Serotypes of influenza during Hajj season, 1424 (2004).

Each year around 1.2 million Muslims from all over the world assemble for at least two weeks in Makkah to perform Hajj, the fifth pillars of Islam. They are joined by about 0.7 million hajjis from Saudi Arabia and 0.3 million local residents of Makkah. In such crowded situations potential for transmission of respiratory infections like influenza is quite high. But as the information about its serotypes circulating in Hajj is lacking, no evidence based recommendations can be made for the contents of influenza vaccine to be used in Hajj.

A cross sectional study was conducted to identify circulating serotypes of influenza virus and collect other baseline epidemiological information to help in development of routine influenza surveillance system in Saudi Arabia.

The study was conducted at both Makkah and Mina health care facilities during Hajj season 1424 H. Health care facilities were selected on the basis of the high number of Acute Respiratory Tract infection cases presenting there during previous hajj season, and also proximity to the Haram in case of Makkah health facilities. In Makkah, it included three hospitals: Ajyad Hospital, King Abdul Aziz Hospital and King Faisal Hospital; and in Mina it included Mina General Hospital, Mina Al-Wadi Hospital and Primary Health Care centre number 13.

For the purpose of this study a suspected case of influenza was defined as any patient, aged one year or above, presenting with fever of at least 38°C, started within 72 hours of presentation; along with history of cough and/or sore throat.

During the study period 5th to 14th Dhul Hijja, 1424 H (27/01/2004 to 05/02/2004), all patients fulfilling the criteria of case definition of suspected influenza at the participating health facilities were identified in screening clinics established at OPD and ER of participating facilities and invited to participate in the study, irrespective of their nationality, residential or hajj status. All participants were interviewed using a structured questionnaire and a throat swab was taken for viral isolation. The swabs were later analyzed at King Abdul Aziz University virology laboratory in Jeddah.

(Continued on page 2)
A total of 415 suspected influenza cases were identified and interviewed in participating health facilities during the study period, among whom 44.6% were recruited from Ajyad hospital. The ages of the suspected cases ranged between 1-86 years (mean 39.3, SD ± 15.65). The majority of participating suspected cases were Hajjis 360 (86.7%); and 135 (32.5%) suspected cases were domestic i.e. residents of Saudi Arabia whether Saudi nationals or not (Table 1). The suspected cases belonged to 36 different nationalities. Only 26.4% had been in the hajj area for 3 days or less (maximum usual incubation period of influenza) before onset of illness, while 73.6% had been staying in the hajj area for more than 3 days.

The clinical features reported by the suspected cases were fever (100%), sore throat (80.2%), cough (79.5%), headache (77.1%), runny nose (58.1%), myalgia (66.1%), expectoration (26.3%) and blocked nose (21.1%). Only 2.2% of the suspected influenza cases were vaccinated against influenza and 16.1% had used antibiotics before being recruited in the study. Among suspected influenza cases, 55 cases (13.3%) were confirmed by the laboratory by isolation of the Influenza virus: 27.3% had influenza type A viruses, and 72.7% had influenza type B viruses. The most predominant serotype among the confirmed influenza isolates was Flu B Sichuan which accounted for 70.9%, followed by Flu A not typed (14.6%), Flu A H1N1 (7.3%), Flu A H3N2 (5.5%) and Flu B Hong Kong (1.8%). Influenza B Sichuan serotype was the predominant strain from all the countries, except Ethiopia and Djibouti where all the three isolates were Influenza A not typed.

The ages of the confirmed cases ranged from 1-70 years (mean 37.13, SD ± 14.96). Among them, 46 cases (83.6%) were Hajjis, while 18 cases (32.7%) were domestic (Table 1). Clinical features of confirmed influenza cases were fever (100%), cough (85.5%), headache (81.8%), sore throat (76.4%), myalgia (67.3%), runny nose (58.2%), expectoration (25.5%) and blocked nose (16.4%). In none of the 8 suspected influenza cases who were vaccinated against influenza was the virus isolated. Among confirmed cases, 16.4% had used antibiotics, 78.2% had not, and 5.4% did not know.

Reported by: Dr. Essa AlSaleh, Dr. Mohammed Al Mazroua, Dr. Abdul Jamil Chaudhry, Dr. Adel Turkistani, Dr. Nasser Al Hamdan (Field Epidemiology Training Program), Dr. Essam Azhar (King AbdulAziz University), Dr. Diaa Olyan (WHO).

---

**Table 1: Differences between suspected and confirmed influenza cases; Hajj, 1424H**

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<thead>
<tr>
<th>Type</th>
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<th>Confirmed influenza cases</th>
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<td></td>
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</tr>
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<td></td>
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<td></td>
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<td>No. % 95% CI</td>
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<td>9 16.4% 7.8 - 28.8</td>
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<td>Country</td>
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<tr>
<td>Domestic</td>
<td>135 32.5% 26.1 - 37.3</td>
<td>18 32.7% 20.7 - 46.7</td>
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<td>Intern.</td>
<td>280 67.5% 62.7 - 71.9</td>
<td>37 67.3% 53.3 - 79.3</td>
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</tbody>
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**Editorial notes:** Influenza is an acute, usually self-limiting, febrile, contagious respiratory illness caused by influenza viruses. The attack rates during outbreaks may be as high as 10-40% over a 5 to 6 week period. Influenza continues to be an important cause of morbidity and mortality in hospitalized and long-term care patients, particularly among the elderly and those with chronic underlying cardiac and pulmonary diseases. It spreads very quickly among the population especially in crowded circumstances. Influenza A and B are the two types of influenza viruses that cause epidemic human disease. Influenza A viruses are further categorized into subtypes on the basis of two surface antigens: hemagglutinin (H) and neuraminidase (N). Since 1977, influenza A (H1N1) viruses, influenza A (H3N2) viruses, and influenza B viruses have been in global circulation. In 2001, influenza A (H1N2) viruses probably emerged after genetic reassortment between human A (H3N2) and A (H1N1) viruses began circulating widely. Influenza activity in Saudi Arabia begins in September and peaks in November, which may contribute to the occurrence of influenza during coming Hajj seasons and at the same time help in having a higher yield in throat swabs. The type of influenza (Continued on page 7)
On 08/03/1425H (28/4/2004), the General Health Directorate of Asir region reported to the Communicable Disease Department, Ministry of Health, that an unusually large number of hepatitis A (HAV) cases were being diagnosed from different villages of Alberk area, in Alberk Hospital and primary health care centers. Alberk area is located in Asir region, south of Saudi Arabia, about 200 kilometers away from Abha, with total population of 15000. An investigative team from the Field Epidemiology training program (FETP) visited Asir region to investigate the outbreak. However, by the time the team had arrived to Asir region, a mass vaccination campaign with IG had already been carried out.

The team conducted a case-control study to identify the risk factors associated with the occurrence of the disease. A case was defined as any person living in the catchments areas (Alberk governorate) and presented to any of the health facilities with jaundice, and/or diagnosed as suffering from hepatitis A clinically and/or confirmed by laboratory tests, during the period of 30/11/1424 (1st January 2004) to 30/3/1425 (19 May 2004). A control was defined as any person who lived in the same area who never had jaundice symptoms (did not suffer from hepatitis A clinically) before 30/03/1425 (19 May 2004). One control was selected for each case. The controls were divided into two major groups according to school attendance. For those cases attending school, one classmate control was selected giving priority to those who sat to the right, left, front, then back of the case respectively. For cases not attending school, controls were selected from the nearest neighbor of the case, and if not available the next neighbor.

We were able to identify and interview 110 cases and 110 controls. All were Saudis. The ages of the cases ranged from 2 to 35 years with mean (±SD) of 9.1 (±6.5) years. There were 54 males (49.1%), and 56 females (50.9%). The symptoms reported by the cases were yellowish discoloration of eyes (jaundice) (99.1%), dark urine (92.7%), abdominal pain (87.3%), anorexia (87.3%), fever (77.3%), vomiting (74%), malaise (68.2%), nausea (59.1%), headache (58.2%), arthralgia (42.7%), diarrhea (33.6%), and itching (15.5%).

Among the 110 cases, 74 (67.3%) reported having contact with a known case of jaundice. Contact with a known case of HAV was identified to have a three times risk to acquire infection (OR= 3.2, 95% CI=1.8 - 5.56) and this was statistically significant. The risk of acquiring HAV was much higher when the cases lived in the same household (OR=11.70, 95% CI= 4.47 - 31.85), which was also statistically significant. There was no difference between those who attended school and those who did not, regarding acquiring HAV (OR=0.74, 95%CI=0.42-1.31), and this was not statistically significant. Washing hands with water and soap before eating and after going to toilet gave protection against acquiring HAV (OR= 0.20, 95% CI= 0.05 - 0.74; and OR= 0.26, 95% CI= 0.1 - 0.68 respectively), and both were statistically significant.

The majority of controls (90%) had received the vaccine, and 82 of the cases (74.5%) had also been vaccinated but had received the vaccine after acquiring the infection, therefore those controls who received the vaccine were protected against infection (OR=0.39, 95% CI = 0.14 - 0.73). There was no community water supply to all the 19 villages where the cases were reported. People depended on tank vehicle for their water supply, brought from either desalinated water pump or from wells. There was no general sewage system in these villages; each house had its own sewage system like: bayara or dug-well, and the type of sewage disposal were not a risk factor for acquiring the infection (OR= 0.99, 95% CI = 0.7 - 1.41) for those who used bayara, and (OR= 1.07, 95% CI = 0.65 - 1.65) for those who used well-hole.

Leaking sewage outside houses was reported by 14 cases (12.7%) compared to 7 controls (6.4%), giving a clue that this may play a role in acquiring infection (OR = 2.14, 95% CI = 0.83 - 5.54).

Reported by: Dr. Essa AlSaleh, Dr. Adel Turkistani, Dr. Randa Nooh (Field Epidemiology Training Program).

Editorial note: Hepatitis A, one of the oldest diseases known to mankind, is a self-limited disease which results in fulminant hepatitis and death in a proportion of patients. It is a significant cause of morbidity and socioeconomic losses in many parts of the world. HAV has a worldwide distribution and like other enteric infectious diseases, it is classically an infection of childhood and is related to conditions of sanitation and hygiene.

Figure 1: Date of onset for 110 Hepatitis A cases, Alberk, Asir Region, 2004.
On 1/5/1424 (1/7/2003) the General Health directorate of Hail reported to the Communicable disease department, Ministry of Health, an unusually large number of citizens from AlFarhaneih village suffering from vomiting, fever, abdominal pain, diarrhea and headache. A team from FETP traveled to Hail to investigate this outbreak. AlFarhaneih village is a rural community about 70 km west of Hail city, which is 700 km north of Riyadh. It contains several farms with a population of 600. There is no general water net and no general sewage net. There is one primary health care center that serves AlFarhaneih village and the villages close by. The investigative team visited AlFarhaneih primary health care center and reviewed the records of the cases. They also visited the main source of water supplied to AlFarhaneih in the last two months located in AlMurma village, 35 km west. The team reviewed the results of laboratory tests of some cases and the results of drinking water analysis.

It was decided to conduct a case control study to identify the source and impact of water contamination. A case was defined as any person who complained of fever, headache, vomiting, abdominal pain or diarrhea from 25/6-12/7, 2003, in AlFarhaneih village. A control was defined as any person who lived in AlFarhaneih village and was free of disease at the time of the outbreak. One control was selected for each case living in the same dwelling or neighbor. A questionnaire was designed inquiring about demographic information, symptoms, history of hospital admission, sources of water to the houses, presence of water tanks, water storage and any change in water properties color, taste or odor.

From June 25 to July 12, 2003, there were 108 cases; giving an attack rate of 18 per 100 people in AlFarhaneih village. The epidemic curve is shown in figure 1. Symptoms included fever 52 (81.3%), headache 48 (75%), vomiting 26 (40.6%), abdominal pain 20 (31.3%), and diarrhea 11 (17.2%). The age distribution of the cases ranged from 6 months to 65 years (mean 16.2, SD ±16.14). The highest age group among cases was 5-9 years (21.6%). A large number of cases were males (62.5%). Five cases (4.6%) were admitted into hospital, all were cured, there were no deaths nor complications. The geographical distribution of the cases was homogeneous with the distribution of the citizens in the village, and the people had not been exposed to a common food or chemical poisoning or contact with infected patients or had visited an endemic area.

In the absence of any tap water, the community of AlFarhaneih relied totally on the water tank for both drinking and non drinking purposes. Laboratory analysis of water from houses demonstrated Escherichia coli in the specimens of four houses of cases.

There were no cases in houses that did not have a ground water tank or had a tank above the ground surface exposed to the sunlight. Having a ground water tank was statistically significantly associated with development of disease (Odds Ratio (OR) 4.07, 95% Confidence Interval (CI) 1.84-9.03). Those people who received their water supply from AlMurma well were at higher risk of developing disease than those who depended on water from other sources (OR 1.5, 95% CI 0.9-2.49). It was found that AlMurma well did not have permission from the Ministry of water to be used as a drinking water source. A water sample from the well found it contaminated by E. coli, Salmonella and Pseudomonas.

Reported by: Dr. Majed A. AlMohameed, Dr. Mohammed A. AlMazroa (Field Epidemiology Training Program).

Editorial notes: Contamination of ground water is a serious environmental problem throughout the world. According to the guidelines of the World Health Organization, a European commission directive states that drinking water should not contain pathogenic microorganisms in a quantity or at a concentration able to adversely affect human health.

One child in the world dies about every eight seconds of water related diseases. In USA, contaminated water has been responsible for 35,000 cases of Salmonella infections, 150,000 cases of infection with pathogenic E. coli, and 320,000 cases of Campylobacter infections.

Waterborne disease is caused by ingestion of water contaminated by bacteria, viruses, parasites or others.

(Continued on page 5)

Figure 1. Epidemic curve of water borne disease in AlFurhaneih, Hail. (from 22 June to 15 July 2003)
Hepatitis "A" outbreak at Al-Berk, Asir, 2004, cont...

(Continued from page 3)

It is acquired primarily by the fecal-oral route by either person to person contact or ingestion of contaminated food or water. It may also be acquired from faecally contaminated food or water and from wastewater-contaminated drills or water supplies. 1, 2 Hepatitis A occurs sporadically and epidemically worldwide, with a tendency to cyclic recurrences. 1 Several countries around the world have reported cyclical communitywide outbreaks of hepatitis A every 5 to 10 years, such as the United States, where from 1980 through 2001, an average of 25,000 cases have been reported to the Centers for Disease Control and Prevention (CDC) each year.

Hepatitis A is endemic in many parts of the world, including Saudi Arabia, 1, 3 where it is a major cause of morbidity. In 1997, the overall seroprevalence of HAV was determined in the Riyadh area to be 30.2% (range 12.5% - 48.6%) among children aged 6 months to 15 years. The seroprevalence was found to be higher (39%) among rural children than urban (28%) or Bedouin (26%) children. 4

General measures for hepatitis A prevention include hygienic and sanitary measures. In household settings, good personal hygiene, including good hand-washing practices and attention to proper food preparation are important in reducing the risk of transmission. At the community level, provision of safe drinking water and proper disposal of sanitary waste will reduce the incidence of hepatitis A. Passive immunization with immune globulin is the first choice in prevention and control of HAV epidemics and as post exposure prophylaxis. 5

References:

Water Contamination in Al-Farhaneih, Hail 1424 H, cont...

(Continued from page 4)

However, an etiologic agent was determined in only 50% of all waterborne outbreaks. In outbreaks of ground water systems, an agent was identified in 38%, while in surface water systems, an agent was identified in 62% of outbreaks. These agents have included: Salmonella, Shigella, Campylobacter, Yersinia, Giardiasis, Cryptosporidiosis, Rotavirus, or E. coli. 2 The major reasons behind water-borne disease outbreaks include: untreated or inadequately disinfected groundwater, untreated or inadequate disinfection of filtered surface water, distribution or storage deficiencies, untreated ground water, inadequate disinfection of ground water and cross-contamination. 2

Escherichia coli is gram-negative rod-shaped bacteria. It causes infection of variable severity characterized by diarrhea, vomiting and abdominal cramps. It is transmitted by drinking unchlorinated or unboiled water. 3

The major finding in this study is the association between having ground water tanks and development of disease. Also, the people of Alfarhaneih did not employ any protective measures to sterilize the water, such as chlorination or boiling.

A previous study carried out in Dareen, a semi rural area in the Eastern province of Saudi Arabia, the gastrointestinal problem was attributed to consumption of highly saline and very hard water, and infrequent cleaning of water storage vessels. 6 Another study in Aif region revealed a similar association between ground water tanks and the development of water borne disease. 7

The main source of drinking water of the village for the two months prior to the outbreak was AL Murma well, which was contaminated by the waste of animals that had settled nearby. We concluded that this outbreak occurred due to using contaminated water brought from an unauthorized well. The main contaminating organism was thought to be E. coli.

It was recommended that Municipalities should monitor tankers to be filled from authorized wells, health education to improve personal practices including disinfection of water by chlorination, and providing piped water supply accompanied with establishment of proper sewage system.

References:
Serotypes of influenza during Hajj season, 1424 H (2004), cont...

(Continued from page 2) virus in circulation during hajj is important with its potential for outbreak in such crowded conditions. However, except for the study conducted by Kholeidi et al in 1421 H hajj season, no information was available about the influenza viral etiology during the hajj, and even in that study viral typing was done on the basis of serological examination of patient’s blood.  

This study found five serotypes of influenza viruses, the most predominant type being Flu B Sichuan, which are the most common serotypes in Asian countries according to CDC and WHO reports, from where most of these patients arrived.  

Although in this type of study, where information about the denominators is not distinctly available, it is difficult to comment about the etiological relationship of disease pattern with the exposure factors; however, absence of any confirmed cases among known vaccinated patients indicate the protective effect of the vaccine. The assumption is quite reasonable as the serotypes identified in this study are already part of vaccine used in 2004-2005 influenza season.  

This study indicates the need of establishment of a National program on influenza surveillance and control in the Kingdom, with special emphasis on Hajj. Its findings also recommend the encouragement of pilgrims to take influenza vaccine especially among the elderly.

References:  
4. Kholeidi AN, Baksh MF, Al Hamdan NA, Al Mazam A, Mohammed AG, Ghazi H.  

Mark your calendar...  

Inside the Kingdom  

September 20-21, 2005: Recent Advances in Infection Control Symposium.  
Location: Riyadh, Saudi Arabia.  
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Location: Imperial Queen’s Park Hotel, Bangkok, Thailand.  
Contact: Professor Chitr Sithi-amom <email: schitr@chula.ac.th> Institute of Health Research/ The College of Public Health, Chulalongkorn University 4th Floor Institute Building #2 Phyathai Rd. Pathumwan Bangkok 10330 Thailand.  
Tel: 662-218-8141 Fax: 662-253-2395.  

Location: Athens, Greece.  
Contact: Tel: +1-502-852-8905, Fax: +1-502-852-4052  
Email: dascoi07@louisville.edu


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Department of Preventive Medicine:  
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Consultant Epidemiologist, Bulletin Editor  
Dr. Abdul Jamal Choudhry  
Consultant Epidemiologist, Bulletin Editor.
دراسة أنشطة فيروس الإنفلونزا بين الحجاج لعام 2001 هـ

تعتبر الإنفلونزا مرض شديد الدوى وسرير استثنائي ويعتبر الجهاز التنفسي وسببها فيروسات الإنفلونزا "أ" و"ب"، وبملاحظة الأطفال المختلفة. اهتم العالم بهذا المرض منذ ارتفاع نسبة وفياته وما يسبقه من أضرار صحية واقتصادية وعملية، على إيجاد لقاح ناجٍ على المرض.

وحيث أن موسم الحج متلقي لنموذج جينسيات العالم بما فيها البلدان الموبوءة بهذا المرض، ونظرًا إلى الحاجة إلى البحث فيه لما يوجد من خصائص المرض، والبيئة المناسبة لانتشار هذا المرض بين الحجاج، خاصة أن موسم الحج خاص، يسمح بالسماح الأخبار التي تتعلق في فصل الشتاء الذي يعتبر موسم إصابته بالإنفلونزا في العام.

هذا الدراسة معدة من تجربة أنشطة فيروس الإنفلونزا بين الحجاج. كان هناك اهتمام بالدراسة المقدمة حيث شملت كل من مستشفى أجياد، مستشفى الملك عبد العزيز، مستشفى الملك فهد، ومبنى مستشفى الملك فهد، ومستشفى العين لمنظمة الصحة العالمية.

تتطلب المياه بقرية الفرحانية

بتسمبل منطقة حائل 1424 هـ

في يوم 5/7/2001، درفت المديرية العامة بالصحة بمحافظة حائل، وثقت أيضاً على مراقبة المياه يسبب أنها ملوثة بـE.coli. وتغولي من التلوثات، والإشعاعات، وتأثيرها البيئي، مما يضر بزراعة الفلاحين. كما تم تحذير وتحذير زوار المياه من استخدام هذه المياه، وحظر استخدامها للشرب.

وتلك التوصيات على أن تقوم البلدية أو مصلحة المياه بترقية سيارات المياه وحالة نظافة بالمياه من الأبار، بالإضافة إلى التأكيد من الاستخدام الكلي.

عاد محمد المحميدي، محمد المزروع (برنامج المياه الحالية).

Saudia Epidemiology Bulletin, Vol 12, No. 1, 2005
### Selected notifiable diseases by region, Jan — Mar 2005

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### Comparisons of selected notifiable diseases, Jan - Mar 2004-2005

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### Diseases of low frequency, Jan – Mar 2005

- **Yellow fever, Plaque, Poliomyelitis, Rabies, Haemolytic Uraemic Syndrome, Ecchinococcosis:** No Cases
- **Pertussis:** 5 Cases (Qassim 2, Makkah 1, Asir 1, Najran 1)
- **Neonatal Tetanus:** 6 Cases (Makkah)
- **Guillian Barre Syndrome:** 36 Cases (Riyadh 12, Jeddah 9, Jazan 3, Makkah 2, Tabuk 2, Baha 2, Madinah 1, Hassa 1, Asir 1, Ha'il 1, Northern 1, Jouf 1)