

## النشرة الوبائية السعودية

تصدرها وزارة الصحة

الوكالة المساعدة للطب الوقائي وبرنامج الوبائيات الحقلية  
المجلد السابع - العدد الرابع - أكتوبر - ديسمبر ٢٠٠١

### Adequacy of well baby clinic visits and immunizations at Al Khobar Primary Health Care Centers, 1415 - 1419 H.

The Preventive Health Program for children under 5 years of age in Saudi Arabia includes a series of well-baby clinic visits and immunizations. Vaccines have to be given on schedule to maximize protection. A retrospective cohort study of immunization and well-baby clinic visits for children born in 1415 H was conducted at primary health care centers in Al Khobar city to assess the adequacy of well baby clinic visits and immunizations.

The first objective of this study was to determine the proportions of children who were up to date (UTD), and those who were age-appropriately immunized (AAI) with the recommended vaccines, and to estimate the frequency of visits to well-baby clinics and the activities done in these visits, such as recording of weight, height, and head circumference, growth chart plotting and examination of child by a physician. Up to date (UTD) children were defined as having received all vaccinations by the particular age being evaluated. Age-appropriately immunized (AAI) children were defined as having received all scheduled vaccinations no later than 30 days of the recommended age.

Immunization registries, medical records, and well-baby clinic registries were reviewed for the period from 1415 H through 1419 H. A random sample proportionate to the number of children in each primary health care center was selected, giving a total of 116 children who had completed their fifth birthday; sixty (48.3 %) were male, eighty-eight (75.9 %) were Saudi and 28 (24.1 %) were non-Saudi.

(Continued on page 22)

#### Index

Well Baby Clinic Visits and Immunisations at AlKhobar Primary Health Care Centres, cont. ....	22
Hepatitis B in Saudi Arabia eight Years after HBV Introduction .....	23
Salmonella enteritidis outbreak, Riyadh, 1999 .....	24
SEB Arabic page .....	26
Calendar.....	27
Notifiable disease reports .....	28



# Adequacy of well baby clinic visits and immunizations at Al Khobar ... cont

(Continued from page 21)

The proportions of UTD and AAI children were found to decrease with age. By the first birthday, 69.8% of children were found to have completed the primary immunization series, while only 19% were AAI. By the end of the second birthday, 58.6% of children had completed the primary immunization series and the first booster doses of DPT & OPV, while only 10.3% were AAI. By the end of the fifth birthday, 30% of children had completed the primary immunization series and both the first and the second booster doses of DPT & OPV, while only 7.8% were AAI.

The UTD and AAI were higher for any individual vaccine than for all vaccines together at 12 months of age, except for MMR (UTD). At 12 months, UTD children ranged from 100% for the BCG vaccine, to 3.4% for the MMR vaccine. The corresponding figure for AAI children ranged from 97% for BCG to 33.6% for hepatitis B. At 24 months, UTD children ranged from 100% for BCG to 59.5% for DPT & OPV. The corresponding figure for AAI ranged from 97% for BCG to 15.5% for DPT & OPV. At 60 months, UTD children ranged from 100% for BCG to 31.9% for DPT & OPV. The corresponding figure for AAI ranged from 97% for BCG to 9.5% for DPT & OPV.

With regards to recommended well-baby clinic visits, 90.4% of visits in the first year of life were completed, 61% in the second year of life, and only 28% in the fifth year of life. Well-baby medical care was found to decrease substantially over time with increasing age; being highest in the first year and lowest in the fourth year of life. All utilization levels were lower than expected at any given age.

This study demonstrated a wide gap between the proportion of children who were UTD on vaccination at a particular age and the proportion who were AAI with these vaccines. Furthermore, it showed that the utilization level of well-baby clinics is much lower than recommended except in

the first year of life.

– Reported by: Dr. Ahmed AlShihry (Field Epidemiology Training Program) and Prof. Mohamed AlSekait (College of Medicine, King Saud University)

**Editorial note:** Children under 5 years of age represent 20% of the Saudi population<sup>(1)</sup>. The Preventive Health Program for children under 5 years of age was adopted by the Ministry of Health (MOH) in Saudi Arabia and implemented at primary health care level since 1404 H<sup>(1)</sup>. The Expanded Program of Immunization began in 1979, becoming an essential element of primary health care in 1984<sup>(2,3)</sup>.

No study in Saudi Arabia has estimated the percentage of age-appropriately immunized (AAI) children and the adequacy of well-child clinic visits. The Immunization coverage survey conducted in eight regions of Saudi Arabia in 1990 reported that 84.8% of children had completed their immunization schedule by the end of their first year of life and 91.9% by the end of their second year. Overall, vaccination coverage was 97.5 %, 94.3 %, and 86.0 % for BCG, DPT & polio, and measles respectively<sup>(3)</sup>. Al Mazrou et al reported that the percentage of fully vaccinated children in the eastern province was 91.5 %. The coverage for BCG was 99.7 %. Hepatitis B vaccination coverage was 96.5% for the first dose, 94.9% for the second and 92.9% for the third dose. DPT & OPV coverage was 96.4%, 95.7% and 94.7% for the first, second and third (51.7 %) of them were female and 56 doses respectively. The coverage for Measles and MMR was 92.8% and 94.7%, respectively<sup>(4)</sup>. A retrospective cohort study evaluating the number and activities of well-baby clinic visits at Al-Qurayat district in 1419 H for children born in 1413 H, reported that 98% of children had completed the primary immunization series by their first birthday and 91% had had

regular follow up visits in the first year of life. Follow-up visits subsequently declined in the following years<sup>(5)</sup>.

This study reports a low proportion of children receiving all the immunization series. The highest figure was for children who had received the primary immunization series (1 dose of BCG, 3 doses of DPT, 3 doses of polio, 3 doses of hepatitis B, 1 dose of measles, and 1 dose of MMR), followed by those receiving the primary immunization series and the first booster dose of DPT & OPV. The lowest figure was the proportion of children who had received the primary immunization series in addition to the recommended 2 booster doses of DPT & OPV. The fall in vaccination coverage when booster doses are added may be attributed to the length of the time between completion of the primary immunization series (at 1 year), and the recommended administration time of the first (18 months) and second (4-6 years) booster doses of DPT & OPV. During this time, major changes may have occurred, such as change of residential area, travel during the recommended immunization time, or the child may have received the vaccine in other non-MOH health sectors.

The proportion of children who were up to date in this study was lower than expected from previous national surveys<sup>(3,4)</sup>. Although the proportion of age-appropriately immunized children was not reported in previous national studies, the low levels of AAI and UTD in this study is consistent with findings of other international studies<sup>(6,7)</sup>.

Preventive medical care was found to decrease substantially with increasing age and was not adequate beyond the first year of life. The mild improvement in the number of well-child clinic visits in the fifth year may be attributed to the recommended fifth dose of DPT & OPV between 4-6 years, as prerequisite to school admission.

(Continued on page 25)



# Hepatitis B in Saudi Arabia Eight Years after HBV Vaccination Introduction into EPI Programme

On October 1, 1989, the Hepatitis B Virus (HBV) vaccine was added as the "seventh" primary immunogen of the Extended Programme of Immunization (EPI) in Saudi Arabia<sup>(1)</sup>. In 1990, another programme was launched by the Ministry of Health to vaccinate all school children. Eight years after the mass vaccination programme, the efficacy of HBV vaccine was evaluated in a community-based study covering all the regions of the country.

For a population survey of the prevalence of HBsAg, the sample size of children required to determine a prevalence to within 10% of an earlier reported prevalence of about 7.5%<sup>(2)</sup> at a confidence level of 95%, was estimated at 4741 samples. This sample size was distributed proportionally according to the population of each of the 14 health regions into which the Kingdom of Saudi Arabia is divided. The selection of children was accomplished using a stratified cluster sampling technique. Each of the 14 regions was stratified into urban and rural areas and a list of Primary Health Care Centers (PHCC) in each area was compiled and a sample of PHCC was selected for each urban and rural areas. The catchment population of each selected PHCC was further subdivided into cluster of households defined by visible landmarks such as roads or mosques. A simple random sample of clusters was selected and the required number of households was visited.

A total number of 4791 children (2361 males, 2429 females) were investigated; of whom 4087 children had completed the three doses of the 10 µgm recombinant HB vaccine. The number of children who had been vaccinated according to the EPI programme (0, 3, 5 months), and since 1993 at 0, 5, and 124 weeks was 3663, while the remainder had received the vaccine at school entry at the age of 6 years according to the

catch-up programme. After informed consent, 5-10 cc of blood was obtained from each child. Along with each sample, a form was filled indicating the child's age, sex, and exact region along with HBV vaccination details. The blood was allowed to clot and sera were separated by centrifugation. Sera was kept at -20°C, until the required number of samples of the specific region were completed, after which they were sent for analysis to the Virology Laboratory at King Khaled University Hospital in Riyadh. A p-value <0.05 was judged to reflect a significant difference; a p-value between 0.05 and 0.1 was judged to reflect a trend.

Among the 4791 vaccinated Saudi children, 15 were found to be HBsAg positive, giving an overall prevalence rate of 0.31%. Only one HBsAg was also anti-HBs and anti-HBc-positive with anti-HBs titer of 15 IU/L. HBsAg positivity was 0.16% among children vaccinated at birth, compared to 0.7% among those who started vaccination at school entry. The prevalence of anti-HBc among children vaccinated at birth was 0.2%, and among those vaccinated at school entry was 1.2%. The overall HBsAg carrier rate was found to have dropped from 6.7% in 1989 to 0.3% in 1997 ( $p < 0.00001$ ). Similarly, there was a significant reduction in the prevalence of anti-HBc from 4.2% in 1989 to 0.46% in 1997 ( $p < 0.00001$ ).

The overall seroconversion rate to HB vaccine among 4087 children up to 12 years of age was about 77%. The seroconversion rate in children vaccinated at birth was 3666 children (77%), compared to 1181 children (71%) in those who were vaccinated at school entry ( $p = 0.0001$ ). The seroconversion rate increased to 77.5% among 9-10 year olds, and reached 85% among 11-12 year olds. The highest seroconversion rate (93%) was found among children less than

one year of vaccination, compared to 66% in children after eight years of vaccination.

After eight years of receiving the third vaccine dosage, close to 65% of the children had anti-HBs titer of more than 10 IU/L, compared to only about 28% who had anti-HBs titer of more than 100 IU/L after the same time period.

The seroconversion rate after eight years of vaccination was similar in all 14 regions of Saudi Arabia and did not fall below 71%. There was no significant difference in seroconversion between sexes or rural versus urban areas.

*— Reported by: Prof. Faleh Z. Al-Faleh, Dr. Mohammed Al-Jeffri, Dr. Abdulrahman Aljumah and co-workers (Long Term Hepatitis B Vaccination Evaluation Study. In collaboration between the College of Medicine, King Saud University and the Ministry of Health).*

**Editorial notes:** The endemicity of Hepatitis B virus (HBV) in Saudi Arabia is well established<sup>(2)</sup>. Acquisition of HBV infection occurs mainly by the horizontal route in early life, and by the age of 10 years, about 7% are HBsAg carriers and about 20% are positive for at least one HBV marker<sup>(3)</sup>. HBV infection significantly contributes to HBV-related morbidity and mortality among Saudi patients. The availability of a safe and efficacious HBV vaccine has led to the feasibility of an effective control of HBV infection, especially in endemic countries<sup>(4)</sup>.

Prior to adding the HBV vaccine to the EPI Programme in Saudi Arabia, a baseline survey of viral hepatitis markers in the kingdom had been established<sup>(3)</sup>. At the beginning of 1990, mass vaccination of all school children was also started. The main objective of these programmes was to

*(Continued on page 25)*



# Salmonella Enteritidis Outbreak, Riyadh, 1999.

On the 23<sup>rd</sup> of June 1999, eight individuals presented at the Emergency Room of Riyadh Medical Compound with symptoms of gastroenteritis, including abdominal colic, vomiting, diarrhea and/or fever. All of them had eaten chicken shawerma at restaurant "A" the previous night. A case control study was conducted to identify the source of the outbreak and to determine its extent. A case was defined as any person who had eaten shawerma from restaurant "A" on June 23, 1999, and who had developed gastroenteritis with any three of the following symptoms: diarrhea, abdominal pain, malaise, vomiting, nausea, and fever and/or *Salmonella* group D non-typhi isolated from a stool culture. 24A control was defined as any person who had eaten at the same time and place as the cases but who had not developed symptoms.

Using a structured questionnaire, 28 cases and 9 controls were interviewed. The main symptoms were abdominal pain, general weakness and diarrhea (100%). Fever and headache were present in 92.9% of cases, 78.6% had nausea and vomiting, and chills were present in 25%. *Salmonella enteritidis* phage 4 was identified in eight stool samples. Both the cases and controls had eaten chicken shawerma. However, only the cases had eaten mayonnaise while the controls had not. The mean and median incubation periods were 15.3 ( $\pm$  0.84) and 15.9 respectively (see Figure 1). The Odds Ratios (OR) for the chicken and ketchup could not be calculated. The OR for Mayonnaise was undefined, but its p-value was <0.001. The OR for pickles was 0.75 (C.I. 0.03-9.49, p-value = 1) and that for potatoes was 0.95 (C.I. 0.15-6.23, p-value = 1). The clinical picture and laboratory results suggest that this outbreak was caused by *Salmonella enteritidis*. Epidemiological evidence indicated that restaurant-made mayonnaise was the source of infection.

– Prepared by: Dr. Maysoon Al-Amoud and Dr. Mohammed Al-Mazrooa (Field Epidemiology Training Program).

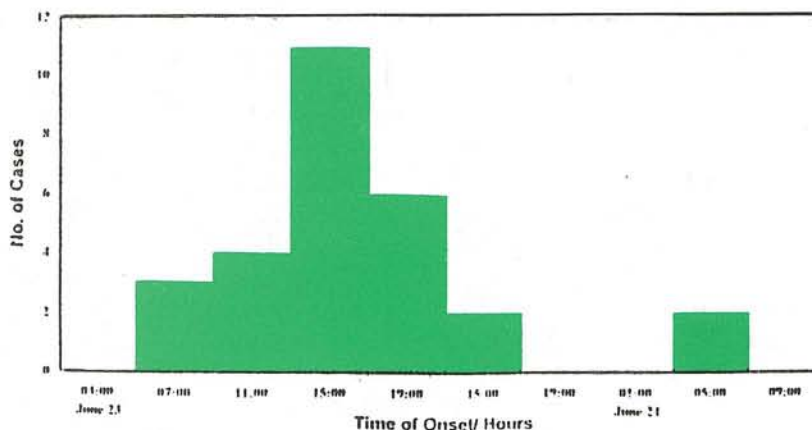
**Editorial notes:** *Salmonella* is one of the most common infective types of bacterial food poisoning, worldwide<sup>(1)</sup>. In particular, *Salmonella enteritidis* phage 4 (group D) is capable of infecting the interior of intact eggs<sup>(2)</sup>. Most of *Salmonella enteritidis* outbreaks have been attributed to the consumption of contaminated eggs<sup>(3)</sup>. In Saudi Arabia *Salmonella enteritidis* phage 4 was identified from eggs in 1993<sup>(4)</sup>. A three-year period analysis of food poisoning cases (1991-1993) illustrated that *Salmonella* was the second cause of food poisoning, being incriminated in 16% of incidents<sup>(5)</sup>.

This salmonellosis outbreak was most probably caused by consumption of infected mayonnaise prepared from infected eggs. It was recommended that restaurants use commercially-packed rather than locally-made mayonnaise, and public awareness should be raised regarding restaurant and home-made preparations.

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Figure 1: Onset of gastroenteritis for 28 cases after eating shawerma from a restaurant, Riyadh, June 23-24, 1999





## Adequacy of well baby clinic visits and immunizations ... cont

(Continued from page 22)

The immunization schedule has to be strictly followed to maximize protection from vaccines and particular attention has to be paid to children after they complete their first birthday.

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## Hepatitis B in Saudi Arabia Eight Years after HBV Vaccination Introduction ... Cont

(Continued from page 23)

prevent the chronic carriage of HBV infection by reducing the reservoir of HBV and HBV-related chronic liver disease in the Saudi population. The effect of HB vaccine eight years after the start of the mass vaccination programme is the first to be reported from the Middle East. Similar long-term effects of HB vaccine have been reported from several other countries<sup>(5,6)</sup>.

Comparing results of this study with a prevaccination survey conducted in 1989 in the same area and among the same age groups<sup>(1)</sup>, the overall HBsAg carrier rate showed a striking decline from 6.7% to 0.31% ( $p < 0.00001$ ). A similar striking decline from 4.2% to 0.46% ( $p < 0.00001$ ) was also noted in the prevalence of anti-HBc. This difference in HBV infection between 1989 and 1997 surveys could not be explained by improvement of hygiene standards or change in population immunity. Similar studies<sup>(5,6)</sup> have attributed the marked decline in HBV infection mainly to the effect of HBV vaccine introduction into the EPI programme.

The decline in the rate of HBV infection (HBsAg or anti-HBc) was less pronounced among children who were vaccinated at school entry compared to those vaccinated at birth. This decline, when translated in calculation of the efficacy of HB vaccine against HBsAg carriage was 95% and 99% at school entry and at birth, respectively. On the other hand, the introduction of HB vaccine to the EPI programme parallel to its introduction to children at school entry contributed significantly to the change of dynamics of HBV infection among unvaccinated children who lived in the same area and had to wait 1-5 years till the time of their vaccination. The risk of infection among these children was reduced as the cycle of horizontal transmission had been broken and due to the reduction

in the infection pool.

In this study, close to 77% of children 1-12 years of age were found to have antibody to HBsAg (anti-HBs >10 IU/L) 8 years after the start of the nationwide vaccination programme. This result is similar to those reported from other countries with regards to seroconversion rate and efficacy of the vaccine<sup>(5,6)</sup>. The relative increase in seroconversion among children in the 7-12 year age group can be explained by the short time interval between vaccination and evaluation. Also, the small number among children aged 11 years may play a factor.

Among the 15 children who were found to be HBsAg-positive, three children (2 brothers and one sister) and two (2 brothers) belonged to the same family and lived at the same house. These 5 children were also HBeAg-positive, indicating that perinatal or horizontal HBV transmission as the most likely route of infection. The remaining 7 HBsAg-positive children were vaccinated at school entry or after, which may explain their early exposure to HBV infection. Other possibilities include poor response to HBV among these children, or infection due to steady decline in anti-HBs titer. Only one HBsAg-positive child was also anti-HBc and anti-HBs-positive with an anti-HBs titer of >10 IU/L. This break-through infection could be due to HBV mutant infection and merits further investigation.

The results of this study demonstrate the tremendous impact of the mass HB vaccination programme on the seroepidemiology of HBV infection in Saudi Arabia. HBV vaccination seemed to protect most children from infection and from becoming HBV carriers. The ultimate goal of preventing HBV-related chronic liver disease and hepatocellular carcinoma in Saudi Arabia is foreseeable in the near future.

(Continued on page 27)



## ملخص باللغة العربية

كفاية الرعاية المقدمة في عيادة الطفل السليم  
والتطعيمات للأطفال الذين أتموا خمس  
سنوات في مراكز الرعاية الأولية في الخبر من  
عام ١٤١٥هـ إلى ١٤٢٠هـ

البرنامج الوقائي للأطفال إلى سن الخامسة في المملكة العربية السعودية يشمل سلسلة من الزيارات إلى عيادة الطفل السليم وسلسلة من التطعيمات والغرض منها الاكتشاف المبكر لأي حالات مرضية. والغرض من التطعيمات هو حصول الطفل على المناعة في سن مبكرة مع إحداث مستويات عالية من الأجسام المضادة في جسمه. ولذلك فقد أوصي أن تكون هذه الزيارات والتطعيمات مجدولة على فترات محددة من عمر الطفل. هدفت هذه الدراسة إلى التعرف على نسبة الأطفال الذي تم تطعيمهم في الأوقات المحددة حسب جدول التطعيمات وعدد الزيارات لعيادات الطفل السليم خلال كل سنة من سنوات العمر الأولى وما تم فيها. تمت مراجعة سجلات التطعيمات والملفات الطبية وسجلات عيادة الطفل السليم من عام ١٤١٥هـ إلى عام ١٤٢٠هـ في مراكز الرعاية الأولية في مدينة الخبر. وقد تم أخذ عينة عشوائية متناسبة مع عدد الأطفال في كل مركز.

بلغت نسبة الأطفال الذين أتموا التطعيمات عند إتمامهم السنة الأولى من العمر حسب الجدول ٦٩,٨% بينما ١٩% فقط أخذوا كل الجرعات من التطعيمات الموصى بها إلى سن سنة حسب الجدول. وفي السنة الثانية بلغت نسبة الذين أتموا التطعيمات حسب الجدول ٥٨,٦% في مقابل ١٠,٣% أخذوا كل الجرعات من التطعيمات الموصى بها إلى سن سنتين. وفي السنة الخامسة بلغت نسبة الذين أتموا التطعيمات حسب الجدول ٣٠% في مقابل ٧,٨% أخذوا كل الجرعات من التطعيمات الموصى بها إلى سن الخامسة. حقق

الأطفال ٩٠,٤% من عدد الزيارات الموصى بها للسنة الأولى من العمر، و ٦١% من عدد الزيارات الموصى بها للسنة الثانية، و ٢٦,٥% من الموصى بها للسنة الثالثة، و ٢٢,٥% من الموصى بها للسنة الرابعة، و ٢٨% من الموصى بها للسنة الخامسة.

هذه هي الدراسة الأولى عن نسبة الأطفال الذين أخذوا كل الجرعات من كل التطعيمات حسب الجدول. أوضحت أن نسبة الذين أخذوا كل الجرعات من كل التطعيمات الموصى بها أقل بكثير من نسبة الذين أتموا التطعيمات حسب الجدول في كل الأعمار التي تم قياس التغطية عندها. كما أن عدد الزيارات لعيادة الطفل السليم كانت أقل من الموصى به حيث تناقصت مع الزيادة في العمر.

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الالتهاب الكبدي الفيروسي "ب" بعد ثمانية سنوات من إقرار التطعيم له في برنامج التحصين الموسع

في الأول من أكتوبر ١٩٨٩ تم إقرار تطعيم الالتهاب الكبدي الفيروسي "ب" كسابع تطعيم في برنامج التحصين الموسع بالمملكة العربية السعودية. وفي عام ١٩٩٠ طبقت وزارة الصحة برنامجاً لتطعيم جميع طلبة المدارس بهذا اللقاح. بعد ثمانية سنوات من تطبيق هذا البرنامج تم تقييم فعالية اللقاح في دراسة شملت جميع مناطق المملكة. تم إجراء هذا البحث على عينة من ٤٧٩١ طفلاً (٢٣٦١ ذكراً، ٢٤٢٩ أنثى)، ٤٠٨٧ منهم كانوا قد أكملوا الجرعات الثلاث من التطعيم. عدد الأطفال الذين طعموا حسب

برنامج التحصين الموسع (بعد الولادة، وعند ٣ و ٥ أشهر) و منذ عام ١٩٩٣ عند الولادة، و بعد خمسة أسابيع ثم ٢٤ أسبوعاً من العمر، كان ٣٦٦٣ طفلاً، أما الباقين فقد تلقوا التطعيم عند دخول المدرسة في عمر ٦ سنوات حسب البرنامج الإلحاقى (عند الولادة، و بعد شهر ثم ٦ أشهر من العمر).

من مجموع ٤٧٩١ طفلاً سعودياً كان قد تلقى اللقاح، وجد ١٥ منهم إيجابياً لـ HbsAg مما دل على معدل انتشار نسبته ٠,٣١%. واحداً من هؤلاء كان أيضاً إيجابياً لكل من anti-HBs و anti-HBc. كلت الإيجابية لـ HbsAg ٠,١٦% في الذين طعموا عند الولادة، مقارنة بـ ٠,٠٧% في الذين طعموا عند الدخول إلى المدرسة. وكان معدل انتشار anti-HBc في الذين طعموا عند الولادة ٠,٠٢%، مقارنة بـ ١,٠٢% في الذين طعموا عند الدخول إلى المدرسة. و وجد أن إجمالي معدل حمل HBsAg قد انخفض من ٦,٧% في ١٩٨٩ إلى ٠,٣% في عام ١٩٩٧. وكان معدل انتشار anti-HBc قد انخفض من ٢,٤% في ١٩٨٩ إلى ٠,٤٦% في عام ١٩٩٧. كان إجمالي معدل التحول بالدم ضمن ٤٠٨٧ طفلاً أصغر من ١٢ سنة حوالي ٧٧%. وكان ٧٧% في ٣٦٦٦ طفلاً طعموا عند الولادة مقارنة بـ ٧١% في ١١٨١ طعموا عند الدخول إلى المدرسة. إجمالاً كان معدل التحول بالدم بعد ثمانية أعوام متشاهماً في جميع مناطق المملكة و لم يختلف بين الجنسين أو بين القرى و المدن.

اعداد: د. فالخ الفالح، د. محمد الجفري، د. عبد الرحمن الجمعة و آخرون (دراسة متابعة عن تقييم التحصين ضد الالتهاب الكبدي الفيروسي "ب": بالتعاون بين كلية الطب بجامعة الملك سعود و وزارة الصحة).



## **Hepatitis B in Saudi Arabia Eight Years after HBV Vaccination Introduction ... Cont**

(Continued from page 25)

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**Printing of this issue of the  
Saudi Epidemiology  
Bulletin  
is supported by  
Abbott Diagnostic  
Products  
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### **Inside the Kingdom**

#### **October 15-17, 2001: Cancer 2001, An International Symposium.**

Contact: Symposium Coordinator, King Faisal Specialist Hospital and Research Centre, P.O.Box 3354, Riyadh 11211, KSA. Tel: 966 1 4647272, ext. 32917. Fax: 966 1 4427854.

E-mail: kawa@kfshrc.edu.sa

#### **January 22-24, 2002: 13th Scientific Session of the Saudi Heart Association.**

Contact: Saudi Heart Association, College of Medicine, King Saud University. P.O.Box 2925, Riyadh 11461, KSA. Tel: 966 1 4671434. Fax: 966 1 4672553.

E-mail: sauhass@ksu.edu.sa

### **Outside the Kingdom**

#### **January 20-23, 2002: 24th Conference of the International Union Against TB and Lung Diseases (IUATLD) Middle East Region.**

Contact: Sudan Chest Association, Khartoum Nile Avenue, P.O.Box 1001, P.C 11111, Khartoum, Sudan. Tel: (249) 777617/779769, Fax: (249) 778322.

E-mail: sca\_conf@hotmail.com

#### **March 11-14, 2002: 10th International Congress on Infectious Diseases.**

Contact: Margie Konopliv, Public Health Nutrition, Division of Epidemiology, University of Minnesota, 1300 S. Second St, #300, Minneapolis, MN 55454-1015, USA. Tel: (612) 626-0793, Fax: (612) 6240315.

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(SEB) is published quarterly by the Department of Preventive Medicine and the Field Epidemiology Training Program (FETP) of the Ministry of Health.

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## Selected notifiable diseases by region, Oct – Dec 2000

	Riyadh	Makkah	Jeddah	Taif	Madinah	Qassim	Eastern	Hasa	Hafr Al Batin	Asir	Bisha	Tabuk	Hail	Al Shamal	Jizan	Najran	Baha	Al Jouf	Gorlat	Gonfuda	Total	
Measles	23	3	18	2	24	14	3	6	4	5	4	3	1	0	4	2	1	0	0	0	0	117
Mumps	43	27	121	7	33	26	19	17	13	29	8	10	3	4	11	6	0	3	1	1	1	382
Rubella	9	4	11	0	4	17	1	1	0	1	0	1	0	0	3	0	0	0	0	0	0	52
Varicella	1072	256	519	203	184	355	1026	471	136	279	308	118	132	48	75	42	85	19	39	62	5429	
Brucellosis	89	10	2	29	20	136	18	13	24	241	28	4	83	4	17	71	2	9	44	5	849	
Meningitis, mening.	2	8	4	0	6	1	3	0	1	0	0	0	0	0	1	0	0	0	1	0	0	27
Meningitis, other	54	33	13	7	23	10	6	5	2	7	3	6	4	3	17	0	0	3	0	0	0	196
Hepatitis A	55	70	46	5	37	12	28	10	28	100	10	38	2	12	39	64	4	10	26	1	597	
Hepatitis B	124	57	186	0	69	26	130	9	4	54	8	16	4	2	4	6	84	1	4	6	794	
Hepatitis C	89	56	184	0	23	19	95	5	0	0	1	3	4	3	3	2	35	0	1	1	524	
Hepatitis, unspecified	17	19	18	0	0	6	0	3	0	26	1	36	25	0	85	2	0	0	0	0	0	238
Typhoid & paratyphoid	13	7	0	0	12	6	12	9	0	18	21	3	12	2	4	1	0	0	0	0	0	120
Amoebic dysentery	32	0	505	24	15	17	18	5	152	94	0	1	15	0	7	8	0	0	1	1	1	895
Shigellosis	31	0	17	0	4	10	26	9	22	0	0	38	1	0	1	27	0	0	1	0	0	187
Salmonellosis	106	2	45	2	11	13	321	13	11	5	0	29	0	0	1	38	7	0	0	0	0	604
Syphilis	4	0	16	0	0	0	7	4	0	0	0	0	6	0	1	0	4	0	7	0	0	49
VD, other	5	0	44	0	0	0	15	17	2	13	0	0	0	0	1	1	0	0	3	0	0	101

## Comparisons of selected notifiable diseases, Oct-Dec 1999-2000

	Oct-Dec 2000	Oct-Dec 1999	Change %	Jan-Dec 2000	Jan-Dec 1999		Oct-Dec 2000	Oct-Dec 1999	Change %	Jan-Dec 2000	Jan-Dec 1999
Diphtheria	0	0	0	0	0	Meningitis, other	196	178	10	716	613
Pertussis	7	1	600	21	9	Hepatitis A	597	479	25	2250	2365
Tetanus, neonatal	8	6	33	13	12	Hepatitis B	794	743	7	3361	3076
Tetanus, other	2	3	-33	10	7	Hepatitis C	524	484	8	2134	1737
Poliomyelitis	0	0	0	0	0	Hepatitis, unspec.	238	274	-13	1041	960
Measles	117	130	-10	617	815	Typhoid/paratyph.	120	93	29	420	390
Mumps	382	472	-19	1388	2290	Amoebic dysentery	895	721	24	3244	3522
Rubella	52	45	16	202	299	Shigellosis	187	137	36	501	551
Varicella	5429	3738	45	20076	23087	Salmonellosis	604	408	48	2045	2145
Brucellosis	849	1224	-31	5320	6250	Syphilis	49	82	-40	165	220
Meningitis, mening.	27	0	2700	337	20	VD, other	101	108	-6	389	460

## Diseases of low frequency, Oct – Dec 2000

Yellow fever, plague, diphtheria, poliomyelitis, rabies, echinococcosis, puerperal sepsis: No cases

Pertussis: 7 (Riyadh 1, Eastern 4, Makkah 1, Assir 1)

Tetanus neonatal: 8 (Makkah 7, Jeddah 1)

Tetanus, other: 2 (Jeddah 1, H. Batin 1)

Guillain-Barre syndrome: 16 (Riyadh 6, Jeddah 2, Jizan 2, Madinah 1, Taif 1, Hail 1, Assir 1, Shamal 1, Tabuk 1)