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ARMED FORCES MEDICAL INTELLIGENCE CENTER

CENTAF INTELLIGENCE

HEALTH THREATS AND ASSESSMENTS -- DESERT STORM (U)

JANUARY 1991
AFMIC-1810R-041-91

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HEALTH THREATS AND ASSESSMENTS DESERT STORM (U)

AFMIC-1810R-041-91

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PREFACE

~~(C/NF)~~ This report presents a medical intelligence package which will serve as a basis for planning US military and civil medical requirements for contingency planning and special operations in the DESERT STORM Area of Operations. It presents elements of information which identify health hazards, including potential chemical threats and environmental and disease threats. Foreign medical capabilities within the area of operations are included. This report has been reviewed by the AFMIC surgeon.

Replied to DIA & AFMIC

(U) Each classified paragraph, caption, and title in this report has been properly marked; those unmarked are unclassified.

(U) Request any amplification of subject matter, constructive criticism, comments, or suggested changes be forwarded to Director, Armed Forces Medical Intelligence Center, Fort Detrick, Frederick, Maryland 27102-5004, AUTOVON [redacted] (b)(3):10 USC 424

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SECTION I
DISEASE INFORMATION

MEDICAL EFFECTS OF WINTER (U)

(U) The following is intended to provide additional information on infectious diseases and general environmental factors during winter months in the DESERT STORM area of operations which may impact operational units and humanitarian medical missions.

General -- (U) Military conflict will weaken existing medical infrastructure, reduce preventive medicine programs, interfere with waste disposal, and compromise personal hygiene. These factors will lead to increased incidence of endemic diseases, and refugee populations will be at elevated risk for these diseases. Additionally, the immigration of nonindigenous persons into some regions may introduce nonendemic diseases and will change the baseline health status of the resident population. (See AFMIC Special Weekly Wires 31-90A, 32-90D, 34-90A, and AFMIC publication AFMIC-1810R-037-90.)

Food- and Waterborne Diseases -- (U) The risk of acute diarrheal diseases from bacterial etiologies generally is greatest from July through September, but these agents will continue to be the primary infectious disease threat to operational forces. Incidence from viral etiologies (primarily rotavirus in children) is elevated from December through March. Risk from hepatitis A is elevated from October through December, and due to the long incubation period (15 to 60 days) and length of deployment, clinical cases may begin to occur in increased frequency in military personnel not protected by immune serum globulin (ISG). Hepatitis A causes approximately 50 percent of the clinical cases (mostly children) of acute viral hepatitis in the indigenous population.

Vectorborne Diseases -- (U) In endemic areas (southwest Saudi Arabia, Yemen, and Oman), malaria transmission peaks from November through April (Figure 1). Mosquito populations will be influenced by the amount of rainfall, and vector surveillance will be important for assessing risk in specific areas. Competent malaria vectors are present in areas where malaria transmission has been interrupted (eastern Saudi Arabia, Kuwait, and southern Iraq); with the influx of malaria carriers and reduced vector control measures, resurgence may occur. *Plasmodium vivax*, followed by *P. falciparum*, would be the most likely forms of malaria to be introduced into southern Iraq and Kuwait. Risk from arboviral fevers (sandfly, Crimean-Congo hemorrhagic, West Nile, dengue, and sindbis) is reduced during colder months. Risk from cutaneous and visceral leishmaniasis is low during this period (transmission peaks from April to September); however, due to the long incubation period (1 week to many months) and length of deployment, clinical cases may begin to occur in increased frequency in military personnel (Figure 2). Risk from sandfly fever (and other arboviral fevers) and leishmaniasis will be significantly greater during the spring and summer of 1991. Intestinal and urinary schistosomiasis risk is lower during winter months (transmission occurs year-round with peaks from June through September); however, due to the long incubation period (2 to 6 weeks) and length of deployment, clinical cases may begin to occur in increased frequency in military personnel (Figure 3).

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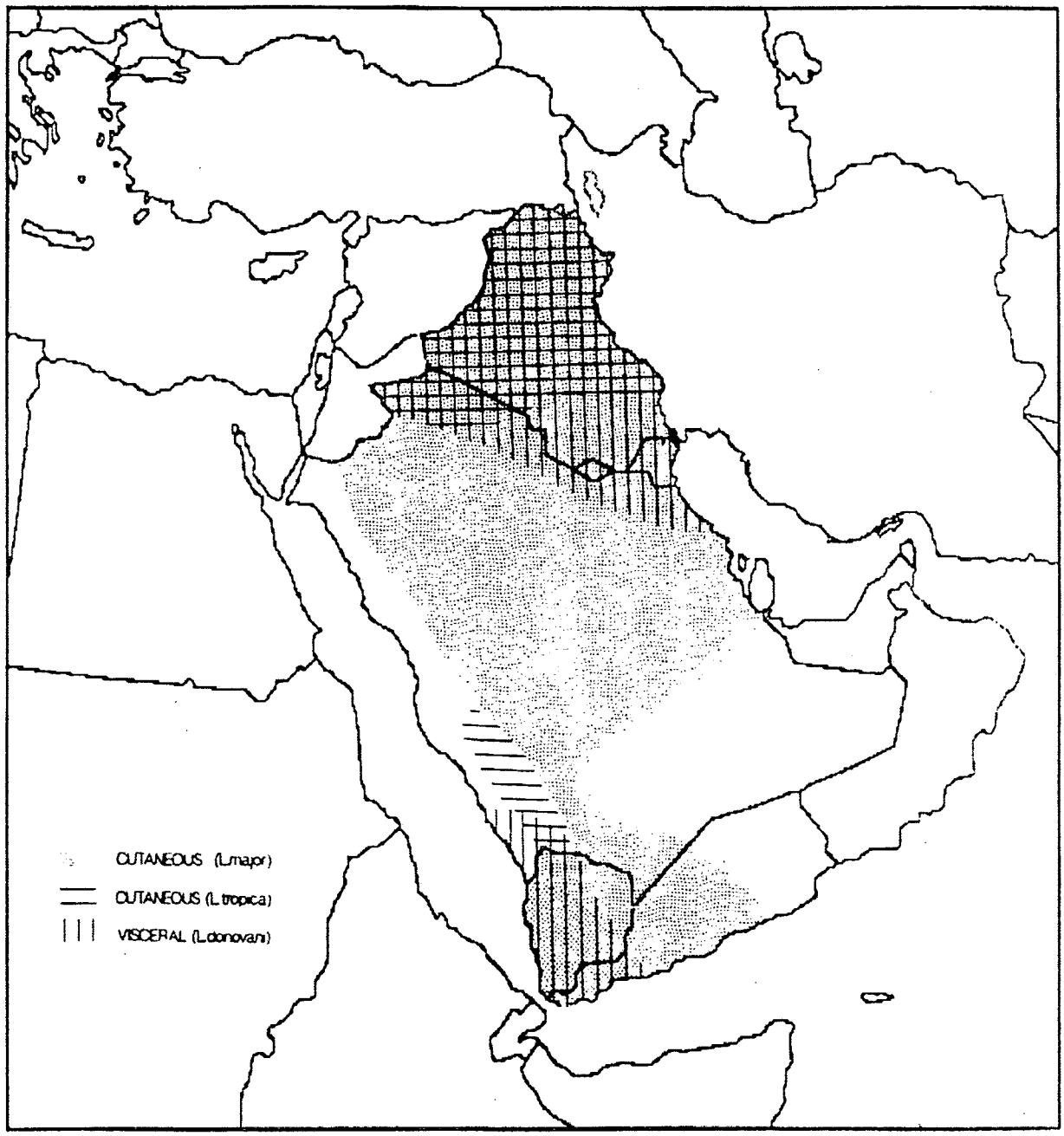

Figure 2. (U) Distribution of Leishmaniasis in Iraq and the Arabian Peninsula

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Other Operationally Important Diseases -- (U) Risk from influenza is highest from December through February; during the late 1980s, isolates of influenza A(H3N2) predominated over those for A(H1N1) and B. Meningococcal meningitis risk is elevated from November through February and is greatest for personnel having close contact with local nationals, particularly children; Group A predominates, although all groups are reported (reporting of Group W-135 isolates increased during the late 1980s).

Other Diseases Endemic in the Local Population -- (U) Epidemic louse-borne typhus is more prevalent in colder months and commonly is associated with overcrowding, transient populations, impoverished people, and poor sanitary conditions. Stray dog and cat populations usually decline in winter months, decreasing (not eliminating) the risk of animal bites and rabies exposure. Measles is the most significant childhood disease in the region, with a marked seasonal peak in incidence in late winter and early spring (January through April); diphtheria is reported in low numbers, with increases in colder months (November through March).

Cold Weather -- (U) Subfreezing temperatures (into the teens) are more common during the nights in central and northern Saudi Arabia and in the northeast mountains of Iraq. Freezing temperatures in the interior of the Arabian Peninsula have been observed as early as November and as late as March.

Precipitation -- (U) Annual precipitation is concentrated during the winter months, and although the total volume is low, it may occur in the form of violent storms. Flash flooding may fill wadis and disrupt roadbeds. Trafficabilty over sebbkahs (salt flats) may also be more hazardous following rainy periods as result of increased subsurface water. Flooding is most frequent in winter and spring along the Tigris River in Iraq as result of both heavy precipitation and melting snow in the mountains.

Wind Storms -- (U) Migratory low pressure systems affect Iraq and the northern part of the Arabian Peninsula and are more frequent in November and April than the other winter months. One feature of the migratory systems is the production of sand and dust storms by the accompanying winds sweeping over dry, loosely packed surfaces. Other winter winds include the kaus, the blat, and the foehn. The kaus is a potentially gale force southeasterly wind on the Persian Gulf during the months of December through April that is accompanied by humid, cloudy weather and rain squalls. The blat is a strong dusty (or sandy) northwesterly wind on the south coast of the Arabian Peninsula. The warmth produced in the descending air of the foehn winds is partly responsible for the absence of severely cold weather in Iraq.

Poisonous Snakes -- (U) Some normally nocturnal snakes may be more active during winter daylight hours from December to March; the most notable being the saw-scaled viper (*Echis coloratus* - reported in various dark shades of gray, blue, or silver, dappled with lighter spots and a white underside; head is bell shaped). The saw-scaled viper is an extremely aggressive snake and is responsible for more snakebite deaths worldwide than any other snake. When encountered, it assumes a characteristic figure-8 coil, rubbing its serrated side scales together to produce a buzzing or sizzling noise. The snake inhabits dry sandy areas, rocky outcroppings, rodent burrows, and dry scrub forests of Saudi Arabia, especially in the southwest region of the Kingdom and the environs around Riyadh. The

saw-scaled viper may also climb into bushes to escape flooding from rains. The viper has not been reported from the northeastern area. A related family member inhabiting the Arabian Peninsula, the carpet viper (reddish brown with white bars on its back with a yellowish colored belly and egg-shaped, speckled head with a trident pointing to the rear) poses a similar threat, but its presence in the area of operations has not been confirmed.

OTHER ENDEMIC DISEASES

(U) This article discusses other diseases endemic in the local population that will be important to medical forces in the Middle East because of the likelihood of humanitarian medical assistance for refugees or displaced persons. Diseases are prioritized in descending order of expected impact on humanitarian medical missions. Additionally, because of the length of time in the Area of Operation (AO), these diseases will be increasingly important to operational units. Common or local names for the diseases are in parenthesis. The available statistics on the prevalence and incidence of many of these diseases are incomplete, making reported rates and numbers of cases generally unreliable indicators of true prevalence or endemicity. Transmission factors that are unique or important in this region are discussed. Complete discussions on incubation periods, routes of transmission, and clinical signs and symptoms are available in standard texts and are beyond the purpose of this article.

ACUTE CHILDHOOD DIARRHEA (Eshal)

Disease Agents: In children younger than 5 years suffering from acute diarrhea, the most common enteropathogens isolated, in descending frequency, generally are rotavirus (37-44 percent), *Salmonella*, enteropathogenic *Escherichia coli*, *Shigella*, and *Campylobacter jejuni*. The most common parasite isolated is *Giardia lamblia* (4-7 percent of the cases). Multiple infections are seen in about 1 percent of the children. Cholera is not endemic in the region; imported cases (and outbreaks) occur, but cholera should not be a significant cause of childhood diarrhea in refugee populations.
Distribution/Risk Period: Widespread. Year-round. Seasonal increases in rotaviral diarrheas primarily in cold months (December-March), but also in the hot dry season (July-September). Seasonal increases in bacterial etiologies occur from June to October; protozoal cases peak in August and September.
Remarks: Rotavirus is a leading cause of gastroenteritis in young children (aged less than 5 years) in Kuwait and Saudi Arabia; the incidence is lower in breast-fed than in bottle-fed infants. Rotavirus diarrhea is a major pediatric health problem, with up to 30 percent of the children having concurrent upper respiratory infection. Among the bacterial etiologies, multiple drug resistance is common among *Salmonella* and *Shigella* isolates.

INTESTINAL PARASITES

Intestinal parasitic infections (IPI) are not notifiable diseases; the true prevalence and incidence of these diseases are unknown.
Agents: Most common IPI are amebiasis, giardiasis, ascariasis, trichuriasis, enterobiasis, and hymenolepiasis. Human dicrocoeliasis (*Dicrocoelium dendriticum*) has been reported from Saudi Arabia and is commonly associated with drinking raw milk or eating raw liver (camel, cattle, goat, or sheep). Taeniasis (*Taenia saginata*) and *fascioliasis* are reported

from discrete foci. Low levels of *Trichostrongylus columbriformis* and *Strongyloides stercoralis* have been detected in northern Iraq.
Distribution/Risk Period: Widely distributed, but vary geographically and depend on many socioeconomic factors; more common among lower socioeconomic levels than middle and upper levels. In developed regions, roundworms and whipworms are present at low levels. Hookworm (*Ancylostoma duodenale*) infections generally occur in primitive rural communities where promiscuous defecation exists. Enteric protozoal agents (*Giardia lamblia* and *Entamoeba histolytica*) are commonly isolated from all regions. Transmission of most agents occurs year-round, with seasonal increases in the dry season. Human cases of dicrocoeliasis peak in October and November.
Remarks: Highest IPI rates can be anticipated in expatriate workers from less-developed countries and from indigenous people from rural areas. A high rate (63 percent) of intestinal parasite infection was found in a hospital-based study in Kuwait. A similar study in Riyadh revealed that 323 of 3,800 patients examined were infected with potential pathogens -- *Giardia, Hymenolepsis nana, E. histolytica*, and *Ascaris* being the most frequent (in descending order). Similar levels were detected in community-based studies in northern Iraq, where IPI rates reached 18.3 percent; prevalence for roundworms (*Ascaris lumbricoides*) in rural areas near Bagdad and Babylon is estimated to be slightly more than 5 percent. In Saudi Arabia, IPI rates may be highest in rural communities in the Asir province; IPI in children from urban areas are most commonly due to *G. lamblia* (13.5 percent), followed by *Enterobius vermicularis* (4.2 percent) and *H. nana*; the general incidence of other helminthic parasites is low. In a 2-year study of stool samples of 42,022 food handlers from Abu Dhabi, United Arab Emirates, hookworms were found in 13.8 percent of the samples, whipworm 6.9 percent, and roundworms 2.6 percent. Interruption of potable water supplies and sewage disposal and deteriorated sanitary conditions in developed regions will increase the incidence of most of these parasites.

TRACHOMA (Ramad)
Transmission: Primarily transmitted by direct contact with ocular and nasopharyngeal discharges on fingers and contaminated materials (face cloths and cosmetic khol sticks used to darken eyelids). Filth flies (primarily *Musca sorbens*, the market or bazaar fly, but also *M. domestica*) contribute to the spread of the disease.
Distribution/Risk Period: Widely distributed and highly endemic, particularly in rural areas with poor hygiene. Year-round.
Remarks: In endemic areas, the highest infection rates are in children. Prevalence of active cases in Oman is an estimated 5 to 15 percent and is 10 percent in Yemen. Approximately 22 percent of the Saudi population suffer from trachoma and about 6.2 percent have active trachoma; the disease is hyperendemic in the Eastern Province of Saudi Arabia. Control measures reduced incidence in the 1980s, but trachoma is still the most widespread eye disease in this region and the leading cause of preventable blindness.

CHILDHOOD DISEASES (Diphtheria, Measles, Pertussis, Poliomyelitis, and Tetanus)
Distribution: Endemic, but marked regional variations in reported incidence exist. Based on the number of reported cases (data available through 1988-89), more developed countries (Saudi Arabia, Kuwait, Bahrain, Oman, and UAE) have a lower incidence. Generally, Yemen and Iraq have the highest rates.
Vaccination Programs: Expanded programs of immunization (EPI) have improved vaccination coverage and reduced the incidence of targeted diseases in the region since the

early-1980s. In 1988-89, Saudi Arabia, Kuwait, Oman, UAE, and Bahrain reported that approximately 85 to 90 percent (weighted average) of infants had received a complete vaccination series (OPV, DPT, measles, and BCG). Percent coverage was lower in Iraq and Qatar. Yemen had the poorest coverage, 35 to 45 percent.
Remarks: Refugee populations that have relied on EPI to control childhood diseases will be at increased risk for outbreaks or epidemics when vaccination programs are interrupted.

BRUCELLOSIS (Al-Brosliyat)
Transmission/Reservoir: Over 80 percent of reported human cases are due to consumption of raw dairy products (goat and camel milk and cheeses). Contact with infected material plays a minor role. In human cases not associated with direct animal or product exposure, most appear to have contracted the disease while travelling through areas contaminated with animal fetal tissues. The disease is endemic in natural reservoirs (goats, sheep, camels, and cattle) which principally are infected with *Brucella melitensis*. The prevalence of infection of sheep and goats commonly exceeds 10 percent. *B. abortus* has been isolated from camels, but the clinical significance is unclear.
Distribution/Risk Period: Widespread, but regional variations exist. Human cases caused by *B. melitensis* are widely distributed, in both rural and urban areas. Seasonally distributed, with most cases occurring March to July, peaking in April and May. Peak incidence of cases associated with environmental exposure coincides with the lambing and kidding seasons.
Remarks: One of the most common human infectious diseases in the region; many areas have experienced true increases in incidence, with some outbreaks reaching epidemic proportions. Particularly common among farmers, shepherds, nomadic tribesmen, and their families (10 to 25 percent sero-prevalence has been detected in agricultural workers). Annual incidence increased greatly in Kuwait in the early 1980s, with the incidence reported in 1985 thirty times higher than in 1976. Other neighboring countries have experienced similar increases. In Oman, about 300 human cases are reported annually, with the majority in the Dhofar region, where it occurs in epidemic proportions among the Jebali people. The rise may be partially due to increased clinical awareness and improved diagnostic capabilities, but highly mobile animal herds and uncontrolled importation of live animals have interfered with control efforts. For each case reported an estimated 25 cases are unrecognized or unreported.

TUBERCULOSIS (Al-Sol)
Transmission/Reservoir: Most tuberculosis (TB) is caused by human-to-human transmission of *Mycobacterium tuberculosis*. Zoonotic tuberculosis is of lesser significance.
Distribution/Risk Period: TB is widely distributed throughout the region, however, countries have varying levels of prevalence.
Remarks: TB is an important disease in the indigenous population. Most of the reported human cases are pulmonary rather than disseminated or extrapulmonary. Tuberculous cervical lymphadenitis represents a significant portion of the extrapulmonary TB in Saudi Arabia (biopsied neck masses are frequently diagnosed as tuberculosis). Based on the estimated level of risk of infection (the proportion of the population which has been infected or reinfected in the course of 1 year), countries in the region can be grouped into three categories of prevalence. Countries with low-prevalence (risk of infection 0.1 to 0.2 percent) are Bahrain and Kuwait. In Bahrain, infection rates in expatriate workers from

less-developed countries were found to be seven times higher than in Bahrainis. High-prevalence (2.0 to 3.0 percent) is reported from Yemen. All other countries in the region have intermediate level prevalence (0.5 to 1.5 percent). All countries in the region, except Iraq, are known to have incorporated childhood BCG vaccination of children into their Expanded Program of Immunization (EPI). A 21.3 percent prevalence of resistance to primary antituberculous drugs was reported from Riyadh, Saudi Arabia. Primary resistance to INH was 19.4 percent; primary and secondary resistance to rifampicin was 3 percent and 33.7 percent, respectively. Most isolates from patients with acquired resistance to rifampicin also were resistant to INH.

ECHINOCOCCOSIS (Hydatid Disease)
Transmission/Reservoir: Carnivores harboring the adult tapeworms (*Echinococcus granulosus*) become infected by eating viscera of intermediate hosts containing hydatid cysts; the dog-sheep cycle (particularly associated with dogs used for sheep herding) is important in this region. Cattle, goats, and camels are lesser important intermediate hosts. Infection rates in dogs vary by region and locality, with highest rates (67 to 100 percent) reported in Irbil Province of northern Iraq. In 1976, the prevalence in dogs in Kuwait was found to be 23 percent, but levels may have declined. Stray dogs in urban areas commonly are infected by feeding on uncooked offal discarded from slaughter houses; up to 15 percent of stray dogs near Al-Hassa, Saudi Arabia reportedly were infected.
Distribution/Risk Period: Endemic and enzootic, especially in rural agricultural areas where dogs are used to herd grazing animals, particularly sheep. However, human cases also occur in larger urban areas. Widely distributed and highly endemic/enzootic in Iraq. Reportedly, the highest prevalence in Saudi Arabia exists in the southern and western regions followed by the central region. Moderately endemic in Kuwait. Year-round.
Remarks: Important parasitic infection in this region, particularly among groups having intimate contact with dogs (and objects soiled with feces). Islamic teachings stress avoidance of dogs; however, this does not provide complete protection. The highest incidence of human disease generally is in the 31 to 40 year old age group. Human infection rates in Iraq are estimated to be slightly less than 1 percent, accounting for 1 percent of all surgical procedures; in highly endemic areas of Saudi Arabia, it has accounted for 5 percent of all major surgical operations. In Kuwait, the majority of recently reported cases were in non-Kuwaitis.

RABIES (Al-Kalab)
Transmission/Reservoir: Sylvatic and urban rabies are important. Urban rabies, with stray dogs (cats and other animals to a lower extent) serving as the reservoir and main source of human exposure, is reported from cities and villages of most countries. The principal enzootic reservoir for sylvatic rabies is the desert fox, and spill over into stray dog and cat populations frequently occurs. Sheep rabies is reported with low sporadic occurrence.
Distribution/Risk Period: In Saudi Arabia, human cases are very sporadic, usually in the northern or eastern rural areas. Although Oman had been considered to be provisionally free of rabies, the disease is endemic in this region, with recently reported laboratory-confirmed cases in foxes and sheep and a human case. Rabies is present but of low incidence in Qatar and the UAE. Kuwait and Bahrain are considered rabies-free; the last case of animal rabies in Kuwait was reported in October 1987. Year-round transmission

occurs, but an increased risk in the spring and summer can be expected due to elevated animal populations and increases in animal bites in warmer seasons.
Remarks: Dog and cat bites/scratches will probably be the primary sources of human exposure and reasons for post-exposure prophylaxis. Animal cases are likely to be unrecognized and underreported by the indigenous population. Additionally, the disruption following military conflict may allow reintroduction into previously free areas.

Q FEVER
Transmission/Reservoir: Commonly transmitted by airborne dissemination of rickettsia (*Coxiella burnetii*) and secondarily by direct contact with infected animals and from consumption of raw milk. Domestic animals, rodents, and ticks (primarily *Hyalomma dromedarii*) serve as natural reservoirs.
Distribution/Risk Period: Widely distributed throughout the region; serological studies suggest that it is highly endemic in eastern Saudi Arabia, and it may be endemic in other areas at similar levels. Enzootic in livestock. Year-round.
Remarks: Sporadic cases have been reported areawide, but incidence is suspected to be greater that reported due to limited diagnostic capabilities. Serology from indigenous personnel in rural areas indicates that subclinical infection develops in childhood and virtually all young adults have had sensitizing contact (inducing aquired immunity).

PLAGUE (Taa'on)
Transmission/Reservoir: Primarily transmitted by the bite of an infective flea (primarily *Xenopsylla cheopis*, the oriental rat flea, but also *Pulex irritans*, the human flea). Reservoirs for sylvatic plague in the region include gerbils (*Meriones* spp. and *Gerbillus gerbillus*) and desert voles. *Rattus rattus* may serve as a reservoir around dwellings in endemic areas.
Distribution/Risk Period: Occurs areawide. Natural occurring enzootic foci of plague historically have existed between the Tigris and Euphrates Rivers and adjacent territories extending from Syria to the Persian Gulf, possibly including Kuwait. In Iraq, the highlands near the border with Syria historically have been an enzootic focus. Although plague is considered eradicated in Saudi Arabia (last reported outbreak occurred in 1969 along the Yemen border in the Khawlan district), sylvatic (wild rodent) plague should be considered focally enzootic in the Asir upland plains in the southwestern portion of the Arabian Peninsula. Year-round, but especially during hot, dry months.
Remarks: Underreported.

ANTHRAX (Al-Jamra)
Transmission/Reservoir: Enzootic, primarily in sheep and goats. Infections in these animals serve as the primary method of environmental and product contamination with spores. Many of the reported human cases are unable to identify the true source of their infection.
Distribution/Risk Period: Widely distributed, but focally endemic. Occurs sporadically in rural areas during summer months.
Remarks: Cutaneous cases predominate, followed by gastrointestinal and pulmonary forms. Cases and outbreaks are most likely in nomadic populations, farmers, and shepherds and in people handling infected animal products (wool, hides, meats). In Iraq, 200 to 269 human cases were officially reported annually from 1976 to 1980.

TYPHUS, LOUSE-BORNE (Epidemic Typhus)
Transmission/Reservoir: By rubbing crushed body lice (*Pediculus humanus*) or their feces into the bite site or abrasions; lice defecate rickettsiae (*Rickettsia prowazeki*) while feeding. Man is the reservoir and maintains the infection during inter-epidemic periods.
Distribution/Risk Period: Thought to be present, but prevalence is unknown. Endemic foci are present in Iraq. Northern Saudi Arabia and Kuwait are at the southern limits of the distribution belt in the Middle East. The disease may be present in the southwest regions of the Arabian Peninsula (Asir Province of Saudi Arabia and Yemen). Seasonal, usually more prevalent in colder months.
Remarks: Louse-borne typhus is commonly associated with overcrowding, transient populations, impovershed people, and poor sanitary conditions; refugee populations would be at increased risk. In 1977, 19 cases were reported from Iraq, with most cases from July to September. An outbreak was reported among nomadic tribes in northern Saudi Arabia in 1961 resulting in 49 cases and 2 deaths.

TYPHUS, MURINE (Endemic Typhus)
Transmission/Reservoir: Primary vectors are infective fleas, usually *Xenopsylla cheopis* (oriental rat flea) and potentially *Ctenocephalides felis* (cat flea). The disease is maintained in nature by a rat-flea-rat cycle; large rodent populations contribute to the spread of murine typhus.
Distribution/Risk Period: Thought to be present areawide, but prevalence is unknown. In Saudi Arabia, human cases occur along the Red Sea coast, the northern province, and along the Persian Gulf coast. Year-round, but peaks during the summer months.
Remarks: Sporadic cases are reported. An outbreak occurred in Kuwait in 1978 with 254 clinical cases detected; the highest attack rates were among people in lower socioeconomic levels. Deteriorated sanitary conditions in Kuwait will elevate rodent populations which will contribute to increased incidence of murine typhus.

NONVENEREAL ENDEMIC SYPHILIS (Bejel)
Distribution/Risk Period: Moderately endemic. Widely distributed, particularly in remote rural areas where the standard of hygiene is low and access to health services is limited. Year-round.
Remarks: Primarily confined to nomadic and semi-nomadic tribesmen (Bedouins), where the prevalence may reach 20 percent; the majority of clinical cases are between 15 and 35 years old. The majority of cases aquire the infection in childhood. The seropositivity rate is higher among females. The social consequences of mistaking bejel for venereal syphylis in a conservative Islamic culture must be recognized.

LEPROSY (Al-Jotham)
Distribution/Risk Period: Indigenous transmission occurs at low levels. Distributed throughout the region, with regional variations expected. Generally associated with areas of crowding, poverty, poor sanitation, and substandard living conditions. Year-round.
Remarks: Prevalence remains low. Increased incidence was reported in Kuwait prior to 1985, attributed to the increased immigration of expatriate workers from endemic areas; from 1983 to 1988, over 95 percent of the patients were immigrants. In 1979, cases were reported from throughout Saudi Arabia, but a foci existed in the southwest region. In 1986, the prevalence in Saudis was 4.1 per 100,000, and in non-Saudis was 126.5 (most non-Saudis were from endemic areas). Tuberculoid leprosy was significantly more common in

Saudi than non-Saudi patients; the prevalence of the other types of leprosy was the same for both groups.

ONCHOCERCIASIS (Sowda)
Transmission/Reservoir: The black fly (*Simulium damnosum* complex) is the primary vector species in the region.
Distribution/Risk Period: Confined to the southwest Arabian Peninsula (Saudi Arabia and Yemen) in focally endemic areas. Cases have been reported in the Asir region of southwest Saudi Arabia (in villages around Khamis Mushayt). In Yemen, it is endemic in all westward flowing permanent streams (wadis) between the northern Wadi Surdud and the southern Wadi Ghayl at elevations of 300 to 1,200 meters; cases have been reported from Hodeida to Taiz (most occurred in Al Barh between Mokha and Taiz). Although not reported, the disease probably occurs throughout the length of Yemen, in Wadis flowing into the Gulf of Aden and the Red Sea. Seasonal, when blackflies are present.
Remarks: Reporting has been limited, making prevalence and incidence estimates unreliable. An estimated 60,000 people are at risk in endemic areas in southwest Yemen. Dermatologic manifestations of onchocerciasis (sowda) predominate in Yemen; ocular manifestations (river blindness) were common in the cases reported from Saudi Arabia.

TOXOPLASMOSIS
Transmission/Reservoir: Human infection is primarily acquired through contact with cat feces or food contaminated with oocysts or through consumption of raw meat containing bradyzoites, principally from sheep and goats. Raw goat and sheep milk containing tachyzoites possibly may be a source of infection. Domestic and wild felines are the only definitive hosts; cat feces is the source of environmental contamination with oocysts. Numerous mammalian intermediate hosts exist; rodents are important sources of infection for felines. The prevalence of infection in sheep and goats is related to the abundance of felines in pasture lands.
Distribution/Risk Period: Widely distributed. Year-round.
Remarks: Seroprevalence is high. Human prevalence in Saudi Arabia is an estimated 33 percent; 58 to 95 percent prevalence was found in Kuwait. Serosurveys indicate that infection may be more prevalent in nomads (Bedouins).

LEPTOSPIROSIS
Transmission/Reservoir: All domestic animals as well as many wild animals, especially rodents, may serve as reservoirs of infection. Many serotypes have been reported from the region, but the predominant serotype(s) in an area is dependent on specific ecologic conditions.
Distribution/Risk Period: Leptospires require a slightly alkaline and strictly fresh water environment, which may restrict their presence in eastern Saudi Arabia or in the salt marshes of southern Iraq (south of Basrah). Conditions in oases are favorable for leptospire survival. The disease can be expected to be focally distributed. Primarily a risk during warm months of the year (June to September).
Remarks: Limited reports suggest a very low endemicity. Cases are sporadically reported from the region; the risk of acquiring the disease and the number of expected cases in indigenous people are low. Leptospirosis generally is occupationally related. Elevated rodent populations may contribute to increased transmission.

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DISEASE OCCURRENCE -- WORLDWIDE EXTRACTS (AUGUST THROUGH DECEMBER 1990) (U)

(U) The following disease information on countries of potential interest to DESERT STORM was extracted from the AFMIC monthly DISEASE OCCURRENCE WORLDWIDE, DST-1810R-001-90, Report 8, 31 August 1990.

Algeria -- (U) According to a 6 August open press report, recent cholera outbreaks had resulted in 60 cases (3 fatal) in the Bouira vicinity, approximately 60 kilometers southeast of Algiers, and at least 3 fatalities in Tissemsilt, approximately 150 kilometers southwest of Algiers. The Bouira vicinity also had experienced cholera outbreaks during a similar time frame in 1989. (See DST-1810R-001-90, RPT 1, 31 January 1990.) Although not included in the current World Health Organization (WHO) list of cholera "infected" areas, cholera is endemic in Algeria and outbreaks may occur annually, particularly in coastal and other northern areas when periods of drought and extreme heat result in water shortages.

Lebanon -- (U) According to a 26 August "Radio Free Lebanon" report, an outbreak of cholera in northern Lebanon had resulted in 18 cases (including 5 deaths). Although no specific outbreak site was identified, the patients reportedly were being treated in Tripoli. On 28 August, a health official in north Lebanon stated that although patients were being treated for "severe diarrhea and vomiting," cholera was not the cause of their illness. Whereas past unofficial reports have implicated cholera in outbreaks of gastroenteric illness in Lebanon (see DST-1810S-001-85, RPT 6, 30 June 1985), cholera has not been acknowledged officially for at least 9 years, and currently is not considered endemic. Gastroenteric disease etiologies appear highly endemic in Lebanon, but outbreaks seldom are reported. (See DST-1810S-001-86, RPT 4, 30 April 1986.)

Saudi Arabia -- (U) According to the Ministry of Health (MOH), the number of officially reported cases of malaria (unspecified; falciparum malaria predominates in the country) has declined by 18 percent, from 9,797 cases in 1988 to 7,997 cases in 1989. Although not reported separately by the MOH, many of these cases are believed to have been imported (Saudi Arabia employs a large foreign work force, many of whom come from malaria indigenous areas). Due to extensive vector control operations (most recently conducted in the western provinces), indigenous malaria transmission has been interrupted in Saudi Arabia, except for the extreme southwest along the Red Sea coast south of 18 degrees north latitude (about 500 kilometers south of Jeddah). An active monitoring program reportedly has not confirmed drug-resistant falciparum malaria in Saudi Arabia, but unconfirmed reports have indicated that chloroquine-resistant falciparum malaria may occur in the extreme southwestern Arabian peninsula, possibly including portions of Saudi Arabia. (See "Epidemiological Note," DST-1810R-001-90, RPT 7, 31 July 1990.)

(U) The Ministry of Health also reported a 1.9 percent drop in the number of officially reported cases of schistosomiasis to 9,779 in 1989. Official control programs have emphasized diagnosis and anti-helminthic chemotherapy of cases, along with molluscicide use and environmental modification of snail habitats. Scattered foci of schistosomiasis remain in some oases of central Saudi Arabia (where intestinal schistosomiasis, caused by *Schistosoma mansoni*, predominates), and in some water catchments or cisterns in western

Saudi Arabia (where urinary schistosomiasis, caused by *S. haematobium*, predominates). (See DST-1810R-001-89, RPT 3, 31 March 1989.)

Somalia -- (U) An unconfirmed report indicated that an outbreak of meningococcal meningitis recently occurred in northwestern Somalia, approximately 250 kilometers southeast of Hargeysa, resulting in 10 deaths per day between mid-June and 5 July. Although meningococcal meningitis (caused by Group A or C) would not be unexpected in this area, which borders the sub-Saharan meningitis belt, outbreaks in this belt usually occur from January to June. Recent unconfirmed reports of disease outbreaks (including hepatitis E - enterically-transmitted non-A non-B hepatitis, malaria, and typhoid fever) in eastern Ethiopia near Hargeysa may or may not be related to this report. (See "Ethiopia," DST-1810R-001-90, RPT 7, 31 July 1990.)

(U) The following disease information on countries of potential interest to DESERT STORM was extracted from the AFMIC monthly DISEASE OCCURRENCE WORLDWIDE, DST-1810R-001-90, Report 9, 30 Sepetember 1990.

Algeria -- (U) According to August open press reports, the cholera outbreak is more extensive than previously reported (see DST-1810R-001-90, RPT 8, 31 August 1990). As of mid-August, at least 12 northern provinces (Wilaya) had been affected: Alger (neighborhoods of El Harrach and Eucalyptus), Batna, Blida, Bouira, Boumerdes, Chlef, Djelfa, Mascara, Medea, Skikda, Tiaret, and Tissemsilt. Although Algeria is not on the WHO list of cholera "infected" areas, 413 cases (24 fatal) officially were reported to the WHO during 1 July to 28 August 1990.

Jordan -- (U) Although concerns about cholera have been raised, an official of the Jordanian Red Crescent medical team recently stated that there have been no cholera cases among refugees at the Shalan 1 and al-Ruwayshid border camps through early September. The official indicated that common afflictions requiring medical treatment included "headaches, sunstroke, upper respiratory tract inflammation, asthma, scorpion bites, medium diarrhea, epilepsy, severe cuts, bruises, and arthritis." Disease reporting from these camps has been extremely limited and of questionable accuracy. An estimated 30,000 refugees remained in Jordan transit camps through mid-September, and conditions reportedly have improved. However, the harsh environment and poor sanitary conditions in these camps likely will continue to create conditions favorable to the occurrence of communicable diseases.

Morocco -- (U) Unofficial reports indicate that cholera outbreaks, officially confirmed during August in three contiguous northern provinces (Fez, Meknes, and Taza), had spread to Casablanca where more than 300 cases were estimated as of mid-September. Officially, a total of 24 cases (none fatal) had been reported as of 22 August from Meknes, but unofficial reports indicated that more than 200 hospitalized cases in Meknes City and approximately 30 deaths in Meknes Province had been attributed to cholera. Although these are the first officially acknowledged outbreaks in Morocco since the 1970s, sporadic cholera cases may have occurred during the 1980s, particularly during seasonal water shortages. Currently, nearby northern provinces of Algeria also are experiencing cholera outbreaks. (See "Algeria," this report.)

Oman -- (U) According to a recent report, the first two confirmed cases of chloroquine-resistant falciparum malaria in Oman were detected in Ibri District in December 1989. The determination was based on standardized WHO *in vitro* tests, and neither patient had travelled outside of the area during the previous 12 months. Falciparum malaria predominates in Oman, and chloroquine resistance previously had been suspected in this region. (See "Epidemiological Note," DST-1810R-001-90, RPT 7, 31 July 1990.) An active control program using antimalarial drugs and insecticide spraying reportedly had reduced malaria incidence from 33,000 cases in 1983 to 16,000 in 1987. However, case totals rebounded to 25,000 in 1988, principally because of intense rains in areas not covered by antimalarial measures (including endemic areas near Dahira, Sharqiyah, Batinan, and Dakhliya). Recent surveys conducted in areas included in the malaria control programs found malaria infection rates of 1.1 percent in coastal areas, 1.4 percent in the foothills, and 0.7 percent in the oases. In the event of military conflict in the Arabian Peninsula, the ensuing disruption of antimalarial efforts likely would lead to increased malaria transmission in endemic areas and recrudescence in areas that currently are malaria-free. (See DST-1810R-001-89, RPT 8, 31 August 1989.)

(U) The following disease information on countries of potential interest to DESERT STORM was extracted from the AFMIC monthly DISEASE OCCURRENCE WORLDWIDE, DST-1810R-001-90, Report 10, 31 October 1990.

Algeria -- (U) According to open press reports, cholera outbreaks continued into October, with Saida Province (Wilaya) added to the list of northern provinces affected by the outbreaks. (See DST-1810R-001-90, RPT 9, 30 September 1990.) During the first 3 weeks of October, at least 25 cases were reported in the city of Saida (northwestern Algeria, south of Oran) and 57 cases (3 fatal) in the northern province of Blida on the outskirts of Algiers. National and local health officials are attempting to provide potable water to affected areas of Saida and Blida Provinces through "mobile carriers," but local residents reportedly are demanding improvements in the country's permanent water system, while protesting overall unsanitary living conditions.

Israel -- (U) According to official Ministry of Health statistics, 36 cases of meningococcal meningitis were reported during the first half of 1990, versus 33 cases during the comparable period of 1989 (no data were available for April 1989 and 1990). Annual case totals from 1987 through 1989 averaged more than 60 percent higher than during the previous 7 years (see DST-1810R-001-90, RPT 5, 31 May 1990), but relatively little change has occurred in serogroup dominance. Serogroup frequency during 1989 (average percentages for 1980-1989 in parenthesis) include Group A, 1.5 percent (7.4); Group B, 79.1 (73.1); Group C, 7.5 (11.3); Group Y, 3.0 (4.6); Group W-135, 8.6 (2.8); and Group E29, 0.0 (0.2). All isolates since 1987 have been resistant to sulfadiazine (used as a laboratory screening standard). Meningococcal meningitis cases occur year-round, with incidence usually peaking from November through February. (See DST-1810R-001-90, RPT 2, 28 February 1990 and RPT 5, 31 May 1990.)

Jordan -- (U) An official report indicated that 2 cholera cases occurred in a transit camp during early September 1990. Previously, Jordanian Red Crescent officials had stated that there had been no cholera cases among the refugees. (See DST-1810R-001-90, RPT 9, 30 September 1990.) These cases were probably imported, and indigenous transmission does

not appear to have occurred in the camps. Repatriation efforts and a decrease in new arrivals have resulted in a reduction of the average refugee population in four Jordanian camps to less than 5,000 (combined capacity is 100,000 displaced persons) and turnover has been considerable. Additionally, sanitary conditions improved markedly as international assistance became available, and the potential for large-scale communicable disease outbreaks now appears reduced.

Kuwait -- (U) Three recently reported cases of meningococcal meningitis in Kuwaiti adults caused by Neisseria meningitidis Group W-135 organisms appear to represent the first known cases of meningococcal meningitis in Kuwait caused by this serogroup. The cases occurred during December 1988 and January 1989, and included 2 cases of meningitis and 1 case of disseminated meningococcemia with circulatory collapse and disseminated intravascular coagulation. All isolates were sensitive to ampicillin and chloramphenicol. Most cases of meningococcal meningitis in the Middle East region are attributed to Group A organisms. Group W135 has been reported only recently in this region and may be underreported. (See "Middle East, General," DST-1810R-001-89, RPT 6, 30 June 1989.) Annual case totals for meningococcal meningitis in Kuwait generally vary from 6 to 26 cases, usually occurring as sporadic cases. However, outbreaks may occur at 10- to 12- year intervals; the most recent outbreak occurred following the return of pilgrims from the 1987 Hajj in Saudi Arabia. (See DST-1810R-001-87, RPT 9, 30 September 1987.)

Middle East -- (U) Gastroenteric illnesses, particularly bacterial etiologies, constitute a primary infectious/communicable disease threat in the Middle East. Although shigellosis apparently is a major cause of gastroenteritis in this region (according to a recent report, 4 to 5.7 percent of childhood diarrheas in Iran were attributed to shigellosis), specific data generally have been relatively limited. Recently available information indicates that the most commonly reported isolates include *Shigella sonnei, S. flexneri, S. dysenteriae,* and *S. boydii,* with the relative frequencies of *Shigella* species varying within the region. Additionally, multiple drug-resistant (including ampicillin, chloramphenicol, early generation cephalosporins, tetracyclines, and trimethoprim/sulfamethoxazole) strains are common, and appear to be increasing in relative frequency in some areas. (One report from Saudi Arabia indicated that only 15 percent of *S. flexneri* isolates and 38 percent of *S. sonnei* isolates were fully sensitive to all drugs tested.)

Saudi Arabia -- (U) Although acute hemorrhagic conjunctivitis (AHC) previously had not been reported as an endemic disease threat, recent published information indicates that an outbreak of AHC affecting hundreds of people occurred in the Jizan region of Saudi Arabia in late 1988. (Similar outbreaks reportedly had occurred in neighboring Arab Gulf countries shortly before this outbreak.) The outbreak was attributed to enterovirus type 70 (EV70), which was isolated from 5 of 29 conjunctival scrapings from patients with AHC. Although AHC is self-limiting, it can be disabling for 3 to 4 days after onset. Dense populations and crowded living conditions, such as those that exist in some coastal regions of Saudi Arabia, usually are contributing factors in AHC outbreaks. Such outbreaks may be explosive in nature, and nonindigenous personnel may be particularly susceptible.

(U) A recent unofficial report indicates that an outbreak of Crimean-Congo hemorrhagic fever (CCHF) may have occurred in May 1990 near Jeddah and Mecca in conjunction with

the Hajj. Serologic confirmation was made in five patients (four slaughterhouse workers and a housewife who had butchered a fresh sheep carcass) having clinical courses reportedly compatible with CCHF. Further details, including the origin(s) of the infective animals were not available. To feed the pilgrims during the Hajj, large numbers of live animals (sheep, goats, and camels) are imported from regions in Africa where CCHF is considered endemic. Such animals could represent potential sources for human exposure to CCHF, but a retrospective study conducted after the May 1990 outbreak suggested that CCHF may be more common in the Arabian Peninsula than previously reported. During June 1989 through June 1990, an improved surveillance system recently established by the Saudi Arabian ministries of health and agriculture detected an additional 32 suspected cases of CCHF (15 fatal) that had been treated in local hospitals. Although CCHF now should be considered more geographically widespread throughout the Middle East, the disease usually occurs as sporadic cases in remote areas.

(U) The following disease information on countries of potential interest to DESERT STORM was extracted from the AFMIC monthly DISEASE OCCURRENCE WORLDWIDE, DST-1810R-001-90, Report 11, 30 November 1990.

(b)(1),1.4 (c)

Saudi Arabia -- ~~(C)~~ According to an unconfirmed report, an outbreak of zoonotic cutaneous leishmaniasis (CL) caused by *Leishmania major* may have occurred in [redacted]. Case totals, age distributions, and dates of presumed infection were not specified. Although improved surveillance and reporting may have been a factor, the influx of nonindigenous workers into an area where CL is highly endemic (65 percent of the indigenous population reportedly had positive reactions from "skin tests" for CL), increases the likelihood that an outbreak actually occurred. CL appears underreported from throughout Saudi Arabia, making estimates of prevalence and incidence rather unreliable. Reporting of clinical cases occurs yearround, peaking from October through January. The sand fly vector is *Plebotomus papatasi* and the reservoir is *Pammomys obesus*, the fat-tailed sand rat (gerbil). The occurrence of CL in foreign workers underscores the potential significance of CL for military forces recently deployed to this region. Because of the long incubation period (8 week average), cases soon could begin to appear in these personnel.

Lebanon -- (U) Recent "Radio Free Lebanon" broadcasts indicated that the "cholera" outbreak previously reported (see DST-1810R-001-90, RPT 9, 30 September 1990) had occurred in 'Akkar (extreme northern Lebanon), and that 270 cases (10 fatal) had occurred through 16 November. The broadcasts also claimed that laboratory testing had confirmed the etiologic agent to be *Vibrio cholerae*. Ministry of Health (MOH) officials recently stated that the outbreak has ended, and repeatedly have denied that cholera was to blame. The MOH has attributed the "severe diarrheas" to consumption of drinking water supplies polluted subsequent to "destruction" of the sewage system by heavy rains. Gastroenteric diseases appear highly endemic in Lebanon, but outbreaks seldom are reported. (See DST-1810S-001-86, RPT 4, 30 April 1986.) Cholera has not been officially acknowledged for over 9 years, and Lebanon currently is not considered cholera "infected" by the WHO.

(U) The following disease information on countries of potential interest to DESERT SHIELD was extracted from the AFMIC monthly DISEASE OCCURRENCE WORLDWIDE, DST-1810R-001-90, Report 12, 31 December 1990.

(b)(3):10 USC 424

(b)(1),1.4 (c)

Oman -- (U) The first documented human death from rabies in Oman recently was reported. An 8-year old boy developed the disease 4 months after being bitten by a fox near his home, 240 kilometers west of Muscat. The report did not indicate whether the fox was tested for rabies or if the boy received post-exposure prophylaxis. Sylvatic rabies is enzootic in Oman, with the desert fox as the principal enzootic reservoir. Spillover into domestic animal populations occurs (laboratory-confirmed cases in two foxes and a goat recently were reported), with stray dogs (cats and other animals to a lesser extent)

responsible for most of the human bite/scratch incidents requiring post-exposure prophylaxis. Risk from rabies in Oman previously had been considered relatively low, but the implementation of stricter animal control measures (dog vaccination and licensure) in late 1989 and a public education program (subsequent to the boy's death) on the dangers of animal bites may indicate that health officials now consider rabies risk to be elevated.

(b)(1),1.4 (c)

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US FORCES DISEASE OCCURRENCE (U)

(b)(1),1.4 (a),1.4 (c)

Next page denied in its entirety per FOIA exemption (b)(1)

(b)(1),1.4 (a),1.4 (c)

SECTION II
CHEMICAL WARFARE

(b)(1),1.4 (b),1.4 (c),1.4 (d)

REFER TO DIA & AFMIC

(U) The Australian navy provides NBC defense training for all personnel at its NBC and Damage Control School at HMAS Penguin in Middle Bay, New South Wales, and continuation training aboard each ship. Several levels of training are provided.

(b)(1),1.4 (b),1.4 (c),1.4 (d)

Bulgaria -- (U) Bulgaria plans to send a chemical decontamination unit of about 300 personnel to Saudi Arabia. They will provide their own chemical defense protection, including impermeable protective clothing.

(b)(1),1.4 (b),1.4 (c),1.4 (d)

Next two pages denied in their entirety per FOIA exemption (b)(1)

(b)(1),1.4 (c),1.4 (d)

(b)(1),1.4 (c),1.4 (d)

(b)(1),1.4 (c),1.4 (d)

(U) The Hungarian individual NBC survival packet contains bandages, drugs for nausea, pain, enteral disinfection, radiation sickness, a chemical decontamination powder, a disinfecting spray (hydrogen peroxide), and two atropine autoinjectors. The second injection is to be administered 1.5 hours after the first.

(b)(1),1.4 (c),1.4 (d)

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(b)(1),1.4 (c),1.4 (d)

(b)(1),1.4 (c),1.4 (d)

(U) The Portuguese also are sending 2 military chemical defense experts (reportedly trained in the US) to Saudi Arabia to fit and train Portuguese Embassy personnel with protective masks and suits. They also are sending outdated protective suits and masks for use by Portuguese Nationals in Saudi Arabia.

(b)(1),1.4 (c),1.4 (d)

Refer Page To NRC + DIA

(b)(1),1.4 (d)

(U) Recent reports indicate that South Korea plans to supply its Embassies with chemical protective clothing and equipment.

(b)(1),1.4 (d)

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(b)(1),1.4 (c),1.4 (d)

Refer Page 70 Atomic + DIA

(b)(1),1.4 (c),1.4 (d)

United Kingdom (UK) -- (U) The British have an aggressive NBC defense program, with research and development in all areas of chemical defense. The British armed forces have adequate supplies of chemical protective gear, detection and decontamination equipment, and chemical antidotes and treatment drugs to support their troops in the Persian Gulf. Field training exercises incorporate simulated NBC conditions, including medical management of chemical casualties. Forty-seven UK medical personnel recently completed the US medical management of chemical casualties course in-theatre.

(b)(1),1.4 (c),1.4 (d)

Next 4 pages denied in the entirety per FOIA exemptions (b)(1) and (b)(3). Page 34 was skipped in this document.

(b)(1),(b)(3):10 USC 424,(b)(6),1.4 (c),1.4 (d)

(b)(1),1.4 (c),1.4 (d)

(b)(1),1.4 (c),1.4 (d)

(b)(1),1.4 (c),1.4 (d)

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SECTION III
HEALTH CARE CAPABILITIES AND ASSESSMENTS

(b)(1),1.4 (c),1.4 (d)

Next three pages denied in their entirety per FOIA exemption (b)(1)

(b)(1),1.4 (c),1.4 (d)

(b)(1),1.4 (c),1.4 (d)

(b)(1),1.4 (c),1.4 (d)

Refer Page 70
AF MIL + DIA

(b)(1),1.4 (c),1.4 (d)

(U) Iraqi troops have stripped Kuwaiti hospitals of sophisticated medical equipment and supplies such as the following: ambulances, kidney dialysis units, blood, frozen plasma, blood banking equipment, entire operating theaters, equipment from organ transplant and burn centers, orthopedic equipment, x-ray machines, x-ray film processors, laboratory equipment, EKG machines, CT scanners, ultrasound machines, ENT equipment, surgical laser equipment, photographic equipment, furniture, air-conditioning units, medications, and other consumable medical stores.

next two pages denied in their entirety per FOIA exemption (b)(1)

(b)(1),1.4 (c),1.4 (d)

(b)(1),1.4 (c),1.4 (d)

(b)(1),1.4 (c)

MEDICAL CAPABILITIES OF ALLIED COALITION FORCES OPERATION DESERT STORM (U)

(U) This article provides an assessment of medical capabilities of foreign allied coalition nations and military forces directly and indirectly associated with Operation DESERT STORM. The scope of the study is intended as a summary and not an in-depth review of each nations medical capabilities. Assessments are based on an integrated review (as appropriate) of their field medical capabilities, chemical and biological warfare (CBW) agent treatment capabilities, medical order of battle, medical personnel, medical equipment and materiel support provided, and their interoperability with each other and the US.

INFORMATION CUTOFF: (U) Assessments presented are based on a summation of best available intelligence information reporting as of 15 January 1991.

(b)(1),1.4 (c),1.4 (d)

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(b)(1),1.4 (c),1.4 (d)

(b)(1),1.4 (c),1.4 (d)

Arabian Gulf States (Bahrain, Qatar, and the United Arab Emirates) -- (U) Medical assistance provided by the Arabian Gulf States in support of Operation DESERT STORM would most likely be in the form of rear area host nation support. There have been no reports of any of these countries providing forward medical support to either their own forces or those of their DESERT STORM allies.

Argentina -- (U) Argentina has deployed 2 small combatant ships to the Persian Gulf. Medical capabilities include rudimentary sick bays. There may be a physician onboard the destroyer. Argentina has considered deploying a small medical team to Saudi Arabia.

Australia -- (U) Australia has provided two 10-man surgical teams to replace a team already deployed on one of the "Mercy" class hospital ships located in the Persian Gulf region. They reportedly are not providing any organic supplies, drawing instead on the host ship's assets.

(b)(1),1.4 (c),1.4 (d)

Canada -- (U) Canada has provided a small medical team to work with US forces.

(b)(1),1.4 (c),1.4 (d)

(b)(1),1.4 (c),1.4 (d)

Hungary -- (U) As of last reporting, Hungary was considering sending a mobile field hospital to the Persian Gulf in defense of the Persian Gulf countries against Iraq. The status of the offer is unknown.

(b)(1),1.4 (c),1.4 (d)

(b)(1),1.4 (c),1.4 (d)

The Phillipines -- (U) The Philippine Government has sent 250 civilian volunteers composed of physicians, nurses, dentists, midwives, medical technologists, and other medical personnel to Saudi Arabia. They probably will be assigned to Saudi military base hospitals in the region of Dhahran.

(b)(1),1.4 (c),1.4 (d)

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(b)(1),1.4 (c),1.4 (d)

Refer Page 7A AFMIC + DIA

(b)(1),1.4 (c),1.4 (d)

Turkey -- (U) Turkey has extensive ground forces deployed in eastern Turkey opposing potential Iraqi threat forces. Turkey should be capable of handling medical requirements for their own forces.

(b)(1),1.4 (c),1.4 (d)

Refer page 70 KFMIC TOIA

(b)(1),1.4 (c),1.4 (d)

Medical Logistics -- (U) Although most of Kuwait's medical equipment and supplies are believed to have been transported to Iraq, the possibility that some still may be in Kuwait cannot be ruled out. The likelihood that remaining medical items can be readily reused or quickly reinstalled should be considered low, because the Iraqi soldiers who removed the medical equipment were untrained and unskilled in biomedical equipment maintenance; a high rate of damage can be expected. An extensive effort may be required just to reinstall and recalibrate sensitive electronic equipment. Additionally, remaining medical supply items should be used cautiously as they may be expired, have had their sterile seals broken, or have been improperly stored.

(b)(1),1.4 (c),1.4 (d)

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Hospitals Currently Being Used By Iraqi Forces -- (U) The Physiotherapy Hospital, near the Sulaibikhat Roundabout (traffic circle), serves as a military headquarters (no status is available on the 280 to 300 evicted patients). The Al Jahra Hospital serves an unreported military function.

(b)(1),1.4 (c),1.4 (d)

Infectious Disease Summary -- (U) Information on the current disease situation in the civilian population in Kuwait is limited; however, generalizations can be made. Prior to the invasion, preventive medicine programs had reduced the incidence of endemic diseases. Because of the dismantling of Kuwait's medical infrastructure, reduction in preventive medicine programs, breakdown in waste disposal, and compromised personal hygiene, the potential for infectious disease occurrence has increased. Additionally, the immigration of nonindigenous persons into Kuwait may introduce nonendemic diseases and will change the baseline health status of the resident population. Recently reported disease occurrence and information on potential outbreaks of infectious diseases in the civilian population that may impact operational units and humanitarian medical missions are discussed in the following paragraphs.

(b)(1),1.4 (c),1.4 (d)

Refer Page To Air Mic + Dia

(b)(1),1.4 (c),1.4 (d)

Vectorborne Diseases -- (U) Prior to the Iraqi invasion, malaria was not endemic, but imported cases occurred, particularly in expatriate workers. Competent malaria vectors are present and the influx of large numbers of possible carriers could lead to indigenous transmission. *Plasmodium vivax*, followed by *P. falciparum*, would be the most likely form of malaria to be introduced; risk of transmission would be greatest in the spring (April) and fall (October). Risk from arboviruses is lowest during colder months; dengue, sindbis fever, and West Nile fever have not recently been reported, but potential vectors are present. Cutaneous and visceral leishmaniasis transmission is reduced during winter months (transmission peaks from April to September); however, due to the long incubation period (1 week to many months), clinical cases in the indigenous population generally peak the following February. Increased urban rodent populations associated with waste accumulation may contribute to elevated sand fly populations; transmission of leishmaniasis may be greater during the spring and summer of 1991 than during recent transmission seasons. Expected increases in urban rodent populations also could contribute to transmission of murine typhus, plague, and rat-bite fever.

(b)(1),1.4 (c),1.4 (d)

Next nine pages are denied in their entirety, and not provided.

(b)(1),1.4 (c)

(b)(1),(b)(3):10 USC 424,1.4 (c)

(b)(1),(b)(3):10 USC 424,1.4 (c)

(b)(1),(b)(3):10 USC 424,1.4 (c)

(b)(1),(b)(3):10 USC 424,1.4 (c)

(b)(3):10 USC 424,(b)(3):50 USC 403-1(i)

(b)(3):10 USC 424,(b)(3):50 USC 403-1(i)

(b)(3):10 USC 424,(b)(3):50 USC 403-1(i)

(b)(3):10 USC 424,(b)(3):50 USC 403-1(i)