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النشرة الوبائية السعودية
تصدرها وزارة الصحة
الوكالة المساعدة للطب الوقائي وبرنامج الوبائيات الحقلي
المجلد الثاني – العدد الأول - يناير، فبراير، مارس ١٩٩٥م

Epidemic salmonellosis from unmonitored water trucks

From July 1993 through 1994, surveillance of salmonellosis in a Saudi Arabian city revealed a steady increase in cases reported. The epidemiologic pattern of these cases was unusual in three respects: 80% were single cases in families without known contact with another case, there was no apparent time and space relationship between cases, and 85% were among children under 6 years.

During 16 Jamada-Awal to 10 Rajab 1415H (Oct. 21 to Dec. 12, 1994), we conducted a case-control study of 52 cases and 104 age-matched controls visiting the same medical facilities for other reasons during the same week as the case. A case was defined as positive culture for *Salmonella* in a person with gastroenteritis.

Salmonellosis was associated with drinking water trucked to the house in 37 case-patients (71%) and 17 controls (16%) (odds ratio [OR]=30, 95% confidence interval [CI] 6.6-225), whereas obtaining water in person from government supplies was protective (OR= 0.2, 95% CI 0.03-0.5). Among houses using trucked water, obtaining drinking water from independent trucks coming from unknown sources had a high risk of salmonellosis (OR=13, 95% CI 5.1-33) compared with getting water from trucks coming directly from government supplies (OR=0.2, 95% CI 0.04-0.7) or from any of four government-monitored private companies. The median price of water purchased by case-households was 7 riyals per cubic meter, compared with 9 riyals per cubic meter for controls ($p<0.001$).

Consumption of raw or undercooked eggs was related to salmonellosis among children under 2 years (OR=5.0, 95% CI 1.4-20). In the same age group, breast-feeding (OR=0.81, 95% CI 0.24-2.6) and bottle-feeding (OR=1.6 95% CI 0.6-4.2) were not related to salmonellosis.

All household contacts were negative for *Salmonella*. Chlorination bacteriology and chemistry of water in government supplies and four private companies had been checked daily; however, no testing of residual chlorine had been done on trucked water.

-- Reported by Dr. Salah Al-Awaidy, Field Epidemiology Training Program

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Dengue fever in Jeddah

On 23/09/1414H, the Ministry of Health was alerted to two confirmed cases of dengue acquired in Jeddah. One was in an adult Saudi male with grade 2 dengue hemorrhagic fever (DHF) and the other in an adult Saudi male with dengue shock syndrome (DSS). Dengue 2 virus isolated from one patient was similar to strains of dengue 2 from East Africa.

During week 10 of 1994 (24/09/1414H) all hospitals and clinics in Jeddah were alerted and asked to report suspect cases of dengue hemorrhagic fever (DHF). Six weeks later they were reminded about reporting and sent a case definition for DHF: fever with thrombocytopenia or leukopenia plus the following: bleeding, skin rash, eye pain, joint pain and headache. Dengue symposia for Jeddah clinicians were presented on weeks 16, 23 and 27. During week 21 (16/12/1414H), surveillance was expanded to include simple dengue fever (DF) in addition to DHF and DSS. The suspect DF case definition was as follows: fever and two or more of the following symptoms: frontal headache, myalgias or arthralgias, retro-orbital pain, skin rash or bleeding.

For each suspect DF case, the Dengue Control Team interviewed the patient about possible exposures and dengue symptoms in household contacts. Blood specimens were collected for isolation of dengue virus and for detection of anti-dengue IgM and IgG. Virus isolation and serology were done at the Virology Department of Dr. Suleiman Fakeeh Hospital, Jeddah. A confirmed case was defined as a suspect case of DF or DHF or DSS with either isolation of dengue virus from blood or anti-dengue IgM detected from the serum.

This surveillance system detected suspect DF every week from week 13 to week 36, and half of these were confirmed (Figure 1). There have been no deaths from DF. One additional DHF case was detected in week 13. Increases in confirmed DF occurred in week 16 and week 22, following improvement in the case definition and reminders about reporting. Thirty-nine percent of both confirmed and suspect DF was in construction workers. Confirmed DF in other persons was more common in new districts of north Jeddah and southeast Jeddah, where new house construction is more common. Currently, the Dengue Control Team is evaluating the role of new house construction in the propagation of dengue vectors and dengue virus.

Entomologic survey: The Malaria Department carried out a survey for dengue vectors beginning on 24/09/1414H. *Aedes aegypti* was found in Ruwais, Bawadi, Sulaimania, and Kilo 7 districts. *Aedes albopictus* was also found in these districts plus Biutat, Rawda and Nuzha districts.

--Reported by the Dengue Control Team, Department of Disease Control, General Directorate for Health Affairs, Makkah Region; Virology Department, Dr. Suleiman Fakeeh Hospital, Jeddah; Preventive Medicine Department, Ministry of Health

Editorial note: Prior to the identification of dengue 2 from Jeddah, dengue 2 transmission had been confirmed from Somalia, Port Sudan, Djibouti and Yemen. The similarity of the dengue 2 virus isolated from the index case to the East African strains of dengue 2 suggests that dengue was introduced from one of these areas.

The control of dengue in western Saudi Arabia will rest on continued and improved surveillance. The dengue surveillance system has successfully identified high-risk groups (construction workers) and high-risk areas to be targeted for control. It has shown the rarity of severe disease and is keeping clinicians informed of the continuing probability of dengue in febrile patients.

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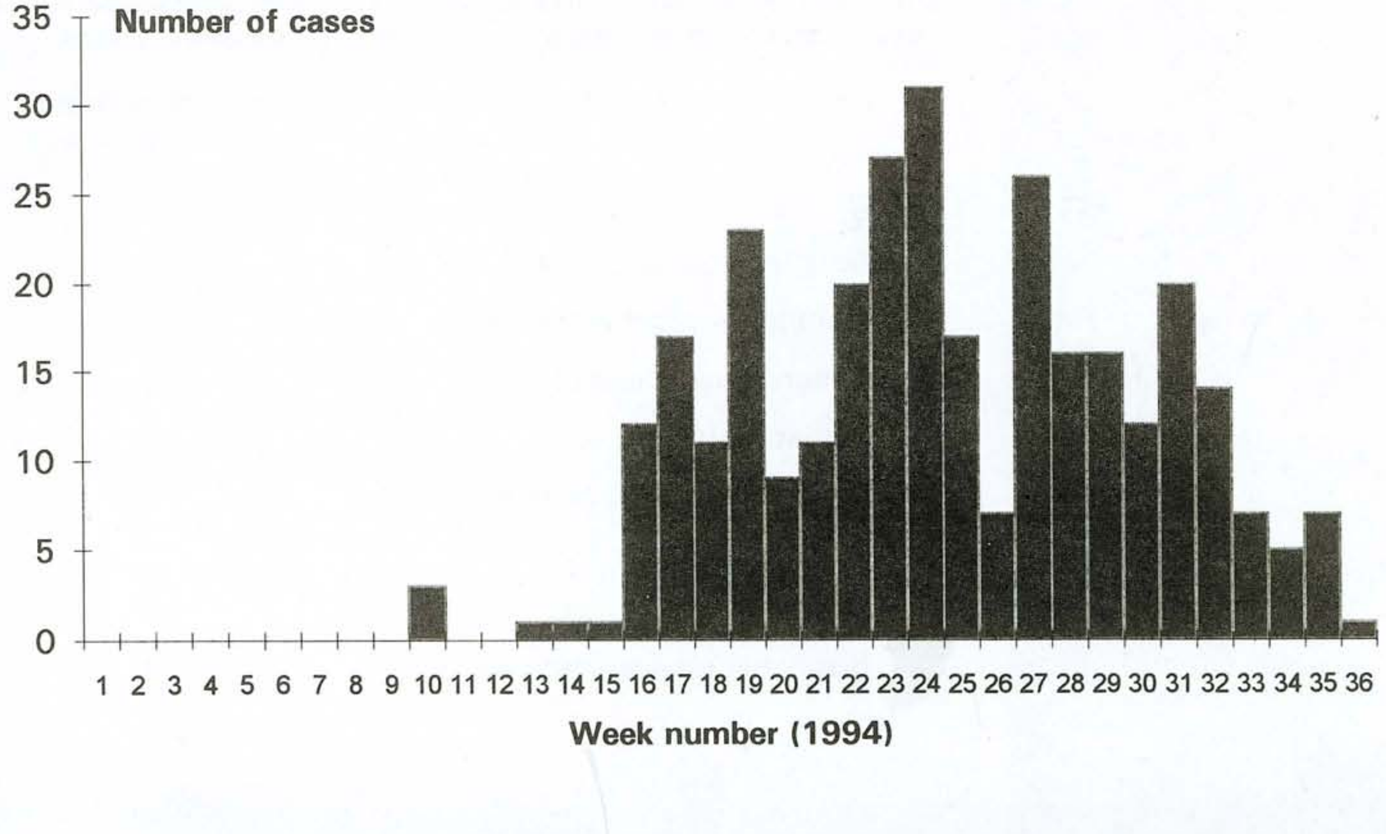
Figure 1: Dengue fever cases in Jeddah, by week, 1994



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Continuing surveillance will be needed to monitor the effectiveness of control.

Physicians should identify and report suspect dengue. In older children and adults, DF presents with fever (38C), prominent myalgias, arthralgias and retro-orbital headache with pain on eye movement. The fever tends to be biphasic. A transient rash sometimes appears during the first two days of fever and a generalized morbilliform rash often appears during the second fever elevation. Other characteristic symptoms include taste aberrations, other sensory phenomena and a conjunctival suffusion. In young children, dengue usually presents only as an undifferentiated fever. DHF and DSS occur both in children and in adults. DHF cases will have a positive tourniquet test, thrombocytopenia and hemoconcentration. DSS cases will have hypotension, a narrow pulse pressure, thrombo-cytopenia and hemoconcentration with or without signs of bleeding. DF, DHF or DSS are confirmed by isolating dengue virus from the patient's blood or detection of anti-dengue IgM in serum taken within 3 weeks of the onset of fever. Physicians should identify and report suspect dengue cases; assistance will be provided for confirmation.

Meningitis vaccine for Hajj is available

Prior to the 1415H Hajj season, the Ministry of Health began a national campaign for vaccination against meningococcal meningitis. If they are over age 2 and/or have not been vaccinated against meningitis in the previous two years, all people working at Hajj or performing Hajj should be vaccinated, as should all their household contacts.

The vaccine is available at primary health care centers, hospitals and private clinics. The vaccine is a polysaccharide for groups A and C.

History of meningococcal vaccine

Several attempts were made to develop a vaccine against meningococcal disease before 1940. These early vaccines consisted of either killed whole organisms or crude extracts of broth cultures. During the mid-1940s, several investigators demonstrated that antibodies to the group-specific capsular polysaccharide antigens could passively protect mice against lethal challenge. However, purified preparations of these polysaccharides failed to induce antibody responses in human volunteers. The success of sulfonamides in both the treatment and the prevention of meningococcal disease at that time made vaccine development less essential.

However, in 1963 sulfonamide-resistant strains of group B meningococci spread, first among U.S. military personnel and then among civilians. Sulfonamide-resistant group C meningococci became the predominant cause of disease throughout the armed forces, and vaccine development was undertaken to control epidemic disease in recruits.

Following the demonstration that circulating antibody directed toward the group-specific capsular polysaccharide of group A and C confers resistance to meningococcal disease, the stage was set for purification of high-molecular-weight polysaccharides of group A and C and subsequently Y and W-135 by Gotschlich and colleagues. The group B polysaccharide that is closely related to certain human brain antigens, as well as blood group antigens, appears to be less effective as an immunogen than are type-specific protein antigens. The four polysaccharide antigens (A, C, Y and W-135) have been combined in a tetravalent vaccine and made available in a single-dose combination.

Reference: Plotkin SA and Mortimer EA. Vaccines (2nd ed.). Philadelphia: WB Saunders Co., 1988: 507.

Salmonellosis

(Continued from page 1)

Editorial note: Waterborne salmonellosis is not commonly reported. A large infective dose (10^5-10^6) of *Salmonella* is required to cause symptomatic disease in healthy adults. *Salmonella* in water tend to be more dilute and unlike in food do not multiply extensively. Waterborne salmonellosis is more difficult to identify than foodborne since cases tend to be scattered in time and place. Moreover, water exposure is common to all persons, making it difficult to single out a specific water exposure during interviewing.

In this investigation, the wide distribution of salmonellosis in the affected city and the epidemiologic association with a special water source (independent trucks) make it plausible to implicate a vehicle such as water. The majority of bacteriologically confirmed cases of salmonellosis were among children with no known contact with similar cases. In infants and young children, hypochlorohydria, rapid gastric emptying (ingested fluids or water) and abnormalities in normal flora increase the susceptibility to lower inocula of *Salmonella*. Children under 2 years are more likely to be fed with infant formula or powdered milk. *Salmonella* may multiply in these after they are reconstituted with water; they are buffering agents that may lower the infective dose of *Salmonella*.

Chlorination of water remains the most effective and least expensive measure to control waterborne disease. Epidemiologic data indicated that chlorination of water from government sources and private desalination stations protected against salmonellosis. In contrast, water purchased from independent water trucks that obtained water from other, unidentified sources, was found to be associated with salmonellosis. The price of this water was below the cost of water adequately treated and chlorinated.

In Saudi Arabia, health authorities in municipalities must identify all sources of water and maintain vigilance over the traffic of water trucks and the chlorination of water in these trucks.

Despite the relatively less important role of eggs in this investigation, the public should be aware that eggs can be infected transovarianally. In the USA about 1 in 10,000 fresh eggs is infected in this way. Eggs may also be contaminated through cracks in their shells. The public should be aware that soft-cooked or raw eggs carry a risk of infection with *Salmonella*. In addition, they should avoid buying cracked eggs. Eggs should not be stored for a long period at ambient temperatures at the market place or at home.

The Kingdom's TB control program

Eight years ago, Saudi Arabia started National Tuberculosis Control Program (NTCP) activities according to guidelines of the eighth and ninth reports of the World Health Organization expert committee on tuberculosis (TB). The objectives of the program are to reduce the incidence of TB and eliminate it as a health problem; to reduce human suffering (morbidity and mortality), and to assess the extent and efficiency of existing health facilities for TB control.

The public health approach for TB prevention and control in Saudi Arabia has two parts:

- Identify and treat persons with TB disease to cure their illness and prevent further transmission
- Identify and treat persons with TB infection (tuberculin-positive) to prevent development of the disease.

The NTCP is a country-wide program adapted to the needs of the population and integrated into the activities of primary health care centers (PHCCs). It is executed through early case detection (smear-positive) and adequate chemotherapy with follow-up and defaulter retrieving, chemoprophylaxis for high-risk groups, BCG immunization for children and health education with community participation.

At the central level, the Chest Disease Section of the Ministry of Health's Infectious and Parasitic Disease Department cooperates with the NTCP committee in planning, coordination of supervision, training, surveillance, evaluation, research and cooperation with the World Health Organization and the International Union Against Tuberculosis and Lung Diseases. At the regional level, the Ministry of Health's Directorate for General Health Affairs and the NTCP coordinator work together on supervision, training, coordination and collection of statistical data. Finally, at the local level, the program is actually implemented by the PHCCs, chest units, chest hospitals and the district directorate supervisor. This entails case finding, treatment, case holding, on-the-job training in reporting and recording, and health education.

In February 1992, the deputy minister for preventive medicine established and became chairman of an advisory committee for the NTCP. A series of introductory training courses is being conducted in all regions; since the start of the courses in 1992, 16 of 19 regions have been covered. Trainees include physicians, nurses, social workers and laboratory technicians.

Surveillance results: In 1993, 2,106 new cases of pulmonary TB were reported. Of these, 954 were Saudi (45.3%) and 1,152 were non-Saudi (54.7%). Nationalities of the non-Saudis were not available. Males accounted for 77.9% of the non-Saudis. The greatest number of cases overall were found in the 15-44 age group (1,385; 65.7%), followed by 45 years (632; 29.5%). In the same year, 280 cases of non-pulmonary TB were reported: Saudis 151 (53.9%) and non-Saudis 129 (46.1%).

The number of cases increased in both Jeddah (482; 22.8%) and Gizan (279; 13.2%) regions in 1993. Overall, however, the incidence of TB has been decreasing since 1978, when the rate was 243/100,000 population (Figure 1). In 1994 it was 13.9/100,000.

Editorial note: TB remains one of the top priorities for preventive action in developing counties, where over 85% of the world's TB now occurs. Each year about 10 million people in poorer countries are thought to develop TB, and at least 3 million die of the disease.[1] The

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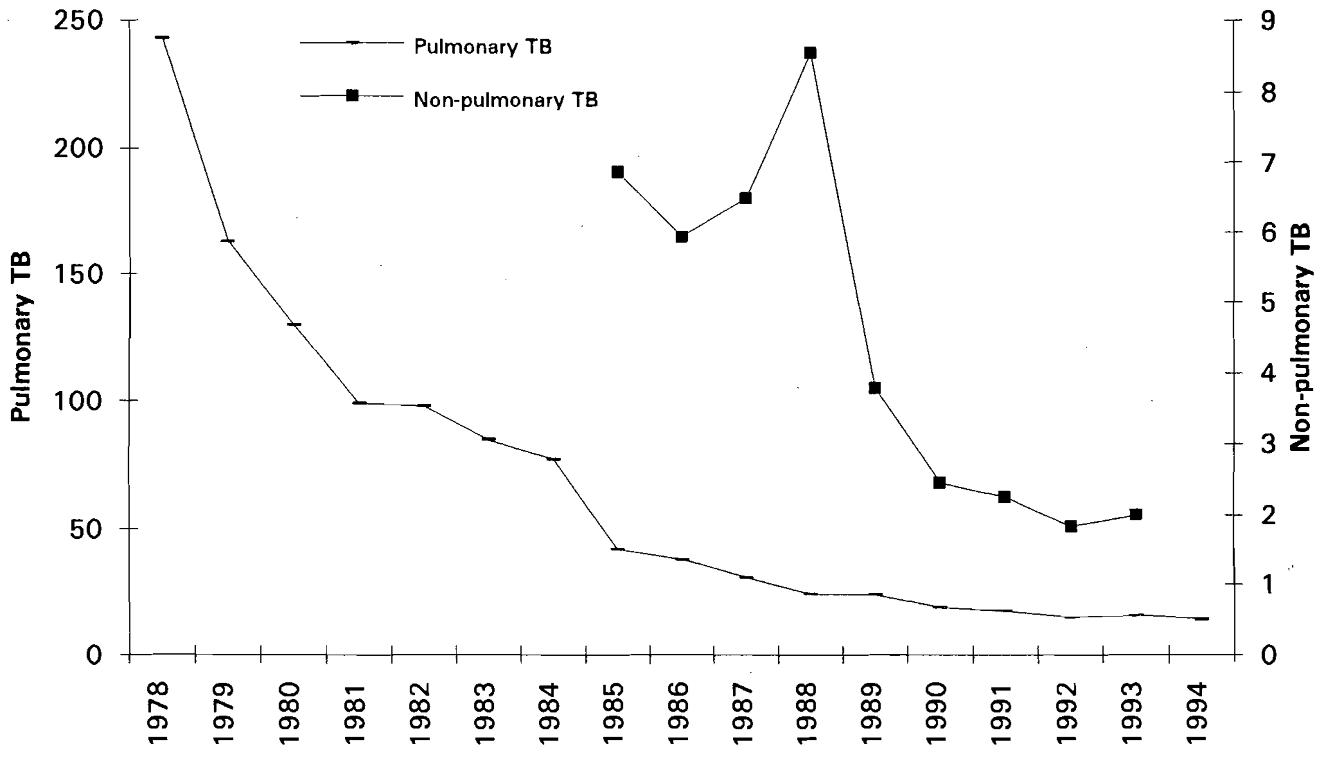
Figure 1: Rates per 100,000 of pulmonary and non-pulmonary tuberculosis, 1978-1994



Tuberculosis

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incidence of pulmonary TB in the Kingdom has steadily decreased from 1978 until 1992 at a rate of 15% annually, and the line graph resembles one of the TB incidence in developed countries in the beginning of this century. This decrease can be attributed to improved case finding, diagnostic tools and management, an active vaccination program, and improvement in the socioeconomic status of the population.

In 1993 the incidence increased by 4.8%, which can be attributed to heightened awareness of TB among health personnel, who received 11 intensive courses in TB case-finding and control in 1993. TB in the Kingdom comes from expatriates from high-prevalence countries; in addition to being a source of infection, they carry a multi-resistant tubercule, so all new arrivals in the Kingdom need to pass a screening test for TB (PPD test and chest X-ray) for issuance of a valid residency permit. The most productive population age group (15-44) has the highest infection rate in the Kingdom; this group also has the highest death rate in developing countries.[2] The economic cost of TB in terms of lost production alone must be greater than that of a disease that exclusively affects children or the elderly.

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Eradicating schistosomiasis

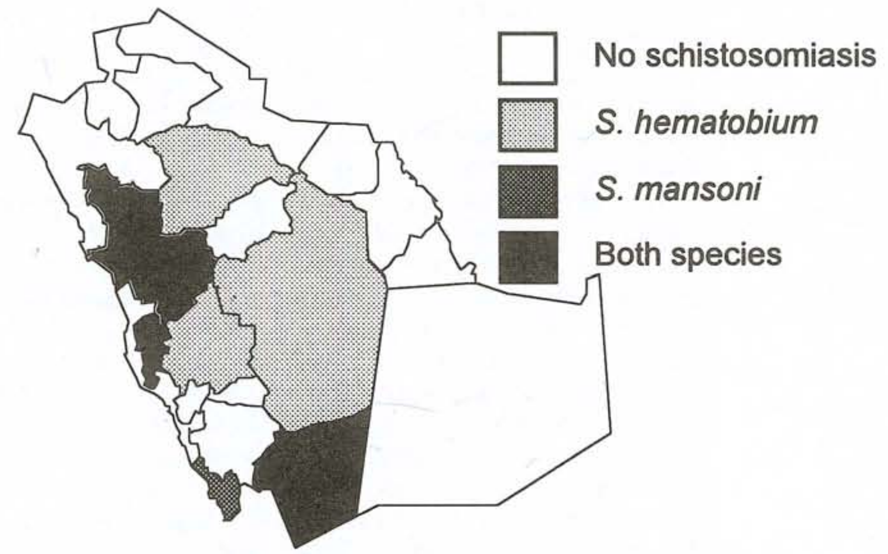

Figure 1: Foci of schistosomiasis infection in Saudi Arabia in 1971

Both intestinal and urinary human schistosomiasis have been prevalent in Saudi Arabia.[1] In 1971, a special unit for schistosomiasis was set up at the Ministry of Health (MOH) to carry out extensive regional surveys. This unit identified 12 foci of the disease (Figure 1). The prevalence rate of schistosomiasis ranged between 5% and 20%, and in some districts the prevalence reached 50%. In 1973-74, the MOH established seven regional *Bilharzia* centers to oversee operations of control programs.

Strategies of control programs were based on case-finding (using skin tests and stool and urine examination), treatment of cases with antischistosomal drugs, treatment of infested water bodies with mollusicides (niclosamide) and environmental modification. Initially antimonial drugs were used for treatment, but they were replaced in 1982 with oral oxaminquine and praziquantel; cure rates reached 95%.

In 1983-84, four new *Bilharzia* control units were established and the control program was extended to cover all endemic areas in the Kingdom. Intervention activities were strengthened. These included provision of safe water supply, mechanical weed control, removal of unnecessary water bodies by filling and drainage, health education and active community participation. In 1990, the control program was integrated within the primary health care program through primary health care centers.

In 1985, when the overall prevalence was 9.5%, about 80% of schoolchildren and inhabitants of infected districts were screened and diagnosed cases were treated. The prevalence of schistosomiasis dropped to less than 1% in 1993. After two decades of extensive effort, it seems that eradication of schistosomiasis in the Kingdom is feasible.

-- Reported by Bilharzia Control Unit, Infectious and Parasitic Diseases Department, Ministry of Health

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Cesarean section rates in Riyadh

In Safer 1415H the executive deputy minister of health assigned us to evaluate the cesarean section rates in Riyadh city because of complaints from the public about reports of increasing numbers of cesarean sections. Ministry of Health (MOH) annual reports for 1412H and 1413H provided the total numbers of normal, instrument-aided (forceps or vacuum), and cesarean deliveries for the Kingdom by hospital in each region.

C-section rates by region increased from 6.1% in 1407H to 7.5% in 1412H. The c-section rates by region for 1412H ranged between 3.7% and 10.2%, with a median of 7.2%. The highest regional rates were reported from Makkah (10.2%) and Bisha (9.4%).

The rates for MOH hospitals in Riyadh region during 1412H ranged from 0.7% (Rawydhat al-Ard Hospital) to 12% (Shagra Hospital), with a median of 6.2%. For 1413H, the rates for MOH hospitals ranged from 9.4% (Maternity and Children's Hospital [MCH]) down to 0.83% (Al-Kharj Hospital), with a median of 6%. There are no data available for the cesarean rate throughout Saudi Arabia for 1413H.

To verify these rates in Riyadh city, we performed a stratified single-stage cluster survey by taking a random sample of days for 1414H for all three MOH hospitals and two delivery centers. For each day we reviewed logbooks of the delivery room, operating room, nursery, death registry and abortion registry for all deliveries, including home and car deliveries, of both live and dead fetuses who weighed >=500gms or were >=22 weeks of gestation.

A cesarean section (c-section) was defined as a record of c- section in the registry book. Estimated c-section rates and other important birth statistics and standard errors were computed. According to our sample, for the year 1414H estimated rates for three major hospitals were 6.5% (95% confidence interval [CI] 4.3-8.7), 7.1% (95% CI 5.1-9.1) and 11% (95% CI 8.4-13).

The highest rate was reported from MCH, the referral hospital. The rates for two delivery centers were 2.9% (95% CI 0.6-5.1) and 3.2% (95% CI 1.6-4.9). These centers fell within the catchment area of MCH and handled many normal deliveries that would otherwise have gone to MCH. The combined estimate for MCH plus the two delivery centers was 8.3% (95% CI 6.7-9.9).

Hospital	Reported rate (%)	Estimated rate (%)	95% CI
MCH	10	11	8.4-13
Nasseriyah	1.6	1.7	0-4.3
Otigah	3.5	3.2	1.6-4.9
MCH & 2 birthing centers	7.9	8.3	6.7-9.9
Al Yamamah	7.6	7.1	5.1-9.1
Prince Salman	6.6	6.5	4.3-8.7

Table 1: Reported and estimated cesarean section rates, 1414H

C-section rates were the same for full-term and preterm infants (7.3%), while the rate for extreme preterm was 16.2%.

When we evaluated the MOH data form for normal and abnormal deliveries, we found misclassification; for example, the column for normal spontaneous vaginal delivery did not say whether the delivery was full term or preterm, and the column for breech delivery did not indicate whether the delivery was vaginal, instrument-aided or cesarean.

Interviews with obstetricians and nurses responsible for statistics revealed that each hospital or center used different definitions for abortion, stillbirth, preterm delivery and prenatal death. We also found no linkage between the files of the mother and her baby.

We found also no difference between estimated rates and hospital recorded rates (Table 1).

--Reported by Dr. Faida Abu Al-Jadayel and Dr. Tomader Kurdy, Field Epidemiology Training Program

Editorial note: The estimated cesarean section rates from MOH hospitals in Riyadh city were low compared with rates in Western countries and in other Middle Eastern countries. We found the estimated rate similar to the hospital recorded rates. C-section rates in general maternity units should be 10-12% or lower in the singleton population, but a more interventionist approach is indicated for very low birthweight infants, because perinatal mortality for very low birthweight infants is low in units with higher cesarean rates.[1]

The variation in rates among physicians was not attributable to the practice setting, the patient population, the degree of obstetrical risk, or the physicians' recent medico-legal experience, and it was not accompanied by corresponding differences in neonatal outcome. But the individual practice style may be an important determinant of the wide variation in the rates of cesarean delivery among obstetricians.[2]

The survival rate after cesarean birth for singleton infants with breech presentation was significantly higher than after vaginal delivery in the 1001-1500g group but not in the 501-1000g group.[3]

Because there are no standard definitions for normal and abnormal deliveries, the information in the data collection form sent to regional health authorities does not mean the same thing in each hospital. This means that differences in rates for types of deliveries, for live and stillbirths and for prenatal mortality could be partially or completely due to differences in definition as well as to misclassification in the data collecting form.

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Send comments, calendar listings or articles to: Saudi Epidemiology Bulletin, Department of Preventive Medicine, Ministry of Health, Riyadh 11176, Saudi Arabia.

For epidemiological assistance, call or fax the FETP at 01-479-0726 or 01-478-1424.

Mark your calendar . . .

Outside the Kingdom

June 5-8: International Congress on Hazardous Waste: Impact on Human and Ecological Health. Atlanta, Georgia, USA. Sponsored by the Agency for Toxic Substances and Disease Registry, Public Health Service, U.S. Department of Health and Human Services. Contact: John S. Andrews Jr. MD MPH, Associate Administrator for Science, Agency for Toxic Substances and Disease Registry, 1600 Clifton Road NE (E-28), Atlanta GA 30333, USA; 00-1-404-639-0708 (telephone) or 00-1-404-639-0586 (fax); JSA1@ATSOAA1.EM.CDC.GOV (e-mail).

June 26-July 14: European Educational Programme in Epidemiology, Florence, Italy. Contact: EEPE, c/o International Agency for Research on Cancer, 150 Cours Albert-Thomas, F-69372 Lyon Cedex 08, France; 00-33-72 73 85 75 (fax).

Sept. 5-8: The 11th International Symposium: Epidemiology in Occupational Health. Held in Noordwijkerhout, The Netherlands (near Amsterdam). Sponsored by the Departments of Epidemiology and Public Health and Air Quality of the Agricultural University – Wageningen, The Netherlands, and the Department of Public Health, Erasmus University – Rotterdam, The Netherlands, on behalf of the Scientific Committee on Occupational Epidemiology of the International Committee on Occupational Health (ICOH). Contact: Susan Peelen MSc, Department of Epidemiology and Public Health, P.O. Box 238, 6700 AE Wageningen, The Netherlands; 00-31-8370-84124 (telephone) or 00-31-8370-82782 (fax); SUSAN.PEELEN@MEDEW.HEGL.WAU.NL (e-mail).

Sept. 11-29: Modern Approaches to the Epidemiology and Control of Infectious Diseases. University of Oxford, UK. Presented by the Centre for Infectious Disease Epidemiology, Zoology Department, University of Oxford. Contact: Sharon Bridgeman (Program Secretary), Continuing Professional Development Centre, Department for Continuing Education, University of Oxford, 1 Wellington Square, Oxford OX1 2JA, United Kingdom; 00-44-1865-270-286 (telephone) or 00-44-1865-270-284 (fax).

Nov. 8-10: IEA Regional Meeting, Shanghai International Epidemiological Association Congress 1995. Held in Shanghai, China. Sponsored by the International Epidemiological Association, Chinese Preventive Medicine Association, Society of Epidemiology and Chinese Preventive Medicine Association (Shanghai branch). Contact: Secretariat (Headquarters of the Congress), Office of 1995 SIEAC, 1380 Zhongshanxi Road, Shanghai 200335, China.

Special notice

Hospital laboratories require regular quality assurance to monitor and assess the performance of media, chemicals, equipment and their technical expertise. The World Health Organization and the United Kingdom External Quality Assurance Scheme have encouraged countries to develop national quality control schemes.

The Microbiology Laboratory at King Khalid National Guard Hospital, Jeddah, established a Microbiology Quality Control Scheme in 1987. It has grown to include several laboratories in Jeddah, Riyadh, and other parts of Saudi Arabia. There is growing interest in participation, and the hospital plans to expand the program, extending facilities to laboratories throughout the Kingdom.

Hospital laboratories seeking more information about this program should contact: Dr. Raina Zaman, Senior Non-Medical Microbiologist, King Khalid National Guard Hospital, P.O. Box 9515, Jeddah 21423, Saudi Arabia; 02-665-6200 (telephone), 02-665-3031 (fax), 605442 HOSNGJ SJ (Telex).

Note

Mrs. Leslie Hoffecker, editor of the Saudi Epidemiology Bulletin, is leaving the Field Epidemiology Training Program in May 1995 to move to India. She has worked hard since the first issue to make the bulletin a good-looking, interesting and valuable publication. We wish her all success in the future.

—Editor in chief

Selected notifiable diseases by region, July-December 1994

	Riyadh	Jeddah	Makkah	Madinah	Taif	Asir	Gizan	Najran	Al Baha	Eastern	Al Ahsa	Tabuk	Al Jouf	Goriat	Arar	Hail	Qassim	Hafr al-Batin	Bisha
Measles	50	102	37	30	147	52	6	2	6	76	13	2	6	0	2	19	12	25	5
Mumps	133	165	33	97	35	134	46	23	12	132	29	13	29	15	14	19	63	32	16
Rubella	33	37	9	10	12	22	3	4	0	82	6	0	0	2	0	4	27	6	0
Varicella	2098	547	130	469	591	1875	212	71	79	3825	1793	100	130	61	123	182	358	910	132
Brucellosis	278	56	24	75	144	319	67	322	126	36	20	10	73	1	6	191	239	99	152
Meningitis, mening.	1	5	0	5	0	1	1	0	0	0	1	0	0	0	0	0	0	0	1
Meningitis, other	65	13	0	8	23	5	24	1	0	3	4	3	0	0	1	0	3	14	0
Hepatitis A	98	74	28	66	22	229	17	327	17	104	51	19	126	33	26	1	70	56	14
Hepatitis B	130	467	245	68	38	135	19	10	204	335	50	15	7	4	10	1	34	137	29
Hepatitis, unspecified	71	248	203	43	4	101	95	23	282	96	24	1	0	0	8	75	0	7	3
Typhoid & paratyphoid	63	10	18	18	2	21	4	9	0	98	27	1	0	0	3	2	0	13	7
Shigellosis	56	43	4	24	0	5	41	66	0	144	10	5	0	1	0	0	2	72	0
Salmonellosis	250	129	31	0	0	13	7	13	0	591	34	2	0	0	0	0	3	0	4
Amoebic dysentery	92	171	17	0	356	1110	88	11	0	150	6	28	233	2	0	20	8	2	13
Syphilis	13	75	0	0	0	12	1	7	12	96	17	0	0	0	0	3	0	4	2
VD, other	15	42	0	0	0	27	32	10	3	361	108	1	0	0	0	0	0	11	2

Comparisons of selected diseases, 1993-1994

	Jul-Dec 1993	Jul-Dec 1994	Jan-Dec 1993	Jan-Dec 1994
Diphtheria	2	1	8	1
Pertussis	23	7	45	14
Tetanus, neonatal	19	20	30	33
Tetanus, other	10	3	20	16
Poliomyelitis	2	1	2	1
Measles	1177	592	3182	1253
Mumps	2017	1040	4033	2278
Rubella	313	257	848	610
Varicella	7650	13686	23011	31708
Brucellosis	3021	2238	6985	4929
Meningitis, mening.	16	15	52	30

	Jul-Dec 1993	Jul-Dec 1994	Jan-Dec 1993	Jan-Dec 1994
Meningitis, other	180	167	383	377
Hepatitis A	1722	1372	3442	2485
Hepatitis B	1964	1938	3756	3826
Hepatitis, unspecified	1171	1284	2194	2582
Typhoid & paratyphoid	412	296	882	564
Shigellosis	453	473	965	844
Salmonellosis	869	1077	1394	1723
Amoebic dysentery	2067	2307	4070	4353
Syphilis	316	242	547	511
VD, other	582	612	916	1129

Diseases of low frequency, July-December 1994

Yellow fever, plague, rabies, transverse myelitis: No cases

Diphtheria: 1 (Asir 1)

Other tetanus: 3 (Riyadh 1, Taif 1, Jeddah 1)

DEPARTMENT OF PREVENTIVE, MEDICINE AND FIELD EPIDEMIOLOGY TRAINING PROGRAM, MINISTRY OF HEALTH

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