for Pharmaceuticals	L.E. 22 million
El Nasr Pharmaceutical Chemical Company	L.E. 14.5 million
The Memphis Chemical Company	L.E. 12 million
The Alexandria Company for Pharmaceuticals and Chemical Industries	L.E. 12 million
The Arab Drug Company	L.E. 12 million

- o Chemical Industries Development Company (C.I.D.)

  Founded in 1946 as a public sector company.

  Products: A broad range of pharmaceuticals, especially antibiotics and insulin; medicines and medicinal teas from plants (cough, renal, and laxative teas); in cooperation with UNICEF, anti-dehydration salts for diarrhea; effervescent tablets (Vitamin C).

Development program: Production of other medications from botanical plants.

Sales: 1978, L.E. 16 million; 1980, L.E. 20 million; FY 1981, L.E. 27 million.

Licensing Arrangements:

USA	Bristol Myers
West Germany	Boehringer Ingelheim Schering A-G Dr. Madaus g.m.b.h.
France	Rosa-Phytofarma Roger Bellen Choay Aron Laroche Nauarren
Italy	Archifar Vista
Sweden	Astra
Japan	Takeda

- o The Nile Company for Pharmaceuticals and Chemical Industries

Founded in in 1962 by nationalization and consolidation of about six small private laboratories.

Products: Intravenous solutions (sold at a loss), cat-gut sutures, pharmaceutical specialties (especially antibiotics), vitamins, medicated skin powders, skin creams, and hair tonics.

Development and research program: Boldevrin syrup (an elixir), entrim syrup (a sulfa drug), thiametrin capsules (a potassium-sparing diuretic), amag salt (an antacid containing glycine); studies of local herbs with therapeutic effects on diabetes, liver disease, and skin disease.

Sales: 1977, L.E. 13.5 million; 1978, L.E. 15.5 million; 1979, L.E. 17 million; FY 1981, L.E. 24 million; FY 1981-82 (estimate), L.E. 30 million.

Licensing Arrangements:

USA	Parke-Davis (Division of Warner-Lambert)
Germany	E. Merck
France	Bioserax Clin-Midy Clayin
Austria	Biochemie
Italy	Richter Le Petit (division of Dow Chemical Company)
Great Britain	White, Evans Glaxo
Netherlands	Organon (division of Akzo N.V.)

- El Kahira Pharmaceuticals and Chemical Industries Company

  Founded in 1962 by nationalization and the merger of four private pharmaceutical companies.

  Products: Hard and soft gelatin capsules, veterinary drugs, botanicals, and a variety of drugs under licenses (see below).

  Development and research program: Botanicals; plans to expand veterinary drugs through license agreements.

  Sales: 1977, L.E. 13.9 million; 1978, L.E. 14.3 million; FY 1981, L.E. 22 million; FY 1982 (goal), L.E. 30 million.

  Licensing Arrangements:

Merck & Company	Aldomet, Cogentin, Edecrin, Idocid, Idocid-R (slow-release form), mintezol, moduretic, ~eriactin, and cryptizol. Clinoril will be added in 1982.
Eli Lilly & Company	Doloxene, Keflex
Morton-Norwich	Macrodantin
Smith Kline	Parnate, Parstelin, Stelabid, Stelazine, Tagamet

G. D. Searle & Company	Aldactazide, Aldactone A., Dramamine, Lomotil, Norpace, Ovolen, Pro-Banthine, Safrinace
Lakeside Laboratories (Dow Chemical Company)	Dactilase, Piptal
The Boots Company, Ltd.	Brufen, Furamide
I.C.I. Ltd.	Atromid-S, Fluothane, Inderal, Ketrax, Mysoline, Savlon, Tenormin
Chemiewerk Hamburg (subsidiary of Degrussa)	Ildamen
Ravizza S.p.A.	Dobren, Eselinate
Antec (British)	Veterinary drugs

- Misr Company for Pharmaceuticals

Founded in 1939 by Misr Bank and nationalized in 1962.

Products: Injectable and oral dosage forms of antibiotics; customary line of vitamin and mineral supplements; a scattering of drugs covering some 25-30 therapeutic categories.

Development plans: A 1982 feasibility study to consider the construction of a new grass-roots production facility.

Sales: 1976, L.E. 8 million; 1978, 10.6 million; 1979, L.E. 14 million; FY 1981, L.E. 22 million; FY 1982 (estimate), L.E. 24 million.

Licensing Arrangements:

Netherlands	Gist Brocades (Mycofarm and Delft divisions)
Switzerland	Solco-Basel A.G.
Austria	Linz
USA	R.P. Scherer Company (manufacture of soft gelatin capsules)

- El Nasr Pharmaceutical Chemical Company

Products: Active ingredients, including aspirin, tolbutamide, paracetamol, sulfanilamides, chloramphenicol, and other antibiotics. A portion of the production is processed into dosage forms and packaged, largely for the public sector hospital market. The product line also includes:

  -- Sterile intravenous solutions
  -- Peritoneal dialysis solution
  -- Veterinary products
  -- Laboratory chemicals

-- Analytical services (instrumental analysis, for a fee, of infrared and ultraviolet spectra; analyses for percent compositions of various elements)

Development program: Doubling the production of I.V. solutions. Ambitious expansion programs also underway to expand the line of active ingredients manufactured by chemical synthesis.

Sales: 1978, L.E. 11 million; 1980, L.E. 13 million; FY 1981 (estimate), L.E. 14.5 million.

Licensing Arrangements:

Netherlands	Mycofarm Delft

o The Memphis Chemical Company

Founded in 1940 by private investors; nationalized in 1962.

Products: Botanical pharmaceuticals, vitamins, and a range of other pharmaceuticals, including products licensed from several leading foreign companies.

Development and research program: A new grass-roots plant, the most modern in Egypt, now underway; research largely on medicinal plants.

Sales: 1976, L.E. 8 million; 1978, L.E. 9.4 million; FY 1981, L.E. 12 million; FY 1982 (estimate), L.E. 16 million.

Licensing Arrangements:

USA	Schering-Plough Corporation	Garamycin Celestone Diprosene Quadriderm Trilafon
	Upjohn	Dipomedrol Lincocin
France	Delalande	Sorfoostyl Sorbitol Etaphylline Etaphylline comb. Sureptil
	Delagrange	Aceto-Sterandryl
	Roussel-Uclaf	Coltramyl Glosso-steramdryl Sedo-gynestryl Soframycine Sterandryl Retard Glifanan K. Thrombyl Triostrine
U.K.	Fisons	Imferon
Switzerland	OM	
Belgium	Janssen (Johnson & Johnson subsidiary)	Vermose
Italy	Zoja	Ethambutol

- The Alexandria Company for Pharmaceuticals and Chemical Industries

  Founded forty years ago as a private pharmaceutical company; nationalized in 1961-1962.

  Products: Rubber gloves, adhesive plaster, veterinary products, and a broad line of human pharmaceuticals.

  Development: Factory expansion, including current expansion of rubber glove plant.

  Sales: 1967, less than L.E. 2 million; 1978, L.E. 6.8 million; 1980, L.E. 10 million; FY 1981, L.E. 12 million; FY 1982 (estimate), L.E. 15.5 million.

  Licensing Arrangements:

USA	Bayer A.G.
France	Rhone-Poulenc

- The Arab Drug Company

  Founded in 1963 as a public sector company.

  Products: Veterinary drugs, sterile injectable drugs in ampoules, tablets, capsules, creams, ointments, drops, and suppositories in a number of therapeutic areas.

  Development: Plans entry into oral antidiabetic and cardiovascular therapeutic

areas and medications for tropical diseases. New products via licensing are needed as well as new technologies, such as time-released capsules.

Sales: 1977, L.E. 6.3 million; 1978, L.E. 6.8 million; 1980, L.E. 8.5 million; FY 1981, L.E. 12 million.

Licensing Arrangements:

West Germany	Knoll A.G. (subsidiary of BASF)
France	Beaufour
Switzerland	Siegfried
Austria	Linz

Other Public Sector Companies

In addition to the eight public sector companies just described, three other public companies support the Ministry of Health.

- The Medical Packing Company, which produces a range of packaging and other materials for the pharmaceutical and food industries. This company and its products are discussed in Chapter 7.
- The El Gomhouria Company for Trading Pharmaceuticals, Chemicals, and Medicinal Appliances, which is charged with purchasing

imported health care supplies (except finished dosage forms, which are imported by Egydrug). El Gomhouria purchases chemicals and medical supplies from suppliers all over the world. Purchases on the basis of price and specification are made by tenders, which are mailed to about 2,000 companies. The chemicals include bulk pharmaceuticals and other chemicals and pigments used in manufacturing dosage forms as well as raw materials used by El Nasr to manufacture bulk pharmaceuticals and fine chemicals used by about eight other Egyptian companies.

The medical supplies include rubber gloves, hypodermic needles and syringes, sutures, adhesive tape, catheters, blood collection bags and transfusion sets, thermometers, and x-ray film. Total imports were about L.E. 60 million in 1979-1980 and about L.E. 80 million in 1980-1981.

- o <u>The Egyptian Drug Trading Company (Egydrug)</u>, which is responsible for importing drugs purchased in international markets in finished dosage forms and for distribution of finished

drugs, both imported and locally produced. The distribution network comprises 42 supply centers. Egydrug also operates 23 pharmacies.

The total annual value of imports through Egydrug is L.E. 30-35 million. Milk products and other baby foods, a significant proportion of the total, represent a product group for which local manufacturing is badly needed. The imported drugs represent about 10 percent of Egyptian needs; the rest are manufactured locally.

About 800 items are imported, mainly from the United Kingdom, West Germany, France, Switzerland, and Hungary. Baby milks are imported from Holland and Ireland. Insulin is imported from Denmark. There are government subsidies, usually in the range of 40-50 percent, for baby foods, insulin, and certain "essential drugs."

Egydrug is required by law to distribute up to 50 percent of the production of public sector companies.

Because a wholesale mark-up of 7 percent is allowed by the Egyptian government, Egydrug

is squeezed between government-controlled selling prices and rising world prices of finished drugs. Egydrug's acquisition prices are further increased by shipping charges and an import duty of 23.5 percent.

Foreign Pharmaceutical Companies

Foreign pharmaceutical companies participate in the Egyptian market in several ways:

- o Fully owned subsidiaries
- o Joint-venture companies
- o Licensing
- o Importing

Only Squibb has a fully owned subsidiary in Egypt.

Joint ventures by foreign companies are encouraged by the Ministry of Health as a means of producing new drugs in Egypt and introducing improved pharmaceutical manufacturing technology and efficient manufacturing practices. Although foreign companies are encouraged to set up joint ventures with the existing public sector companies, this is not essential.

The joint ventures already in place in Egypt have variable financial results. Those selling old product lines which are price controlled may have great difficulty in making a profit. For example, the

ingredients in the Pfizer-Egypt anti-diarrheal drug Diapec cost more than the allowed price.

Companies with relatively new drugs have fared better. Price allowances on drugs introduced since 1977 have been relatively generous. Experience has differed with the wide variety of foreign drugs licensed to public sector companies for manufacture in Egypt--apparently depending upon whether the foreign company can exercise quality control over local production and assist in training production personnel. For example, Merck & Company, which has sold its products in Egypt for many years, works well in the local environment and has had a favorable experience.

For the many new exclusive drugs that are imported into the country in finished dosage forms, Egypt has no alternative but to purchase at the company prices applicable at foreign distribution points.

The four companies operating in Egypt with foreign equity participation are Hoechst-Orient S.A.A., Pfizer-Egypt S.A.A., Swiss-Pharma, and Squibb-Egypt.

Hoechst-Orient S.A.A.

Hoechst-Orient, a well-established joint-venture company, is the Egyptian arm of the worldwide, diversified German chemical company, Hoechst A.G.

Hoechst has 500 employees in Egypt, including 400 in the pharmaceutical sector and 60 connected with the sale of imported dyestuffs and chemicals. Pharmaceutical production capacity is tight and insufficient to produce for export markets.

In 1980, pharmaceutical sales were L.E. 11 million. Sales for 1981 were expected to reach about L.E. 13.5 million.

Because many of its products have been on the market for a number of years, Hoechst operations have been penalized by controls which have held prices at low levels. Pricing allowances for drugs introduced after 1977 have been more liberal and, for the past two years, have encouraged new investors.

The Hoechst product line is shown in Table 3-1.

Table 3-1

PRODUCTS PRODUCED IN EGYPT BY HOECHST-ORIENT S.A.A., 1981

Trade Name	Therapeutic Category	Generic Name
Avil	antihistamine	pheneramine p-aminosalicylate
Baralgin	spasmolytic combination	dipyrone, piperidinoethoxy-O-carbmethoxy benzophenone HCl, and diphonylpiperidino-ethyl acetamide bromine methylate
Cambison ointment	adrenocorticosteroid-antibiotic combination	prednesolone, neomycin HCl, and bis (2-methyl-4-aminoquinol) carbamide hydrochloride
Cosaldon	cerebral sclerosis treatment combination	1-hexyl-3.7-dimethylxanthine and niacin
Cosavil	antipyretic analgesic	pheneramine maleate, antipyrine salicylate, and caffeine
Daonil	oral antidiabetic	glibenclamide
Festal	pancreatitis-gastoententis remedy	pancreatic enzymes, bile constituents, and hemicellulose
Festavital	pancreatis-gastroententis remedy	pancreatic enzymes, bile constituents, and vitamins
Hostacortin	adrenocortical steroid	prednisone
Hostacortin H	adrenocortical steroid	prednisolone
Hostacycline	antibiotic	tetracycline hydrochloride
Hostacycline P	antibiotic	tetracycline phosphate
Irtensain	coronary vasodilator	chromonar
Jarit	antimycotic	salicyclic acid, buclosamide and hydrocortisone
Lasix	diuretic	frusemide
Neoviasept	antidysenteric	glycobiasol and chloroquine phosphate
Novalgin	analgesic	dipyrone
Omnamycin	antibiotic combination	penicillin-procaine, penicillin benzyl, omnadin and streptomycin sulfate
Rastinon	oral antidiabetic	tolbutamide
Reverin	antibiotic	tetracycline pyrrolidinomethyl
Segontin	coronary vasodilator	prenylamine lactate
Urbason	adrenocortical steroid	methyl prednisolone sodium hemisuccinate
Urbason Retard	adrenocortical steroid	prednisolone

Pfizer-Egypt S.A.A.

Established in 1960, this company began production in 1961. The U.S. company Pfizer, Inc. owns 60 percent of equity and receives 45 percent of earnings; 25 percent of 60 percent of total earnings go to the employees; 40 percent of equity is owned by Egyptian National Minority, which is comprised of private individuals.

Of the 450 employees, 300 are employed in the plant. Fiscal 1981 sales were about L.E. 10.7 million. This included a relatively small volume in the resale of imported industrial chemicals such as citric acid and gluconic acid, and a small volume in veterinary drugs, feed additive antibiotics, coccidiostats, and the like. For a small fee, animal feed mixes are produced from Pfizer additives and the farmer's grain.

Bottles are an expensive item. About 3 million bottles are used annually. Because locally manufactured bottles are not sufficiently uniform for machine filling, foreign bottles are used at a cost of L.E. 70 per thousand. Bottle costs are increased by high import duties and breakage. Occasionally, pharmaceutical production is halted because of an insufficient supply of bottles or a lack of foreign

exchange with which to purchase bulk drugs from foreign sources. Duties amount to approximately 62 percent on plastic tubes and 38 percent on glass bottles and other containers.

Pfizer-Egypt produces about 28 products, including the new antischistosomal drug oxamniquine (trade name, Vansil). Although at L.E. 7 per dose, this drug is expensive for the Egyptian market, it has great potential. Customarily, applications for the sale of new drugs in Egypt are not acted upon until the drug is approved for sale in the U.S. by the U.S. Food and Drug Administration. Oxamniquine, however, received "fast track" approval in Egypt before it was approved in the USA late in 1980.

Prices of veterinary products and animal feed additives are not as rigidly controlled as those of human pharmaceuticals, but the market is difficult inasmuch as small quantities are sold to many small farmers.

About six Pfizer-Egypt products are loss products. Diapec, for example, is an effective antidiarrheal agent which contains sulfaguanidine, homatropine methyl bromide, neomycin, kaolin, and pectin. The ingredients, however, cost more than the allowed

selling price.

Other Pfizer products are listed in Table 3-2.

Table 3-2

PRODUCTS PRODUCED IN EGYPT BY PFIZER-EGYPT S.A.A., 1981

Trade Name	Therapeutic Category	Generic Name
Feldene	anti-inflammatory	piroxicam
Cortril Topical	adrenocortical steroid anti-inflammatory	hydrocortisone
Daritran	anticholinergic-antispasmodic combination	oxyphencyclimine hydrochloride plus meprobamate
Deltacortril	adrenocortical steroid anti-inflammatory	prednisolone
Niamid	antidepressant	nialamide
Obron	vitamin-mineral combination	
Sigmamycin	antibiotic combination	tetracycline hydrochloride plus oleandomycin
Terra Cortril E/E Susp.	adrenocortical steroid antibiotic anti-inflammatory combination	hydrocortisone acetate plus oxytetracycline hydrochloride
Terracortril ointment	adrenocortical steroid antibiotic anti-inflammatory combination	hydrocortisone plus oxytetracycline hydrochloride
Terramycin	antibiotic	oxytetracycline hydrochloride
Terramycin with Polymyxin ointment	antibiotic combination	oxytetracycline plus polymyxin
Tyzine	adrenergic nasal vasoconstrictor	tetrahydrozoline hydrochloride
Vibramycin	antibiotic	doxycycline hyclate

Swiss-Pharma

The largest of the private sector joint-venture companies, Swiss-Pharma is owned 40 percent by local investors, 30 percent by the Swiss company Ciba-Geigy, and 30 percent by the Swiss company, Sandoz A.G. There are 500 employees, including 430 production employees.

Sales in 1981 are estimated at L.E. 20 million; in 1980, at 18 million.

The company originally was formed by Ciba, which later merged with Geigy, and by Wander, which merged with Sandoz. With access to four different product lines, it has more important products on the market than any other drug company in Egypt. Ciba-Geigy, Sandoz, and Swiss-Pharma all have detail forces in Egypt. Ciba-Geigy and Sandoz promote the Swiss-Pharma line and those of their own products that are not produced by Swiss-Pharma.

Swiss-Pharma products are distributed to drugstores partly by direct sales and partly through Egydrug.

Swiss-Pharma products are listed in Table 3-3.

Table 3-3

PRODUCTS PRODUCED IN EGYPT BY SWISS-PHARMA, 1981

Trade Name	Therapeutic Category	Generic Name
Acylanid (Sandoz)	cardiac failure	acetyl digitoxin
Adelphan (Ciba)	antihypertensive	reserpine plus dihydralazine
Antisacer	antiepileptic combination	phenytoin sodium and phenobarbitone with potassium bromide, caffeine citrate and atropine sulfate
Antistine (Ciba)	antihistamine	antazoline
Antrenyl (Ciba)	antispasmodic	oxyphenonium bromide
Asmac	anti-asthma combination	ephedrine HCl, aminophylline extract of ipecacuanha, caffeine and allobarbital
Belladenal Retard (Sandoz)	spasmodic combination	belladonna alkaloids and phenobarbitone
Bellergal Retard	Neurosedative combination	belladonna alkaloids, ergotamine tartrate and phenobarbitone
Bradoral (Ciba)	oropharyngeal combination	benzocaine and bradosol bromide
Brinerdin (Sandoz)	antihypertensive combination	reserpine, clopamide and dihydroergocristine
Butarolidine suppositories (Ciba-Geigy)	anti-inflammatory	phenylbutazone
Cafergot (Sandoz)	antipyretic vasoconstrictor	ergotamine tartrate and caffeine
Calcibronat	sedative	calcium bromide lactobionate
Cedilanid	cardiac glycoside	lanatoside
Colposulfona	vaginal antiseptic combination	sulfanilamide plus oxyquinoline sulfate with additive
Coramine (Ciba)	CNS stimulant	nikethamide
Cotesor (Wander)	CNS stimulant, cardiotonic	heptaminol hydrochloride
Deseril (Sandoz)	antimigraine	methylsergide dimaleate
Dihydergot (Sandoz)	antimigraine	dihydroergotamine methansulfonate
Elkosin (Geigy)	urinary antiseptic	sulphisomidine
Enteroviaform (Ciba)	anti-amoebic dysentery	iodochlorhydroxyquinoline
Entobex (Ciba)	anti-amoebic dysentery	4,7-phenanthroline + 5,8-quinone
Felamine	choleretic	dehydrocholic acid, cholic acid and hexamine
Femandran	menopausal disorders	oestradiol benzoate and testosterone isobutyrate
Hygroton (Geigy)	diuretic	chlorthalidone
Intestopan (Sandoz)	intestinal antiseptic	bronyquinoline and brobenzoquinaldine
Ircodenyl suppositories (Geigy)	antipyretic analgesic combination	amidopyrine, butazolidine, codeine phosphate and heptabarbitone
Irgapyrine (Geigy)	antipyretic analgesic combination	amidopyrine and phenylbutazone
Locacorten (Ciba)	adrenocortical steroid anti-inflammatory	flumethasone pivalate
Melleril (Sandoz)	tranquilizer	thioridazine hydrochloride
Methergin (Sandoz)	oxytocic	methylergometrine maleate
Mexaform (Ciba)	anti-amoebiasis combination	iodohydroxyquinoline, oxyphenonium bromide, and 4,7-phenanthroline + 5,6-quinone
Neuro Trasentin (Ciba)	sedative combination	phenobarbitone and ediphenine hydrochloride
Nimarol	anti-amoebic dysentery combination	iodochlorohydroxy-quimeline and formosulfathiazole
Noveril (Wander	antidepressant	dibenzepine HCl
Optalidon (Sandoz)	analgesic combination	amidopyrine and isobutylallyl barbituric acid
Palerol (Sandoz)	antispasmodic	tropenzilium bromide and piperylon
Pantozyme	digestive aid	pancreatic enzymes, pepsin, and cellulose
Percortan (Ciba)	adrenocortical steroid	desoxycorticosterone trimethylacetate
Plimasine (Ciba)	antihistamine combination	pyribenzamine HCl and ritalin HCl
Priscopnan (Ciba)	autonomic nervous stabilizer	phenobarbitone, ediphenine HCl and tolazine HCl
Privine (Ciba) Nasal Drops	adrenergic vasoconstrictor	naphazoline nitrate
Pursennid	cathartic	sennoside A & B
Pyrgasol Lozenge (Wander)	antiseptic-anesthetic throat lozenge	p-lauroyphenyloxyethyl benzyldimethyl ammonium chloride and novesine
Pyribenzimine (Ciba)	antihistamine	tripelennamine HCl
Rimactane (Ciba)	antitubercular antibiotic	rifampicin
Ritalin (Ciba)	CNS stimulant	methylphenidate HCl
Sandosten (Sandoz)	antihistamine combination	thenaldine digluconate and calcium lactobionate
Serpasil (Ciba)	antihypertensive	reserpine
Serpatenil (Ciba)	Cerebral arteriosclerosis	methylphenidate HCl and reserpine
Spasmo Canulase (Ciba)	antispasmodic combination	methixene HCl, dimethyl polysiloxane, cellulose, pepsin, glutamic acid HCl, pancreatin and sodium dehydrocholate
Syntocinon (Sandoz)	stimulate uterine contraction	oxytocin
Tanderil (Geigy)	anti-inflammatory	oxyphenbutazone
Tofranil (Geigy)	antidepressant	imipramine hydrochloride
Toresan (Sandoz)	tranquilizer	thiethylperazine
Ultandren	sex hormone (androgen)	fluoxymesterone
Ultracortenol (Ciba)	adrenocortical steroid	perednisolone trimethylacetate

Squibb-Egypt

Squibb-Egypt, wholly owned by the Squibb Corporation, of the United States, has the most modern pharmaceutical plant in Egypt. Production was started early in 1979.

Sales in 1980, the first full year of production, were about L.E. 4.1 million. Sales for the 1981 fiscal year came to about L.E. 5.4 million.

Although a few chemicals are purchased locally, most supplies, including packaging suitable for machine filling, are imported.

Roughly half of Squibb's distribution is handled by Egydrug, a public sector company, and half by Middle East Company for Chemicals, a private importing and distribution company. Middle East Company imported Squibb products before Squibb started production in Egypt.

Squibb-Egypt's product line includes the trade-name specialties listed in Table 3-4.

Table 3-4

PRODUCTS PRODUCED IN EGYPT BY SQUIBB-EGYPT, 1981

Trade Name	Therapeutic Category	Generic Name
Dexacillin	antibiotic	epicillin
Kenacomb	antibacterial-antifungal-anti-inflammatory ointment	nystatin, neomycin sulfate, gramicidin and triamcinolone acetonide
Kenacort	oral adrenocortical steroid	triamcinolone
Kenacort A	topical adrenocortical steroid	triamcinolone
Kenacort A with Graneodin	anti-inflammatory-antibacterial combination ointment (adrenocortical steroid with antibiotic)	triamcinolone acetate, neomycin sulfate, and gramicidin
Modecate	tranquilizer	fluphenazine decanoate
Fungizone	antifungal antibiotic (oral, vaginal, and skin lotion forms)	amphotericin B
Motival	tranquilizer	fluphenazine hydrochloride
Mycostatin	antifungal antibiotic	nystatin
Pronestyl	cardiac antiarrythmic agent	procarnamide hydrochloride
Vagmycin	antitrichomonal-antibiotic combination	amphotericin B plus tetracycline
Siquil	tranquilizer	triflupromazine hydrochloride
Veloset	antibiotic	cephradine
Volog	topical adrenocortical steroid	halcinonide

The Arab Company for Drug Industries and Medical Devices (ACDIMA)

Founded in Cairo in March 1976 as a result of nearly ten years of discussion and planning by the Arab countries of Africa and Asia, ACDIMA was established for the purpose of manufacturing pharmaceuticals and medical supplies.

In 1975, the founding countries collectively consumed $786 million worth of pharmaceuticals. Since then, the market has grown rapidly, thus providing a potential market with sufficient cumulative demand for individual products to provide economy of scale. The consumption of pharmaceuticals by the member states in 1985 is projected at U.S. $2.8 billion.

Because Egypt has the most advanced pharmaceutical industry in the Arab world and 37 percent of the population of the Arab countries involved, ACDIMA established its headquarters there. Egypt and Sudan together account for more than half the population of the Arab world.

The 1978 Camp David accord between Israel and Egypt threw the ACDIMA plan into disarray. At a meeting in Tunisia in 1979, the ACDIMA board expelled Egypt from membership and relocated ACDIMA headquarters to Amman, Jordan.

Refusing to accept this arrangement, the chairman and other personnel of the Egyptian ACDIMA company remained in Cairo. Of the two ACDIMAs now in operation, only the Egyptian ACDIMA is active in Egypt.

The Egyptian ACDIMA. Following the split, the Egyptian group devoted itself in 1979-1980 chiefly to planning and feasibility studies and the publication of a report entitled, "Drugs in Egypt in the Year 2000."

The aim of the original ACDIMA had been to secure 50 percent of the pharmaceutical-medical device market. After the split in 1979, however, the Cairo ACDIMA turned its attention to planning for the Egyptian market. Although Sudan may eventually join the Cairo group, it has not yet done so.

In 1979, the Prime Minister of Egypt confirmed the advantages of the ACDIMA concept and the legality of the Egypt-based company. A decree was signed by President Sadat in 1980 and was published in the official Gazette of July 15, 1980.

Of the ten different projects under study by the Egyptian ACDIMA, two or three seem to be well along in concept. Among these is a pharmaceutical glass container company, which will be owned 30 percent by ACDIMA, 10 percent by Abay, and 60 percent by the

public sector companies Medical Packing Company, C.I.D., Memphis Company, and Arab Drug Company. Construction on a $37-million plant has been started by the Belgian company, Abay Engineering, which undertook the feasibility study in 1977. Scheduled for completion by the end of 1983, the total investment for the project, including working capital, is $63 million.

Using a process developed by Verlipack, another Belgian concern, the facility will be able to produce 305 million small bottles and vials annually. Abay's contract covers construction and supply of machinery, control equipment, raw material storage facilities, an in-plant transport system, infrastructure, and training. It will also provide technology and training when the work has been completed.

Another Egyptian ACDIMA project is the establishment of a firm named Egyptian International Pharmaceutical Industries Company. Capitalized with about L.E. 20 million, this company will manufacture pharmaceutical chemicals under license. The ownership is divided among ACDIMA (30 percent), Kahira Company (30 percent), Arab Pharmaceutical Company (10 percent), Memphis Company (10 percent), and the Egyptian Trading Company (20 percent). It is anticipated that numerous

products will become available for manufacture as patents and licenses expire over the next four years.

A plant for the manufacture of flexible packaging materials also is being planned, with ACDIMA holding a 50 percent share. A feasibility study was made by an Egyptian group, and bids were opened in Cairo at the end of April 1981. It is hoped that a contract can be awarded soon. Capitalized at U.S. $8.4 million, the company will produce packaging materials for use in both the pharmaceutical and food industries. Thus far, a Swedish company, a French company, and two German companies have expressed interest in providing the necessary technology.

A small pharmaceutical chemical plant, funded at U.S. $1.5 million, is planned for a location adjacent to El Nasr. To be owned approximately 30 percent by ACDIMA, 30 percent by El Nasr, 30 percent by C.I.D., and 10 percent by a foreign partner yet to be selected, the plant would manufacture several semisynthetic penicillins, such as amoxycillin and dicloxacillin from 6-APA.

Plans for the establishment in Alexandria of a plant for the manufacture of hard gelatin capsules are under consideration. A feasibility study has been made

by an Indian group, but technology now concentrated in Parke-Davis, Eli Lilly, and R. P. Scherer, is difficult to acquire. The technology once held by Hoffman LaRoche was sold to R. P. Scherer. Canadian and Indian technologies are being considered, and the manufacture of medical appliances also would be of interest. Only 10 percent of current consumption is now manufactured locally.

Botanicals. Although there is interest in the production of medicinal plants, specific projects have not yet been identified. Studies started in 1962 are continuing at six botanical field stations, but the work is uncoordinated. Current plans call for making contracts with farmers and for raising the plants on farms rather than for processing the plants to isolate the active ingredients. It is estimated that the production of botanicals in Egypt amounts to about 7 million pounds per annum.

Plans for the production of laboratory chemicals and veterinary products are further in the future.

It is not clear at present how important a role the Egypt-based ACDIMA will play in the continued development of Egypt's pharmaceutical and medical supply industry. It is expected, however, that Egypt

will maintain some sort of relationship with the ACDIMA group in Jordan.

An Appraisal of Egypt's Pharmaceutical Industry

As part of a worldwide study of the pharmaceutical industry, the Secretariat of the United Nations Industrial Development Organization (UNIDO) in Vienna issued a report in 1978 which classified less-developed countries (LDCs) according to five categories as follows.

- Group 1: countries without facilities for manufacturing pharmaceuticals and dependent upon imports of finished products
- Group 2: countries which have started to repack formulated drugs and to process bulk drugs into dosage forms
- Group 3: countries which manufacture "a broad range" of bulk drugs into dosage forms and manufacture certain simple bulk drugs from intermediates
- Group 4: countries which produce a broad range of bulk drugs from intermediates and which manufacture some intermediates, using locally produced chemicals
- Group 5: countries which manufacture most of

the intermediates required by the pharmaceutical industry and undertake local research on the development of products and manufacturing processes

Table 3-5 presents examples of countries assigned to each group. No African country has yet reached Group 5. However, Egypt is one of the few LDCs which has moved up to Group 4.

Table 3-5

UNIDO RANKING OF LESS-DEVELOPED COUNTRIES
ACCORDING TO PHARMACEUTICAL CAPABILITY, 1978

Area	Group 1	Group 2	Group 3	Group 4	Group 5
Africa	Burundi	Madagascar	Algeria	Egypt	None
	Chad	Sudan	Ghana	Tunisia	
	Lesotho	Tanzania	Morocco		
	Rwanda	Uganda			
	Sierra-Leone	Zambia			
	Somalia				
	Swaziland				
	Togo				
	Central African Empire				
Latin America	Honduras	Haiti	Colombia	Argentina	Brazil
	Trinidad	El Salvador	Ecuador		Mexico
		Guatemala	Peru		

Table 3-5 (cont'd)

Area	Group 1	Group 2	Group 3	Group 4	Group 5
Asia/Middle East	Jordan	Afghanistan	Iran	Pakistan	India
	South Yemen	Burma	Iraq	Turkey	
		Malaysia			
		Nepal			
		Sri Lanka			
		Vietnam			

Source: UNIDO, 1979.

The Future Outlook

Egypt now has a well-developed pharmaceutical industry for manufacturing conventional dosage forms. The capacity expansions and modernizations now underway at companies already established, together with the projected establishment of several new private sector companies, will provide for the greatly expanded production of tablets, capsules, ointments, and the like. However, in order to avail themselves of the latest pharmaceutical technology, in addition to licensing new products, public sector companies are interested in participating in joint ventures, and it is likely that most of them will do so during the 1980s. Such joint ventures will probably involve a variety of medically related products as well as pharmaceuticals, as follows:

- Timed-release capsules
- Improved drug delivery systems, such as transdermal skin patches and osmotically controlled slow-release capsules
- Improved technology for sterile intravenous solutions and nutrients
- Disposable hospital supplies
- Diagnostic products

- Products based on gene-transfer or fermentation technology, particularly for treatment of diarrhea

A subject which will receive increased attention in Egypt in the near future is the domestic production of the bulk active pharmaceutical entities. A few are now produced by the El Nasr Chemical Company. However, many of the drugs now consumed in Egypt are used in such small quantities that the local market cannot support an economically viable manufacturing operation. Nonetheless, as the local market expands and as export opportunities develop, profitable opportunities for the manufacture of bulk chemicals may arise.

4. GOVERNMENT REGULATION OF THE PHARMACEUTICAL INDUSTRY

The Higher Council

The pharmaceutical industry in Egypt is closely regulated by the Higher Council for Pharmaceuticals, Chemicals, and Medical Equipment, which is comprised of officials from the Ministry of Health, the Chairmen of the Boards of the public sector pharmaceutical firms, and professors from Egyptian medical schools.

The Higher Council plans and regulates almost all aspects of the pharmaceutical industry. It determines which products will be produced or imported, how the drugs will be distributed, and what prices are appropriate. The Higher Council aims to provide drugs to the public at the lowest feasible prices and to prevent the waste of limited health care resources through duplication of medicines produced locally.

The Higher Council has three committees to regulate various aspects of the pharmaceutical industry: the Supreme Committee for Importation of Finished Products, the Supreme Committee for Registration, and the Tariffication Committee.

- The Supreme Committee for Importation of Finished Products decides which foreign-

produced drugs should be imported, and in what quantities. It will not permit the importation of foreign drugs for which adequate substitutes are produced locally. Competing brands of foreign drugs are imported to ensure that the lowest possible prices are obtained for consumers.

- o The Supreme Committee for Registration approves new drugs for sale in Egypt based on the results of study and analysis by the Organization of Drug Research and Control.
- o The Tariffication Committee determines what prices are appropriate for imported and locally produced drugs. The price allowed for almost all imported drugs is slightly more than 186 percent of the FOB price.

Registration and Regulation of New Drugs

Registration

A new drug is approved for sale in Egypt by the Organization of Drug Research and Control (The Supreme Committee for Registration), whose approval process is equivalent to that of the U.S. Food and Drug Administration. Although this organization reports to the Minister of Health, it is not part of the Ministry

of Health.

Registration of a new drug for sale in Egypt is based chiefly on test results obtained in other countries and on approvals for sale in other countries. Approval by the U.S. Food and Drug Administration is the most important factor in approval for sale in Egypt.

A company seeking registration of a drug submits a profile of the drug based on the available test results, registration approvals, and side effects developed in other countries. A sample of the drug is submitted to the Egyptian authorities for analysis and, in some cases, for further clinical testing. The first shipment of a newly approved drug is tested once again. Registration and testing procedures usually require three to nine months, though drugs considered non-essential, such as tranquilizers, may be slower in moving through the approval process.

The approval of a pharmaceutical for sale in Egypt is valid for ten years. If experience with the drug is deemed satisfactory, the product can be re-registered for another ten years. Approval can be revoked during the ten-year period if the drug appears to have detrimental side effects.

The Control of Registered Drugs

After a drug has been approved for sale in Egypt, it is policed by the Department of Pharmaceuticals and Pharmacy in the Ministry of Health. This agency exercises a watchdog function over pharmacies and the movement of drugs, but not over the producing companies.

Approvals of new pharmaceutical plants and plant expansions in Egypt are controlled by the Ministry of Housing and the Ministry of Industry.

The Distribution of Drugs

Drugs follow several paths from the manufacturer of the active bulk pharmaceuticals to the retail pharmacy.

- Active ingredients are manufactured by El Nasr and distributed in bulk to domestic public sector or private sector companies for conversion to dosage forms. The dosage forms are then either sold directly to pharmacies or distributed to pharmacies by Egydrug, a public sector company. Public sector companies are required to merchandise at least 50 percent of volume sold in Egypt through Egydrug.
- On the basis of price and specification, active

ingredients manufactured outside of Egypt are purchased by the public sector company El Gomhouria from vendors throughout the world. El Gomhouria solicits quotations with a want list sent to various vendors. The list is compiled on the basis of what needs are supplied by local producers of pharmaceuticals. El Gomhouria also purchases many of the hospital supplies used by public sector hospitals and clinics.

Sales of bulk pharmaceuticals by El Nasr are small in comparison with the volume imported by El Gomhouria.

- Finished drugs and milks not manufactured in Egypt are purchased in world markets by Egydrug for distribution to pharmacies and hospitals. Small quantities are also imported and distributed by some 18 small, private sector importer-distributors which import a wide variety of products, including finished pharmaceuticals and proprietary drugs, milks and baby foods, medical supplies, personal care products, essential oils, fragrances, specialty chemicals, and sanitation products.

Pharmaceuticals are sold to the public by private pharmacies and are distributed free by government clinics. As of 1979, there were 4,403 private pharmacies in Egypt.

The Availability of Drugs

Most drugs are readily available in Egypt. Prescriptions are required only for narcotics, hypnotics, and certain central nervous system stimulants (particularly amphetamines). Consequently, there are claims that drugs, particularly antibiotics and mild tranquilizers, are over-used. The free distribution of drugs by the government also tends to encourage over-use.

Approximately 60 percent of the drugs consumed in Egypt are issued free of charge by government hospitals, other health care institutions, and medical authorities in public sector firms. Consumers who are treated as out-patients at clinics, or by medical authorities in public sector firms, usually obtain their medicines free of charge at private pharmacies upon presentation of a government-issued prescription.

The ready availability and low prices of some types of drugs lead to large purchases by tourists from Europe, the USA, and the Arab countries. Although

exact figures are unavailable, it is estimated that tourists purchase well over L.E. 10 million worth of drugs in Egypt annually. These purchases consist chiefly of antibiotics, anti-diabetics, vitamins, tranquilizers, oral contraceptives, and insulin.

The Ministry of Health plans to tighten controls on the sale of drugs in Egypt. In June 1981, an official body was established to study the availability and quality of drugs sold. In addition to tightening controls on drugs sold over the counter, the newly established body will review all imported drugs and impose restrictions upon those with low efficacy.

The Pricing of Drugs

As noted earlier, the pharmaceutical industry in Egypt is closely regulated by the government, particularly with regard to pricing. Prices were rolled back in 1962. In 1977, a 30 percent price increase returned prices on old drugs almost to the 1961 level. Consequently, prices of older drugs, particularly those considered "essential drugs," are considered low in comparison to prices in the U.S. and Western Europe. Government policy requires that drugs be priced low in order to make them readily available to the public. However, in recent years, price

allowances on new drugs have been relatively liberal. A sort of dual price structure exists, therefore, one that is not much different from that which is starting to emerge in the USA, where high-priced, patented, trade-name products as well as low-priced, generic drugs are available.

In Egypt, retail mark-ups are held at 10 percent and wholesaler mark-ups at 7 percent. The controlled price of a drug as set by the government applies to the retail price. The price charged the pharmacy is 90 percent of the government-set price. In recent years, there has been some movement by pharmaceutical companies to sell direct to pharmacies. The object is to improve margins, since the manufacturer can charge the pharmacy the same price that a wholesaler does and thus realize 90 percent, instead of 83 percent, of the retail price. It is estimated that 10 percent of all pharmaceuticals are distributed directly from manufacturer to pharmacy.

In addition to subsidizing public sector pharmaceutical companies, the Egyptian government also subsidizes some drugs (insulin, for example) which are sold in pharmacies substantially below the cost of the products as purchased from suppliers

abroad.

With few exceptions, the retail prices of drugs imported into Egypt are calculated on the basis of a formula outlined in the Ministry of Health Decision No. 239/1978. This formula lists the charges that may be added to the FOB prices of drugs when calculating retail prices and profits. The total cost of a drug is calculated as FOB price plus 8 percent of FOB price for freight; 23.5 percent of FOB price for customs duties; and 12 percent of FOB price for insurance, bank, transport, and clearance charges. The total cost before profit and distribution amounts to 143.5 percent of FOB price.

Because the permissible profit is 30 percent of the total cost calculated with this formula, the final retail price is usually 186.485 percent of the FOB price. The actual profit on retail drug sales varies considerably from the theoretical profit calculated with this formula since freight and other charges on imported drugs are dependent, inter alia, on the bulk of the imported drugs. Usually 20 percent of the theoretical profit is retained by the importer/ distributor; the pharmacist is allotted 10 percent. In general, the profit margin allowed the retailer on

locally produced drugs is higher.

In order to make a realistic comparison of drug prices, in 1981 Egyptian prices were compared with U.S. prices at the wholesale level. Prices of several high-priced patented products compare as follows:

	Cost in Egypt	Cost in USA	Egyptian Prices as Percentage of U.S. Prices
Keflex (250 mg)	31.5¢	36.9¢	85%
Valium (10 mg)	16.3¢	17.8¢	92%
Lasix (40 mg)	8.5¢	10.2¢	83%

On the average, the Egyptian wholesale price for these drugs is 87 percent of the U.S. price. Among the older drugs there are wider price differences:

	Cost in Egypt	Cost in USA	Egyptian Prices as Percentage of U.S. Prices
Dimelor (500 mg)	3.26¢	11.07¢	29.5%
Acetazolamide (250 mg)	3.0¢	9.7¢ (Diamox)	30.9%
Indomethacin (25 mg)	5.0¢	14.2¢	35.2%
Persantin (25 mg)	3.6¢	11.16¢	32.3%
Tolbutamide (500 mg)	1.6¢	3.8¢ (generic)	42.2%

For this group of drugs, the average price in Egypt is 34.0 percent of the average U.S. price.

In the USA, numerous generic equivalents of trade-name drugs are available from cut-rate services at relatively low mark-ups. Some of these compare with Egyptian pharmacy prices as follows:

Trade Name	Price	Generic Name	Price
Isodril (10 mg)	2.6¢	Isosorbide dinitrate	2.95¢
Dexazone (5 mg)	4.7¢	Dexamethasone	7.5¢
Erythrin (250 mg)	15.74¢	Erythromycin stearate	9.0¢
Persantin (25 mg)	4.0¢	Dipyridamole	6.0¢
Rastinon (500 mg)	1.8¢	Tolbutamide	5.5¢

For this group, the retail price in Egypt is, on the average, 86 percent of the U.S. retail price.

5. THE MARKET FOR PHARMACEUTICALS IN EGYPT

The Classification of Pharmaceuticals

The Ministry of Health closely monitors the production and sale of drugs manufactured in Egypt. Each company is required to submit monthly reports of turnover. Imports of finished drugs are monitored by Egydrug, the Egyptian Company for Trading and Distribution of Medicines, which imports and distributes finished drugs and distributes many of the drugs manufactured domestically.

The Ministry of Health classifies pharmaceuticals according to four basic categories:

- Category A: "Essential drugs" such as antibiotics, antirheumatics, hormones, cardiac drugs and nervous system drugs. Drugs in this category receive preferred treatment for importation or for licensing of local manufacture.
- Category B: Pharmaceuticals which, though needed, are not considered vitally important
- Category C: Drugs considered non-essential
- Category D: Products such as laxatives, vitamins, and so on

The Ministry of Health publishes an Index of

Specialties in English and Arabic which lists, by generic name, all drugs imported or manufactured in Egypt. Under each generic name are listed all trade-name or generic-labeled drug dosage units, pack sizes, and the Egyptian manufacturer or foreign source. Indices by trade name as well as generic name are provided. This book of approximately 500 pages is published annually and may be purchased from the Ministry of Health for L.E. 5 (approximately U.S. $6.00).

The Ministry divides drugs into 44 therapeutic categories. Two of the categories--No. 43, Milks and No. 44, Baby Food and other Special Preparations--are generally not considered therapeutic in most other countries.

Sales of Pharmaceuticals by Category

In 1980, total pharmaceutical sales (excluding milks and baby food) amounted to L.E. 273.6 million (U.S. $396 million). Of this amount, 89.5 percent, or L.E. 245.0 million, was manufactured locally and 10.5 percent, or L.E. 28.6 million, was imported. The breakdowns by therapeutic category are presented in Table 5-1.

Table 5-1

RETAIL SALES OF PHARMACEUTICALS IN EGYPT, 1980

		Millions of L.E.		
		Produced in Egypt	Imported	Total
1.	Anesthetics	1.13	0.56	1.69
2.	Analgesics, antipyretics, and antirheumatics, including antiarthritic and antigout	27.70	0.57	28.30
3.	Analeptics (CNS stimulants)	1.30	0.18	1.48
4.	Anthelmintics	2.50	0.50	3.00
5.	Antidiarrheals, including anti-infectives	6.10	0.10	6.20
6.	Antibiotics	62.90	1.09	64.00
7.	Antimalarials	0.01	-	0.01
8.	Anticoagulants	0.34	0.16	0.50
9.	Antihistamines	3.78	0.17	3.95
10.	Cardiac, circulatory, and antilipemic drugs, including antihypertensives	9.10	3.82	12.92

Table 5-1 (cont'd)

		Millions of L.E.		
		Produced in Egypt	Imported	Total
11.	Cathartics	1.70	-	1.70
12.	Chemobiotics (antibiotics in combination with other anti-infective agents)	2.00	0.15	2.20
13.	Antituberculosis and leprostatics	0.60	0.07	0.67
14.	Treponemicides (spirocheticidals)	0.01	-	0.01
15.	Sulfonamides	0.60	-	0.60
16.	Cytotoxics and antineoplastic agents	-	0.40	0.40
17.	Dermatologicals	11.35	1.13	12.48
18.	Ano-rectals	1.20	0.02	1.22
19.	Diagnostic aids	0.003	0.605	0.608
20.	Endocrine system drugs, including oral contraceptives and antidiaretics	15.24	4.29	19.53
21.	Gastrointestinal and anorexogenic	13.00	2.00	15.00

Table 5-1 (cont'd)

		Millions of L.E.		
		Produced in Egypt	Imported	Total
22.	Hepatobilogenics	0.50	0.22	0.72
23.	Hemostatics and coagulants	0.0004	0.48	0.48
24.	Immunologic agents	-	0.12	0.12
25.	Miscellaneous	3.00	1.04	4.00
26.	Ophthalmics, including steroids and anti-infectives	4.50	0.96	5.46
27.	Orodentals	1.00	5.02	6.00
28.	Oto-rhino-laryngetics	2.00	0.05	2.10
29.	Oxytoxics and myotonics (cholinergics)	0.50	0.36	0.86
30.	Respiratory system; cough and cold remedies	9.00	0.97	10.00
31.	Single vitamin preparations	2.25	-	2.25
32.	Vitamin combinations, including liver extract	15.40	-	15.40
33.	Minerals	1.70	-	1.70

Table 5-1 (cont'd)

	Millions of L.E.		
	Produced in Egypt	Imported	Total
34. Vitamin-mineral combinations	13.20	-	13.20
35. Lipotropics and geriatrics	3.50	-	3.50
36. Proteins, including combinations with vitamins	-	0.02	0.02
37. Blood substitutes and restoratives	3.10	0.12	3.20
38. Neuro-sedatives and hypnotics	1.00	0.02	1.00
39. Skeletal muscle relaxants and tranquilizers, including anticonvulsants and antidepressants	6.50	2.11	8.60
40. Spasmolytics (parasympatholytic agents)	8.60	0.37	9.00
41. Urologicals, including diuretics	7.00	0.64	7.60
42. Vaginetics, including trichomonacides	1.70	0.27	2.00
43. Milks: 5.74 million imported	-	-	-
TOTALS	245.00	28.60	273.60

Source: Ministry of Health, 1981.

The Projected Market for Pharmaceuticals

The Egyptian market for pharmaceuticals is expected to expand rapidly throughout the remainder of this century.

- o Population growth will continue at a rate of from 2.5-3 percent annually.
- o A growing percentage of the adult population will enter the work force, and the job status and economic level of those already employed will be improved.
- o Per capita income will continue to grow at an annual rate of from 7-10 percent.
- o Improved and expanded health delivery systems will be implemented at a rapid rate.
- o The general public will become more health-conscious, more aware of what drugs are available and how to obtain them.
- o Health insurance will be expanded, covering around 80 percent of the population by the year 2000, up from 20 percent in 1981.
- o Prices of pharmaceuticals will continue to be subsidized, with many dispersed free of charge.

Population and Market Growth

Of the present Egyptian population of 43 million,

51 percent is below age 20, 9 percent above 55, and 40 percent between ages 20 to 55.

The age distribution of the population now and in the future indicates continued strong growth in demand for pharmaceuticals, particularly for antibiotics and other anti-infective agents for treatment of childhood infections and diarrhea.

However, almost all Egyptians already are consumers of pharmaceuticals because of government programs to make the basic "essential" drugs available either at low cost or free of charge through government hospitals and other health care institutions.

In a report completed in March 1980, Dr. A. Sallam, Chairman of the Cairo-based ACDIMA, projected the future growth in demand for pharmaceuticals in Egypt. This report presented the following points:

- In 1950, consumption of pharmaceuticals was L.E. 5 million (at retail prices), and per capita consumption was L.E. 0.22. Local production met only 10 percent of market needs.
- In 1979, consumption was L.E. 200 million and per capita consumption L.E. 5.00 (compared to a minimum of L.E. 9.00 by international standards). Local production accounted for

80-85 percent of consumption.

- Between 1952-1979, consumption of pharmaceuticals increased by about 15 percent per year. Per capita consumption rose about 12 percent per year.
- By the year 2000, per capita consumption should reach L.E. 21.5 (at today's prices and with a growth rate of 18 percent per year). With a population of 70 million, total demand would be L.E. 1,500 million ($2,200 million) by the year 2000.

In its issue of July 28, 1980, Script, a pharmaceutical newsletter, summarized a report entitled "Opportunities for Pharmaceuticals in the Developing World Over the Next Twenty Years." This report, prepared by Information Research Ltd., projected the demand in the year 2000 at $3,860 million (L.E. 2,700 million) as compared with the 1980 demand of $315 million (L.E. 220 million). This figure presumably includes an annual adjustment for price inflation. A price increase of 3 percent per year between 1980 and 2000 would convert the L.E. 1,500 million projected by Dr. Sallam to the $3,860 million projected by Information Research Ltd.

The Information Research report estimated local pharmaceutical product capacity in the year 2000 at about L.E. 810 million ($118.0 million), which, in turn, would lead to a demand for imported drugs of about L.E. 1,890 million ($2,700 million). In view of the trends and government policies in Egypt, this figure is highly unrealistic. It is much more probable that Egypt will be close to self-sufficiency in drug production in the year 2000.

In his report Dr. Sallam recommended that, every year, a new factory with the capacity for producing L.E. 53 million worth of pharmaceuticals annually be put into operation. This amount represents more than double the output of the largest existing factory in Egypt. Considering that the establishment of such a factory will require about five years, according to this plan, 15 new factories would be started up to the year 2000, the total output in that year reaching L.E. 795 million. Including the output, after expansion, of the already existing factories (L.E. 460 million), local output in the year 2000 would reach L.E. 1,255 million, or 84 percent of total market needs.

Dr. Sallam recommended that ACDIMA and the Misr

Milk Company cooperate in studying various offers to construct factories for the production of baby food and milk, the most important of which were made by Nutricia and Francelait. It was suggested that whichever offer proves economically suitable be accepted.

With respect to importation of finished dosage forms, the Sallam report recommended that requirements be established to cover items that are not locally produced and, following an international tender, individual products be purchased according to generic names. It also recommended that additional distribution companies be established to meet expected growth.

A committee appointed by the Minister of Health to study the Sallam report and submit recommendations agreed, in general, with the ACDIMA study in an analysis submitted on July 7, 1980. This analysis emphasized the following points:

- Formulation and packaging should be handled only by Egyptian companies since such industries, which have a high rate of return on investment, require only small investments and have the required facilities and expertise.
- Basic materials covering about half of the

country's requirements should be manufactured locally.

- For materials supplied by the Ministry of Health and Health Insurance, generic names should be used.
- To achieve a reasonable margin of profit, prices should be checked periodically and adjusted to meet increases in the prices of raw materials (local and imported) as well as increases in the cost of the various factors of production (labor, maintenance, etc.). The margin thus achieved will assist in developing research and quality control as well as with maintenance and investments.

6. INVESTMENT OPPORTUNITIES IN PHARMACEUTICALS

Introduction

A variety of factors contribute to making the Egyptian pharmaceutical industry a promising area for foreign investment.

- The present lack of excess production capacity
- The strong growth projected for the next two decades
- The continuing emergence of new pharmaceuticals, the manufacture of some of which involve sophisticated new technologies*

In June 1974, "Law Number 43 Concerning the Investment of Arab and Foreign Capital and the Free Zones" (Public Law 43) was enacted. The purpose of this legislation and the amendment, Law 32 of 1977, is to encourage the transfer of Western technology in joint ventures in Egypt or in the regional "free zones." The Investment and Free Zones Authority was created to promote, implement, and expedite foreign investment.

As noted in "A Guide to Doing Business in Egypt,"

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* For example, a synthetic growth hormone produced by fermentation involving gene transfer.

which follows this report, Public Law 43 offers numerous benefits, including a five-year tax holiday, to potential investors for projects approved by the Investment Authority. The Investment Authority facilitates the review of proposed projects and gives final approval. Proposals involving pharmaceuticals, medical equipment, and public health require a prior review by the Ministry of Health as to the need and acceptability of the project. Projects involving medical supplies have high priority because of the pressing needs in this sector.

Theoretically, four routes to investment in pharmaceutical manufacturing projects are possible: total ownership by the foreign investor, a joint venture with a public sector company, a joint venture with a private sector company, or a mixed joint venture with Egyptian public and private participation. Squibb owns 100 percent of the pharmaceutical company it established in Egypt several years ago. It is not likely that another such arrangement would be approved.

The remaining routes are joint ventures, and the options are virtually unlimited. U.S. companies considering investment in Egypt should not hesitate to propose any imaginative organizational and equity

framework that is practicable and reasonable.

Joint Ventures with Public Sector Pharmaceutical Companies

A joint venture in which the Egyptian partner is a public sector company has several advantages:

- The public companies have established basic physical facilities, although many of them require modernization and expansion.
- A core of trained and experienced managerial, administrative, sales, and production personnel is in place.
- Marketing channels within Egypt--and, in some cases, abroad--have been established.
- Experience in the Egyptian environment, highly important in many aspects of purchasing, production, and marketing, has already been developed.
- Management officials generally recognize the need for and seek modern technology, marketing expertise, and associated managerial acumen. Also, many officials want to operate as a private company with the advantages of Public Law 43 and freedom from government regulations regarding hiring, salary and wage levels, and marketing, among others.

- Undertaking a joint venture with an established public sector company is the simplest, most straightforward method of securing a strong position in the Egyptian market. Opportunities for importing dosage items are few in number and are dwindling, and licensing is likely to lead to competition rather than a partnership in the important North African-Middle Eastern market.

All proposed new undertakings must fit into the overall plan for the public sector and must fill a need. A joint-venture proposal in cosmetics is not likely to be viewed favorably in that cosmetics are not considered essential products. However, needed products such as new pharmaceuticals, medical suppplies, and containers for drugs would have top priority.

A project in conflict with a public sector effort would not be approved. On the other hand, a projected joint venture, if conceived as a subsidiary to a public sector company, would probably be approved if it were expected to provide earnings that would offset losses on other items produced by the parent company.

The government's present attitude regarding the

pricing of pharmaceuticals produced by public sector companies is a formidable obstacle to joint ventures with public companies. Many public sector companies now operate at a loss and eve tually receive government subsidies to keep them in business and to provide funds for expansion. However, it is probable that the government pricing policy will be altered in the near future to enable a series of profitable joint ventures to be set up between public sector companies and foreign companies.

There is no reason why a public company cannot act as a holding company with several operating units, some functioning as subsidiaries or affiliates with local and foreign equity participation under Public Law 43 or the New Companies Law (Public Law 159). Units in which there is private participation would strive for profitability. Other fully owned, public units might operate on a not-for-profit basis, if necessary for the public interest.

Such a program would have the following advantages:

- o The introduction of exclusive new products
- o The infusion of capital by the foreign partner
- o Access to the latest technology in production,

and efficient manufacturing practices and quality control procedures

- o With improved manufacturing technology, production costs can be reduced and a good profit margin achieved. Further economy of scale can be achieved by producing for export to markets in neighboring countries.

Although some Egyptians advocate the establishment of new public sector pharmaceutical companies at the rate of one each year for the next fourteen years, to meet the level of demand anticipated for the year 2000, most officials recognize that this is not an economical approach. They point to the skills and technology that are required to establish new companies, the high cost of starting new companies, and the expensive redundancies in areas such as analytical and quality control laboratories, purchasing facilities, product development departments, and so on.

The more economical approach, and the one most likely to be adopted, is to modernize the existing public sector companies by streamlining production, replacing obsolete machines with new, high-speed equipment and, in general, by improving overall production efficiency. In addition, it would be

beneficial to organize production facilities of public sector companies to eliminate duplication. For example, public companies now produce eight brands of chloramphenicol ear drops. Similarly, there are seven sources of chloriquine phosphate, eight for 250 milligram ampicillin capsules, and eleven for testosterone propionate.

Consolidation, modernization, and expansion of public sector companies present opportunities for converting all or individual operating units of these companies into Public Law 43 joint ventures with foreign pharmaceutical firms. In such cases, the new company will be treated as a private sector company and would be operated accordingly.

As previously noted, the three joint-venture companies now operating in the pharmaceutical sector are Pfizer-Egypt, Hoechst-Orient, and Swiss-Pharma.

Other foreign pharmaceutical companies will join this group in the years ahead. For example:

- Bayer is currently negotiating to set up a joint-venture company with Alexandria Pharmaceuticals and Chemical Industries Company. Bayer has a new drug, praziquantel, for treatment of bilharziasis. If praziquantel

lives up to its advance billing, it will be badly needed for the program to combat bilharziasis infection.

- The Arab Investment Company and the Arab Company for Medical Industries and Medical Requirements are planning a joint venture with the government-owned El Kahira Pharmaceuticals and Chemicals Industries Company to build a pharmaceutical factory in the Cairo suburbs.
- Delft, a division of the Dutch company Gist-Brocades, will have an equity position with an ampicillin plant which El Nasr Pharmaceutical Chemicals Company is building.
- A company named Egyptian International Pharmaceutical is being formed, with a capital of about L.E. 20 million, to manufacture pharmaceuticals under license. Equity participation of three public sector companies (Kahira, Arab, and Memphis), ACDIMA, and a private Egyptian group is involved.

Other public sector companies are interested in undertaking new production projects, and some of them are interested in joint ventures. For example:

- The Arab Drug Company would like to enter the

oral antidiabetic and the cardiovascular therapeutic areas, and would like to find effective medication for tropical diseases.

- The Memphis Chemical Company is interested in expanding its botanicals.
- A new venture is needed for the production of sterile injectable products and kidney dialysis solutions that would replace the existing obsolete facilities.
- A small pharmaceutical plant, to be funded for about U.S. $1.5 million, is planned for a location adjacent to El Nasr. It would be owned jointly by El Nasr, C.I.D., ACDIMA, and a foreign partner. The foreign partner, who would have about 10 percent equity, has not been selected.

Some of the new products and systems that are developed internationally might present opportunities for joint ventures in Egypt. The present development activities of the advanced pharmaceutical companies of the world indicate that drugs of the future will involve improved drug delivery systems; products based on gene-transfer technology, such as human growth hormone; new vitamin-like products, such as coenzyme

Q-10; and new therapeutics that are related to natural product discoveries such as ursodeoxycholic acid.

With the demand for dosage forms increasing so rapidly, additional opportunities may soon arise in the production of bulk pharmaceuticals. These, of course, must be studied to determine whether new productions by chemical synthesis or fermentation are economically feasible from the standpoint of volume required by Egyptian pharmaceutical usage and the availability of appropriate technology, so that production costs will be in line with those of low-cost foreign production. Of the 1,575 active pharmaceuticals used in Egypt, only a few are currently used in quantities large enough to offer an economic scale of production. However, considering that Egyptian demand and penetration of other Middle Eastern and North African countries are continually increasing, this situation may change.

As noted previously, El Nasr Pharmaceutical Chemicals Company is the only company now producing active ingredients. However, ambitious expansion programs are underway to expand the line of active ingredients manufactured by chemical synthesis. These include the semisynthetic penicillins, ampicillin, amoxicillin, and dicloxacillin, and the ingredients in

the anti-infective combination cotrimoxazole: trimethoprim and the sulfa drug, sulfamethoxazole. The expansion programs could provide sales of L.E. 6-7 million, thereby increasing the total for bulk chemicals to L.E. 12-14 million.

The most important project underway is a 30-ton-per-year plant to produce penicillin derivatives. The main product, to be made from imported 6-APA (6 amino penicillin acid) and phenylglycine, will be ampicillin trihydrate. The 6-APA will come from the Dutch company Gist-Brocades, which produces penicillin G by fermentation and then cleaves it to the basic penicillin ring structure 6-APA. Eventually, 6-APA might be manufactured by El Nasr. At present, the necessary liquid nitrogen is not available. To protect the sensitive penicillin ring structure, it is necessary to produce the cleavage by phosphorous pentachloride at very low temperatures. Eventually, the fermentation to make penicillin G may also be handled in Egypt.

Ampicillin consumption in Egypt amounts to about 10 tons of trihydrate and 15 to 20 tons of the anhydrous form. Delft, a division of Gist-Brocades, will have an equity position in the ampicillin plant.

Eventually, the capacity of the new plant will be expanded to produce a range of semi-synthetic penicillins, particularly amoxicillin and dicloxacillin. This part of the project will have several equity partners, as follows:

El Nasr	30 percent
ACDIMA	30 percent
C.I.D.	30 percent
A foreign partner	10 percent

As explained in "A Guide to Doing Business in Egypt," which follows, the Egyptian Investment Authority sponsors a fund to reimburse a portion of the costs incurred by U.S. companies that investigate investment opportunities in Egypt.

Other Joint-Venture Possibilities

Joint ventures are also possible with private companies, development banks, and specialized organizations such as ACDIMA.

As noted above, ACDIMA has a few projects that seem to be developing well, and they have another seven or eight projects that have only reached the preliminary analysis stage. U.S. companies interested in investing in Egypt should certainly examine the role ACDIMA might play as a partner.

7. HOSPITAL AND MEDICAL SUPPLIES

Introduction

In addition to opportunities for joint ventures in pharmaceuticals, there are numerous opportunities in hospital and medical supplies. A number of entrepreneurial companies are being organized to capitalize on the opportunities presented by market vacuums and the need to import foreign products at high prices. Some public sector pharmaceutical companies also are trying to enter these product areas.

Unfortunately, all of these projects share the same shortcoming: lack of modern design and production technology. To attain satisfactory levels of technology and production efficiency, there is thus a pressing need to attract U.S. and other foreign participants in joint ventures.

Numerous types of medical supplies and packaging materials are produced by public sector companies in Egypt. The quality of these products is such that they are utilized only in public sector health care delivery clinics: the private sector uses high-priced imported products. What is needed in each instance is a source of local products manufactured according to the very best modern technology. Only with such a source can

the production be accepted by all types of Egyptian health care delivery organizations and at the same time be suitable for bulk exports to markets in Sudan, Saudi Arabia, and other Gulf countries.

Stainless Steel Needles

At the top of the list of needed medical products are stainless steel needles of all types: hypodermic, intravenous infusion, blood withdrawal, suture sewing, catheter, and so on. Needles are now imported from foreign companies such as Terumo in Japan. Needles intended for single use only are re-used repeatedly, with widespread hepatitis resulting.

Reliable figures on the size of the needle market in Egypt are unavailable. Although, apparently, about 100 million needles are required per year, because of shortages and re-use, imports appear to amount to about 8-10 million per year.

Rubber Gloves

The Alexandria Company for Pharmaceuticals and Chemical Industries has a small rubber glove factory with a production capacity of one million pair per year. These are reusable gloves, having many uses other than surgical.

Though local production can satisfy 75 percent of

the market, the product is considered inferior in quality because it is slippery and unsterilized. It is therefore used only in public sector hospitals. Gomhouria Company imports about 100,000 pairs of gloves annually from Watra Company and Drago Export Company in Czechoslavakia. The better hospitals use "Regent Dispo" brand from LRC Products Ltd. in England at a cost of L.E. 2 per pair. Because imported gloves of high quality are expensive, surgeon's rubber gloves are sometimes re-used or substituted for.

In short, there is great need for a joint venture to produce high-quality surgeon's gloves. The best Egyptian partner for such a venture might be the present local glove manufacturer, Alexandria Company.

Gelatin Capsules

Soft gelatin capsules, used for liquid dosage forms such as Vitamin E, are formed and filled simultaneously. El Kahira Company and Misr Company both produce products in soft gelatin capsules.

El Kahira can produce 8-10 million soft gelatin capsules per month. When production was started in 1967, the old droplet method was used. This was replaced in 1970 with a high-speed unit from P. Leiner in England, which used the double band technology.

Misr licenses soft gelatin capsule technology from R. P. Scherer Company, a U.S. firm and the world's largest in the soft capsule field.

El Kahira can also produce, and utilize, 13 million hard gelatin-type capsules per month. It uses four machines, including a 1972 model high-speed machine from Zanabi Nigris S.p.A. (Italy); a fifth machine will soon be installed.

The hard gelatin capsule is a two-piece preformed container. Leading suppliers are Eli Lilly & Company, Parke Davis, and R. P. Scherer. Except for those produced and used by El Kahira, all other capsules used in Egypt are imported. Demand is close to one billion per year--a $20-million market. Additional local manufacture is required to supply Egypt and neighboring countries.

Sutures

The Nile Company for Pharmaceutical and Chemical Industries is the only producer in Egypt of "cat-gut" sutures. Produced from sheep membrane, which is not acceptable by modern hospitals, these sutures are now produced from cow membrane in a new plant which started production with Braun-Melsungen technology late in 1981. The quality of the new suture is unknown. All

types of sutures (animal source, nylon, and synthetic polyglycolic acid) are therefore imported--from Ethicon (a division of Johnson & Johnson) and Davis & Geck (a division of American Cyanamid). Consumption is about 500,000 units a year, and to satisfy demand, another modern suture-manufacturing facility is needed in Egypt.

Adhesive Tape

The Alexandria Company produces adhesive plaster in an old plant with inefficient technology which meets no more than 30 percent of Egypt's requirements. Because it considers the quality unacceptable, the private sector market uses products imported from Germany, England, and the United States.

A roll of "Elastoplast" brand Smith & Nephew porous elastic tape, 10 cm. x 4.5 meters (stretched length), costs L.E. 5.0. Adhesive dressings are imported from Johnson & Johnson in the U.S. A 25 cm. x 10 cm. dressing costs 75 piasters (L.E. 1.0 to the patient).

The Alexandria Company is constructing a new plant that will use Beiersdorf technology and a high-capacity tunnel drier that will be able to produce six or seven times the current capacity.

Plastic and Textile Disposables

All types of disposable plastic and textile products are now imported. Local production is required for surgical face masks, surgical drapes, swabs, urine bags, incontinent pads, ostomy supplies, cannulas, catheters, intravenous infusion sets, blood-collecting bags, blood transfusion sets, gauze bandages, gauze eye pads, airway breathing tubes, enema administration sets, irrigation trays and syringes, isolation gowns, elastic bandages, cervical collars, burn dressings, and so on. Many needed products are not used because of lack of availability. Surgical operations, for example, are often performed without face masks.

Germicidal Surgical Scrub Solution

Gomhouria does not import this product, and it is not manufactured in Egypt. A local source is badly needed. Private hospitals import "Sterillum" brand cetyletheyl dimethylammonium ethane sulfate in isopropyl alcohol from Bacillofabrik Dr. Boda & Company of Hamburg, Germany. A one-liter plastic bottle costs L.E. 10. The povidone (polyvinylpyrrolidone) iodine germicide widely used in the U.S. and Western Europe is known, but unavailable. The germicide-saturated scrub

pads, also unavailable in Egypt, would be used if manufactured locally and sold at a reasonable price.

Plaster of Paris Bandages

At present, the free hospitals in Egypt use only plaster of paris powder, not prepared bandages. Private hospitals use prepared bandages, which come in various sizes from Smith & Nephew in England. These bandages consist of gauzes impregnated with plaster of paris. They are wet before application and set to form hard plaster casts. A roll 15 cm. wide x 2.7 meters long costs L.E. 3.0.

Egypt's gypsum deposits are considered the best in quality in the world. Plaster of paris bandages using local gypsum deposits and manufactured in Egypt could be exported throughout the Middle East.

The naturally occurring mineral gypsum, also found in a crystalline form called selenite, is calcium sulfate dihydrate. Careful dehydration by heating yields plaster of paris, the half hydrate: $(CaSO_4)2.H_2O$.

Talc

Talc is a magnesium silicate mineral that is widely used in the production of cosmetic body powders and pharmaceutical pills. At present, talc is

imported. A local industry should be developed to produce iron-free, pharmaceutical-grade talc from Egyptian deposits.

Thermometers

Thermometers are not manufactured in Egypt. In 1980, Gomhouria imports from China and other sources amounted to 1,463,098 units, including both flat and prismatic types.

X-Ray Film

All x-ray film is imported. The 200,000-300,000 square meters used annually are imported from Orwo (East Germany), Ilford, and Agfa-Gevaert. Egypt and neighboring Middle Eastern markets together would probably support a single x-ray film plant, but the output would be acceptable to the overall market only if it were high quality.

The x-ray film industry is also concerned with the expected transition during the next five years from recording medical x-ray images on film to digital computer storage.

Condoms

In an effort to curb population growth, the Egyptian government is strongly supporting birth control programs. Condoms are therefore a promising

candidate for local production. Over 100 million units are used annually, and most of these are imported from the U.S. by A.I.D. and distributed to pharmacies by Egydrug at subsidized prices. The retail sale price is about 5.6¢ per unit.

Condoms from Japan, China, and other sources are also on sale, but at unsubsidized prices. The retail price of Japanese condoms is 25 piasters each.

Egypt's birth-control program has reduced the birth rate from 30 per thousand to about 20 per thousand over a five-year period. Managed by the Family Planning Board of Egypt, which works with A.I.D., the program has promoted chiefly IUDs and condoms. Though oral contraceptive pills are available, they are difficult to administer in Egypt.

Infant Nutritionals

Production of all types of baby food is needed in Egypt. Virtually all baby food is imported. Sales of infant milk and milk replacement products, such as Similac, Enfamil, and Neslac total about L.E. 13 million annually. These products are manufactured by Nestle, Wyeth, Abbott, Lyjempf, Nutricia, M. Johnson, and Milupia.

Planning for production of infant nutritionals in

Egypt presents a number of problems:

- o Containers. Glass and metal containers of required quality are not yet available in Egypt.
- o Raw Materials. Many of the required ingredients, such as sweet whey, glucose, lecithin, mono- and diglycerides, and corn oil, are unavailable in Egypt in suitable quantities and quality.
- o Pricing. The imported products now sold in Egypt are purchased by the government and sold to retail outlets at heavily subsidized prices. The subsidized retail price of a can of baby milk is 50 piasters; the C.I.F. price is U.S. $1.40-1.45. A local producer would be expected to sell his products to retail outlets without benefit of a subsidy.

Containers for Drugs and Other Medical Supplies

The principal producer of containers for the Egyptian pharmaceutical and food industries is the government-owned Medical Packing Company, also referred to as the Drug Containers Company. It produces plastic containers and small quantities of glass bottles and ampoules, which are supplemented by imports. Glass

bottles are gradually being replaced with plastics.

Because the necks of locally produced bottles are inconsistent in size, machine filling is difficult. Locally produced aluminum foil varies in thickness, and locally made ointment tubes often include metal fillings which contaminate the product.

Glass bottles and aluminum foil must be imported to assure top-quality production. These imports account for about 10 percent of total costs. There is thus an available market of L.E. 20 million or more (L.E. 200 million in the year 2000) for a manufacturing company with modern technology to produce pharmaceutical packaging materials.

The Medical Packing Company has made a detailed study of overall packaging requirements in Egypt to the year 2000. Based on available information for the period 1962 to date and estimates for the next five years, these data are considered fairly accurate. In this study, the demand for packaging in Egypt in 1980-1981 was estimated at L.E. 30 million. In 1981-1982, it is expected to rise to L.E. 41 million (U.S. dollars 60 million), representing 700 million units, including 200 million bottles. During 1980-1981, the Medical Packing Company produced one-third of the

L.E. 30 million and imported L.E. 7-8 million. It plans within two years to increase production sufficiently to be able to free itself from reliance upon imports, and to this end it is interested in joint ventures with foreign partners with appropriate technology.

Production of aluminum tubes for toothpaste, and the like, which now amounts to 35 million tubes per year, will be increased until the domestic demand for 75 million tubes per year is met. The average cost of a unit is 5 piasters; an opthalmic salve tube costs 6 piasters.

Work on flexible packaging from aluminum and composites of aluminum bonded to paper and plastic film is underway, and the Medical Packing Company is also developing:

- A seamless plastic floor and wall covering suitable for hospital operating rooms, food-processing factories, and soft-drink plants. The new flooring is being installed in the Om el-Messryeen Hospital in Giza.
- An artificial kidney device, the first to be manufactured in Egypt
- Plastic greenhouses

- Polyethylene plastic film to line canals and trenches and to underline poured concrete structures so that moisture can be contained until the concrete has cured
- Eyeglasses and sunglasses, with technology and designs supplied by the French couturier, Pierre Cardin.

The Medical Packing Company also is interested in producing hospital equipment and disposables, including beds, chairs, lavatory basins, tables, and screens. Technology is needed for plastics and disposables, and joint ventures as well as other connections with outside companies would be welcome.

8. ANIMAL HEALTH PRODUCTS

Introduction

The Egyptian government has a strategic plan for substantially increasing the consumption of animal protein in Egypt by increasing local production of meat, milk, and eggs. The goal of the plan is to increase per capita consumption of animal protein by 50 percent by the year 2000 and, at the same time, to make Egypt virtually self-sufficient in these products.

Implementation of this plan will have a major impact on the animal health sector.

Livestock

The production of red meat and milk will be increased by making genetic improvements, reducing sterility, combatting internal and external parasites, and encouraging feedlots for raising male livestock to proper slaughtering age. Although the Egyptian livestock population is not likely to increase significantly, the structure of the industry is likely to shift away from small village holdings of a few livestock held principally for draft purposes, and toward the operation of a greater number of large commercial herds.

The current livestock population consists

principally of 4.6 million cattle and water buffalo and 3.3 million sheep and goats.

Government Health Programs for Livestock

Government health programs in the strategic plan for livestock include:

- o Increasing the fertility of existing cows by 5 percent through the application of hormones over a five-year period. The annual cost is estimated at L.E. 3.9 million.
- o Treating livestock (and poultry) over a five-year period for external parasites as well as internal parasites such as stomach worm, helminths, distoma hepatica, and blood parasites. The annual cost for implementing this program is expected to be L.E. 2.6 million.*
- o Upgrading local cattle genetically through artificial insemination using imported semen. This is expected to require an investment of L.E. 6.5 million for the establishment of frozen semen units in nine Egyptian governorates.

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* In Egypt, farm animals are sprayed with insecticide and pest-control agents rather than dipped into them as in the United States. Because all spray equipment and motors are now imported, the Ministry of Agriculture would like to establish a local industry to produce sprayers.

Three units have already been established.

- o Introducing milk replacers for suckling livestock to free the mother cow's milk for human consumption. Because milk replacer is not now produced in Egypt, opportunities may exist for manufacturing the product locally using imported ingredients. The potential market for milk replacer amounts to about 120,000 MT annually and has a retail value of $120 million at 1981 prices.

Government Health Programs for Poultry

The government's strategic plan places top priority on the development of a large commercial poultry sector. The goal is to increase the annual production of poultry meat from about 129,000 MT in 1980 to 661,000 MT by the year 2000. Similarly, egg production is to be increased from 1.4 billion eggs in 1981 to 7.8 billion eggs by the end of the century.

Expansion of the poultry sector will take place principally in the private sector with a few large integrated poultry companies providing chicks, feed, vaccines, pharmaceuticals, and services to smaller private broiler and egg farmers.

The need for genetic and health-related poultry

support systems in Egypt is expanding rapidly.

Veterinary Pharmaceuticals

The market for antibiotics and other pharmaceuticals is small and fragmented. Total turnover is estimated at about L.E. 10 million. Participants include Arab Drug Company, Alexandria Company, C.I.D., El Nasr, Hoechst-Orient, Memphis Company, Misr, Nile Company, and Pfizer-Egypt. Veterinary products imported from foreign firms such as Merck, Bayer, and American Cyanamid are also distributed. Although the Ministry of Agriculture is involved in all phases of animal health and prophylaxis against infection, the approval of new veterinary pharmaceuticals is controlled by the Ministry of Health. The prices of veterinary pharmaceuticals are not controlled as rigidly as is the case with human pharmaceuticals.

The active ingredients used in the animal health field for pharmaceuticals, antibiotics, antiparasitic drugs, insecticides, fungicides, and the like are imported. Although there may be sufficient demand to support the local manufacture of a few of these ingredients, feasibility studies would be required to identify suitable candidates.

Veterinary Vaccines

The Ministry of Agriculture handles all matters related to the availability and use of vaccines. Most animal vaccines are purchased from foreign sources (mostly France) by a special sector for imports as well as by several companies. A public sector company, General Poultry Company, purchases poultry vaccines. Foreign-source vaccines are purchased on tenders at prices set by the producers. The vaccines are distributed free by the Ministry of Agriculture.

A few vaccines are produced in Egypt. Production is the responsibility of the Animal Health Research Institute of the Ministry of Agriculture. The quantities manufactured fall far short of requirements, and a joint venture between a foreign company and the Egyptian government or a public sector company would be welcome. Local manufacture is desirable because of procurement problems and because vaccines could be produced form virus strains that are specific to Egypt.

Total vaccine needs beyond the amounts produced locally probably amount to L.E. 2 million. Within three to four years, volume could increase to L.E. 4-5 million. There also are opportunities for export sales to neighboring countries.

Vaccines for Poultry

In the poultry field, the main need is Newcastle's vaccine (vs. avian pneumoencephalitis). More than one billion doses per year are now required; only 100 million doses are produced locally. Chicks are vaccinated on day 1 and given booster shots after 7 days and sometimes after three to four weeks. By the year 2000, about 5 billion doses per year will be required if the goals of the government's strategic plan are to be achieved.

Gumboro vaccine (vs. infectious avian nephrosis) is also required. About 35 million doses are imported annually at a cost of $4 per 1,000 doses.

Very little Marek's vaccine (vs. avian leukosis) is required, and it is not produced locally. About 4 1/2 million doses are used annually at a cost of $10 per 1,000 doses. Because chicks are vaccinated on day 1 and most chicks are imported, they arrive already vaccinated. However, soon as a local chick production industry is developed, the need for Marek's vaccine will grow rapidly.

Vaccines for Livestock

Three vaccines for cattle, buffalo, and sheep are needed: foot and mouth disease vaccine (vs. aphthous

fever), Rift Valley fever vaccine, and anerobic vaccine (vs. diarrhea: Clostridium perfringens). The small quantities that are produced locally satisfy less than 10 percent of the need.

- o Foot and mouth disease. All animals should be vaccinated twice a year. Cost per dose is 20 piasters. Local production is 0.5 million doses; annual need, about 13 million doses.
- o Rift Valley fever. Sheep and cattle should be vaccinated twice a year. Only 100,000 doses are produced locally. The current supply contact is for 4 million doses, imported from southern France.
- o Anerobic vaccine. This vaccine is used every six months. Some is produced at a cost of $1 for 20 doses. Foreign prices are higher.

As the animal population increases, a vaccine will also be needed to combat IBR (infectious bovine rhinotrachitis).

Prepared Livestock and Poultry Feeds

There is a shortage of both animal and poultry feeds in Egypt. Poultry feed ingredients are imported and mixed in Egypt. Livestock go without their full requirements.

Prepared Animal Feed

Current production of prepared animal feed, about 1.4 million MT annually, is manufactured chiefly by the government-owned oil mills, which use cottonseed cake as the principal protein. The estimated annual requirement for prepared animal feed is 4-5 million MT.

The Ministry of Agriculture would strongly support any prepared animal feed project that would utilize nonconventional processes, especially if local residues such as rice, straw, bagasse, or corn stalks were utilized. U.S. companies with the appropriate technology--such as the various single cell protein processes--might find interesting opportunities to produce animal feed in Egypt.

Prepared Poultry Feed

In 1981, 600,000 MT of poultry feed utilizing imported corn, soya, and various additives, were prepared in Egypt. By the year 2000, the annual production of poultry feed is expected to exceed 3 million MT.

Most of the large poultry companies are now producing poultry feed for their own use and for their satellite poultry farmers. Because these companies, plus several new companies now entering the poultry

sector, have large expansion plans, it is unlikely that there will be opportunities for joint ventures in producing prepared poultry feed except as part of an integrated poultry operation.

Nonetheless, considering the current and anticipated need for poultry and livestock feed, opportunities for U.S. companies to produce additives or premixes for feed may well exist. These premixes consist of combinations of small quantities of feed with vitamins, essential trace elements, antioxidants, growth promoters, and anti-infective agents (coccidiostats, antibiotics, anti-fungal agents, etc.). The premix is in turn combined with the farmer's grain and other purchased nutrients (fishmeal, cottonseed meal, etc.) before being fed to livestock and poultry.

9. A REVIEW OF POTENTIAL INVESTMENT OPPORTUNITIES

The 23 potential joint-venture opportunities identified in this report on health care products are summarized in Table 9-1. Most of these opportunities are in the preliminary conceptual stage and require market analysis and discussions with Ministry of Health officials to determine possible production and marketing constraints as well as possible joint ventures with public companies or ACDIMA.

In principle, the Ministry of Health, the Investment Authority, and, in applicable cases, the Ministry of Agriculture, rate all of these opportunities as having high priority among Egypt's development goals.

The "Profiles" that follow Table 9-1 summarize potential opportunities that may be of particular interest.

Table 9-1

JOINT-VENTURE POSSIBILITIES DISCUSSED IN REPORT ON THE PRODUCTION OF HEALTH CARE PRODUCTS IN EGYPT

	Product	Page References
1.	Stainless Steel Needles	108, Profile 1
2.	Rubber Gloves	108-109, Profile 2
3.	Hard Gelatin Capsules	109-110, Profile 3
4.	Sutures	110-111, Profile 4
5.	Adhesive Tape	111
6.	Plastic and Textile Disposables	112
7.	Germicidal Surgical Scrub Solution	112-113
8.	Plaster of Paris Bandages	113
9.	Talc	113-114
10.	Thermometers	114
11.	X-Ray Film	114
12.	Condoms	114-115
13.	Infant Nutritionals	115-116
14.	Pharmaceuticals	102-106
15.	Pharmaceutical Packaging Materials	116-119
16.	Hospital Management	18
17.	Veterinary Pharmaceuticals	124

Table 9-1 (cont'd)

	Product	Page References
18.	Vaccines for Livestock	126-127
19.	Vaccines for Poultry	126
20.	Prepared Livestock and Poultry Feeds	127-129
21.	Animal Sprayers	122
22.	Milk Replacers for Calves	123

Profile 1

STAINLESS STEEL NEEDLES

Description:	A joint venture for the production of stainless steel needles of all types: hypodermic, intravenous infusion, blood withdrawal, suture sewing, catheter, etc.
Egyptian Interest:	Ministry of Health and, possibly, the Arab Company for Drug Industries and Medical Devices (ACDIMA).
Location:	To be determined.
Role of Foreign Firm:	Technology and equity participation.
Project Status:	Conceptual.
Output:	The specific types and quantities of products required are to be determined through detailed market analysis.
Market:	There are no detailed data on the size of the needle market in Egypt. About 100 million per year appear to be required, but because of shortages and re-use, imports amount to 8-10 million annually.
Competition:	Needles are not manufactured in Egypt. Imports are handled primarily through the government organization, El Gomhouria Company for Trading Pharmaceuticals, Chemicals, and Medicinal Appliances, and come from foreign companies such as Terumo in Japan.

Profile 2

RUBBER GLOVES

Description:	A joint venture for the manufacture of high-quality, disposable, surgical gloves.
Egyptian Interest:	A Ministry of Health company, probably the Alexandria Company for Pharmaceuticals and Chemical Industries.
Location:	To be determined.
Role of Foreign Firm:	Technology and equity participation.
Project Status:	Preliminary discussions only.
Output:	The specific types and quantities required are to be determined through detailed market analysis.
Market:	Although local production of one million pair can satisfy 75 percent of the market, the product is considered unsatisfactory because it is slippery and unsterilized. Some 100,000 pair of disposable gloves, used principally in the private sector, are imported annually. This is not truly reflective of potential demand because imports are restricted and very expensive.
Competition:	The Alexandria Company for Pharmaceuticals and Chemical Industries, which manufactures a re-usable, general purpose rubber glove, is the only producer of rubber gloves in Egypt. The government-owned El Gomhouria Company for Trading Pharmaceuticals, Chemicals, and

Medical Appliances imports gloves from Watra Company and Drago Export Company in Czechoslovakia. The better hospitals use "Regent Dispo" brand from LRC Products Ltd. (England) at a cost of L.E. 2 per pair.

Profile 3

HARD GELATIN CAPSULES

Description:	The establishment of a facility to produce hard gelatin capsules.
Egyptian Interest:	The Ministry of Health through one of its companies--El Kahira Company or Misr Company, for example, both of which manufacture soft gelatin capsules.
Location:	To be determined.
Role of Foreign Firm:	Technology and equity participation.
Project Status:	Conceptual.
Output:	Approximately 2-3 million hard gelatin capsules daily.
Market:	Close to one billion capsules annually, representing a $20-million market.
Competition:	El Kahira Company can produce 13 million hard gelatin capsules per month. It uses four machines, including a 1972 model high-speed machine from Zanabi Nigris S.p.A. (Italy); a fifth machine will soon be installed. El Kahira utilizes its total output. Eli Lilly and Company, Parke Davis, and R. P. Scherer are the leading foreign suppliers.

Profile 4

SUTURES

Description:	The establishment of a modern suture-manufacturing facility for the production of high-quality sutures (animal source, nylon, and synthetic polyglycolic acid).
Egyptian Interest:	The Ministry of Health and one of its companies, The Nile Company for Pharmaceutical and Chemical Industries.
Location:	To be determined.
Role of Foreign Firm:	Equity participation and technology.
Project Status:	Product mix and production capacity must be determined through market analysis.
Market:	In 1981, about 500,000 units per year.
Competition:	The Nile Company is the only producer of "cat-gut" sutures in Egypt. Produced from sheep membrane in the past, sutures are now produced from cow membrane in a new plant which started production in late 1981 using Braun-Melsungen technology. The quality of the new suture is unknown. All types of sutures (animal source, nylon, and synthetic polyglycolic acid) are imported from Ethicon ((division of Johnson & Johnson) and Davis & Geck (division of American Cyanamid).