Volume 12, Issue 3

July—September 2003

Community Health & Disease Surveillance Newsletter

Sultanate of Oman **Ministry of Health**

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Influenza Surveillance in Oman

Background

Acute respiratory illnesses are the most commonly experienced diseases of adults and children and viral infections account for over 90% of these illnesses. Attack rates are influenced by socioeconomic status, geographical location, and especially age and season. Rhinoviruses and coronaviruses are the most common causes of colds in all age group while influenza, respiratory syncytial virus (RSV), adenoviruses, enteroviruses, measles and parainfluenza viruses are the common causes of more severe influenza-like illnesses (ILI). Children acquire all of these viruses with high frequency, while adults with ILI are much more likely to have influenza which is the respiratory pathogen of the most concern. Influenza as a clinical entity has been recognized for centuries.

Fig. 1
WHO Global Influenza Surveillance Network

The Influenza Virus

There are three subtypes of influenza that are known to occur in man: A, B and C. Influenza A is responsible for the familiar influenza pandemics and is responsible for most of the morbidity and mortality associated with influenza. Epidemics of influenza B are also known, but tend to be less severe clinically and are usually limited to school-aged children. Influenza C infections in humans usually produce either a very mild respiratory illness or asymptomatic infection. Influenza A viruses infect a number of different species of animals while B is known to infect only man and influenza C has been isolated from both man and pigs.

Influenza virus has the capacity to modify its antigenic structure in a relatively short period. There have been two types of antigenic variation demonstrated in influenza A viruses which are important epidemiologically. The first type of genetic variation is "*antigenic drift*" which involves the gradual change or drift in the HA and NA antigens of

the virus currently circulating within a host population due to accumulation of point mutations. The second and more dramatic variation is called *"antigenic shift"* which is a complete change in its antigenic character (HA and NA antigens).

Clinical Disease

Influenza in man is a self-limiting illness typically characterized by an abrupt onset of fever, sore throat, runny or stuffy nose, headache, muscle aches, and a non-productive cough. There is often extreme malaise associated with the above symptoms that can last for several days. Gastro-intestinal symptoms may occur, but are usually seen only in children. Most cases recover completely in 1 to 2 weeks.

"Outbreaks of influenza in humans usually begin abruptly & can typically affect up to 50% of the population with the highest incidence in 5 to 14 years olds."

More severe disease can result from primary viral pneumonia or secondary bacterial pneumonia. Influenza related complications can occur at any age; however, the elderly and people with chronic health problems are much more likely to develop serious complications than are younger, healthier people.

Influenza Vaccination

Much of the influenza morbidity and mortality can be prevented by vaccination. With information gained through world-wide surveillance network (Fig.-1)the *'WHO Influenza Task Force' f*ormulates a new influenza vaccine each year. When the match between the vaccine and the circulating virus is close, the influenza vaccine is shown to be more than 70% effective in individuals under the age of 65. In older age groups and those with chronic medical conditions, the vaccine is often less effective, but it can reduce the severity illness as well as complications and death.

http://rhone.b3e.jussieu.fr/flunet/www/

Among nursing home residents, vaccine can reduce the risk of hospitalization by about 50%, the risk of pneumonia by about 60%, and the risk of death by 75% to 80%. Influenza vaccination is specifically recommended for people who are at high-risk for developing serious complications and these include:

- All people aged 65 years or older
- People of any age with chronic diseases of the heart, lung or kidneys, diabetes, immunosuppression or severe forms of anaemia
- Residents of nursing homes and other chronic care facilities
- Children and teenagers who are receiving long-term aspirin therapy and who may therefore be at risk for developing Reye syndrome after an influenza virus infection
- Children 6 months or older with respiratory disorders
- People who live in a household with a high risk person
- Health care personnel and volunteers who provide care to high-risk patients

Influenza Epidemics

Outbreaks of influenza in humans usually begin abruptly and can typically affect up to 50% of the population with the highest incidence in 5 to 14 years olds. This can put an enormous burden on the health care system of the affected country. Outbreaks are seen primarily in populated areas, where people live in crowded conditions, and in schools. As the disease spreads through communities, the number of cases

(Continued on page 8)

Nizwa Healthy Lifestyle Project Survey

(Summary)

Introduction

The World Health Report in 1997 drew attention to the growing burden of non-communicable diseases (NCD) in both the developed and developing countries. It predicted that they would become a dominating public health problem in the world in the twenty-first century.

The far-reaching social changes that Oman and many countries of the region have gone through during the last thirty years have affected a change in the lifestyles. Increasing physical inactivity, smoking and a calorie dense high fat diet resulting in an increase in non-communicable diseases such as hypertension, heart diseases, strokes, diabetes and cancer characterize these new lifestyles.

Situation analysis

The National diabetes survey, 1991, revealed that 10% of the population ≥ 20 years had diabetes and a further 10% had impaired glucose tolerance. Diseases of the circulatory system constituted 34% of total deaths in 1995.The number of hospital cases discharged with cardiovascular diseases (CVD) increased from 9439 in 1990 to 11936 in 1992 and to 13804 in 1995. In addition, the national hypertension survey in 1994 observed that 23% of Omani had hypertension (defined as BP ≥140/90mm Hg). Further, the study showed that 12% of the study subjects smoked and 37% were obese.

The Ministry of Health collaborated with the World Health Organization (WHO) to initiate a community based intervention programme against the three major non-communicable diseases by establishing a pilot project in one of the Wilayat in the sultanate. This project would serve as a demonstration for the possibility of using this community-based approach nation-wide.

Subsequently, a request from the Wali of Nizwa was submitted to the Ministry of Health for the establishment of the project in Nizwa Wilayat, in Ad' Dakhliyah region, with an Omani population of about 55,000.

Objectives

The Survey would aim to achieve the following:

1. Provide baseline data on CVD and other NCD's risk factors among the population in Nizwa Wilayat for the planned community-based demonstration programme.
2. Develop and test the methodology of NCD's risk factor survey to be used periodically in the demonstration area and in other settings and nation-wide.

Methodology

The required sample size was 1000 for each gender, for which a two-stage sampling was done.

In the first stage, 16 of the 80 *Census Enumeration Areas* in Nizwa Wilayat were selected randomly. In the second stage, a computer generated random list of 1000 Omani individuals of each sex was drawn from the sampling frame, giving a total of 2000 subjects.

Survey procedure

The questionnaire in Arabic was finalised and a pilot study was conducted two months prior to the actual survey. The survey site was identified as the Nizwa Extended Health Centre.

The selected subjects were invited to the survey on a particular date. In the survey site, each subject was interviewed for about 30 minutes, during which the survey

"The far-reaching social changes that Oman & many countries of the region have under gone during the last thirty years have affected a change in the lifestyles."

questionnaire was administered. Physical examination included measurements of height, weight, waist and hip circumferences, and blood pressure.

A venous blood specimen was taken from all participants for the determination of fasting glucose, serum total and HDL-cholesterol. The oral glucose tolerance test was performed; hence a second sample of blood for 2-hour post glucose was drawn.

Subjects found to have high blood pressure at the time of the survey (BP >150 mmHg systolic or diastolic above 100 mm Hg) were channelled to medical team. In addition, subjects who were later (after receipt of laboratory test results) shown to have diabetes mellitus and or high serum cholesterol were contacted and asked to see a physician.

Preliminary analyses of the data were done in the Ministry of Health in collaboration with the National Public Health Institute, Finland using suitable software. A private statistician was appointed with the task of doing the detailed analysis.

The results are summarized below in table-1.

"The results of the survey clearly show the need for intervention in the Nizwa Wilayat. A workshop to introduce the intervention project was conducted in Nizwa with the active participation of community leaders in March 2002."

Conclusions

The results of the survey clearly show the need for intervention in the Nizwa Wilayat. A workshop to introduce the intervention project in Nizwa was conducted with the active participation of community leaders in March 2002. A short-term consultant to advice on the strategies to control and prevent risk behavior in the population visited Oman in April 2003. The actual intervention is expected to begin by mid 2003. A second survey to assess the effects of intervention on the risk factors for non-communicable diseases will be conducted after about 5 years from now.

Table-1
Summary of Survey Results

Prevalence	Male %	Female %	Total %
By fasting blood glucose	9.3	8.1	8.7
By 2-hour blood glucose	7.7	4.4	5.9
Impaired Fasting Glucose	9.5	9.8	9.7
Impaired Glucose Tolerance	16.2	15.9	16.1
Undiagnosed diabetes (male and female combined)			60.5
Hypertension (≥140/≥90mmhg)	16.2	8.5	12.1
Undiagnosed hypertension (male and female combined)			69.0
Overweight and Obesity combined (BMI ≥ 25kg/m²)	40.5	42.3	41.5

New Milestone in the Oman's EPI

(Introduction of the Penta Vaccine)

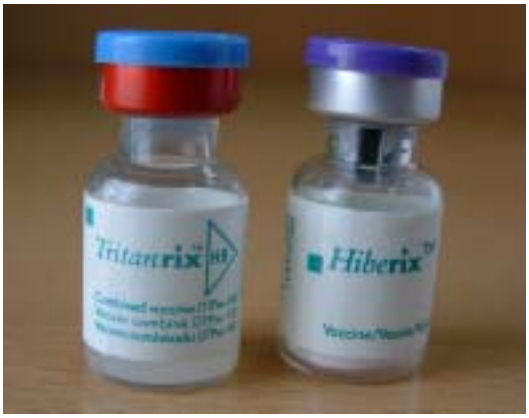
Although in the early seventies the childhood immunization was one of the components of health services in Oman but it was not until 1981 that the Expanded Programme on Immunization (EPI) was formally launched in the country. The EPI was then integrated into the comprehensive childcare program that was introduced nationally in 1987. A standardized record system that included the child-health-card and child-health-register was launched. Defaulter retrieval system was streamlined. As a result, the immunization coverage increased throughout the late 80's to early 90's. Coverage of more than 95% has been maintained since the early 1990's for all the vaccines included in the EPI.

After the last outbreak of poliomyelitis, two additional doses of OPV were introduced. Oman has been polio-free since 1993. Following the nationwide outbreak of measles and rubella in early 90's a Measles-Rubella (MR) catch-up campaign was conducted to vaccinate all children (15 months to 18 years). Subsequently MR was introduced into EPI. As a consequence Oman entered the phase of elimination of measles as well as Rubella from 1996. Another catch-up campaign with Hepatitis B vaccine targeting all adolescent children not covered by the EPI program was launched in 2001 and is ongoing. It is envisaged that by the end of 2004, all under the age of 21 years in the Sultanate would have been vaccinated against Hepatitis B. The latest addition to the EPI schedule is the Hib vaccine in 2001. Thus, the schedule has been revised and expanded several times over the past two decades and now includes the 10th antigen.

To further enhance the programme, Ministry of Health, Oman has in 2003 introduced the ***Penta*** vaccine in routine EPI.

Pentavalent vaccine is a combined vaccine consisting of *Trtfanrix HB* (combined *Diphtheria, Tetanus, Pertussis* & *Hepatitis-B*) and *Hiberix* (*Haemophilus influenzae type b*) providing safe, effective and long lasting protection from five serious childhood diseases. This represents a major innovation in paediatric vaccine formulation. In addition to high immunogenicity for all antigens and good tolerance it provides immediate benefit to the patient. The advantage of this vaccine includes effective protection from five serious childhood diseases with a single injection. Less number of injections also means less pain and less vaccine wastage.

The PENTA Vaccine



The vaccine is reconstituted by adding liquid *Trtfanrix HB* to freeze dried *Hiberix* powder. The recommended dose of reconstituted 0.5 ml the vaccine is administrated by deep intramuscular route on the anterolateral aspect of left thigh. The schedule consists of three doses administrated at 1 ½, 3 and 5 months after birth.

The vaccine was introduced from the 1st of July 2003. Children born before this date will continue with the old schedule. The *Penta* vaccine will be available in all Government health institutions that are having immunization facilities including vaccine qualified private clinics.

"The Penta Vaccine provides safe, effective & long lasting protection from five serious childhood diseases."

Vision 2020: The Right to Sight

ELIMINATION OF AVOIDABLE BLINDNESS

Global Scenario

Forty-five million people in the world today are blind and that a further 135 million people are visually impaired; and 90% of these live in the developing countries of the world. The blindness has significant economic impact on both communities and countries. Most of the causes of blindness are avoidable and that the treatments available are among the most successful and cost-effective of all health interventions.

"Oman, as one of the member states has already implemented a number of initiatives to eliminate the preventable blindness in the country."

In order to tackle the burden of avoidable blindness and to avoid further increase in the numbers of blind and visually impaired people, the *Global Initiative for the Elimination of Avoidable Blindness*, known as **Vision 2020**– the Right to Sight, was launched in the year 1999.

The Fifty-sixth World Health Assembly in May 2003; on this background of elimination of avoidable blindness; passed a resolution on the global elimination of blinding trachoma. Oman, as one of the member states has already implemented a number of initiatives to eliminate the preventable blindness in the country.

Progress in the Elimination of Avoidable Blindness in Oman

- '*National Eye Health Care Committee*' was established in the Ministry of Health in the year 1992. The committee includes members from University, ophthalmic services, and epidemiologists from various disciplines. Members from Armed Forces Health Services are often invited to and proposal to invite other ministries and local NGOs is on the anvil.
- Oman is the first country in the region to launch the national **"Vision-2020"** initiative in collaboration with WHO in 1998.
- The **Vision-2020** plan was incorporated into the 5th & 6th Five-Year Health Development Plan with identification of strategies and supportive activities initiated at all the subnational levels.
- Reporting of the six priority eye diseases viz. cataract, trachoma, diabetic retinopathy, glaucoma, refractive error and corneal diseases was integrated into the effective standardized national health information system.
- Indicators were developed for monitoring the progress to achieve the midterm and end-decade goals of prevention of blindness in Oman.
- The Eye health Care programme is building national as well as generating international support for the cause of elimination of preventable blindness in Oman.

To mobilize additional resources to ensure that target of elimination of avoidable blindness is reached by 2020, following support is envisaged in 6th Five-Year plan:

1. Providing biometry equipment to Dhahira, North Sharqiyah and Musandam regions.
2. Providing three additional microsurgery cataract instrument sets to each ophthalmic unit in the regional hospitals.
3. Providing ophthalmic loupe to all Primary Health Care Institutions.
4. Provision of equipment for detection, documentation and management of diabetic retinopathy in one institution.
5. Provision of equipment to tertiary care unit for sub-specialty units.
6. Establishing the eye bank in Oman

By the end of 2002 following indicators

highlight the progress of vision 2020 in Oman:

1. Rapid decline in the active trachoma cases. Oman in collaboration with WHO aims to eliminate blinding trachoma by 2005.
2. The cataract surgery rate has increased from 1500/million in 1999 to 2500/million in 2002.
3. All school children are provided refractive error services. The compliance improved and local health committees participated in providing spectacles at low cost.
4. A system of eye check-up of diabetics established in all regions. Magnitude of diabetic retinopathy, glaucoma and visual impairment was assessed and published in international journals.
5. A survey for determining the glaucoma problem is planned in 2004.
6. The proposal for the establishment of eye bank prepared and put forwards to the health planners.
7. Participation in international meets and provision of assistance to other countries in prevention of Blindness related activities.
8. A number of operational research projects on the six priority eye diseases were conducted.

A strong and effective collaboration has been established with WHO for *Program for Preventable Blindness* (PBP). The ministry of health is also collaborating with other ministries, sister health organizations, private sector and NGOs in Oman for blindness prevention and rehabilitation. National capacity building through training of Ophthalmologists, ancillary staff and health program managers is an ongoing process. SOPs and research related to eye diseases and PBP management is being published regularly. Oman's experiences in relation to the eye health care programme are also being shared with other WHO member states.

"The Eye health Care programme is building national as well as generating international support for the cause of elimination of preventable blindness in Oman."

Coverage (%) of Target Groups (1985 & 1986 birth cohorts) by Region/Governorate
Hepatitis B Catch-up Immunization Campaign in Schools: 2002-03

Region/ Governorate	1st Secondary Class (% Coverage)				2nd Secondary Class (% Coverage)			
	Target	1st round	2nd round	3rd round	Target	1st round	2nd round	3rd round
Muscat	9,121	99.3	99.5	99.1	6,971	95.7	97.3	99.3
Dhofar	4,382	97.9	99.7	99.3	3,942	99.4	99.8	99.6
North Batinah	10,187	99.3	99.6	98.7	9,158	99.8	99.4	98.9
South Batinah	5,687	99.8	100	100	4,266	99.9	100	100
Dakhliyah	6,943	100	100	99.9	5,799	100	100	100
Dhahira	3,955	99.9	99.9	100	3,013	100	100	100
North Sharqiyah	2,880	100	100	100	2,603	100	100	100
South Sharqiyah	3,264	98.3	100	100	2,875	99.1	100	100
Al Wustah	209	100	100	99	154	100	100	100
Musandam	610	100	100	99.3	402	100	100	99.3
TOTAL	**47,238**	**99.4**	**99.8**	**99.5**	**39,183**	**99.1**	**99.4**	**99.6**

(Continued from page 2)

peaks in about 3 weeks and subsides after another 3 or 4 weeks. Schools are an excellent place for transmission of flu viruses, so that families with school-age children have a higher rate of infection than other families.

The epidemiology of influenza A in humans follows three general patterns: (1) local sporadic outbreaks; (2) regional or nationwide epidemics; and (3) worldwide pandemics. Regional and local outbreaks are due to varying degrees of antigenic change due to drift. Pandemics result from antigenic shift where the antigenic character of the virus is completely changed. This allows the virus to replicate in an immunologically virgin population with devastating results.

"The Vaccination remains the most cost-effective public health measure available for the prevention of the influenza & its associated complications."

The role of animals in human influenza has been the subject of speculation even before the virus was isolated in 1930. With the advent of better serologic techniques, isolation procedures and molecular studies, the role of animal influenza in human disease is becoming better understood. There is evidence that influenza viruses of animals and avian species could have been the origin of the HA and NA antigens of at least the last two pandemic strains.

During this century, three large pandemics have occurred. The *"Spanish flu"* A(H1N1) in 1918-19 with 20 million deaths worldwide; "Asian flu" A(H2N2) in 1957-58 with over 70,000 deaths in USA alone; and *"Hong Kong flu"* A (H3N2) in 1968-69 which in the following years caused about 400,000 deaths in the United States, more than 90%these deaths were among the elderly. In 1997-98 human infections with avian influenza A(H5N1) were identified in Hong Kong raising a worldwide concern of yet another pandemic. To this date there has been no such pandemic.

The recent world wide outbreak of SARS in 2002-03 rang the bell that whether is the beginning of another pandemic of influenza.

Influenza Surveillance

As with most medical conditions, the prevention of influenza and associated complications is preferable to treatment. Vaccination remains the most cost-effective public health measure available for the prevention of the influenza and its associated complications. Due to the potential of the influenza virus to change its antigenic nature and the potential viral reservoirs in humans, pigs and especially aquatic birds, the only way to prevent disease through vaccination is **continuous surveillance on viruses circulating in human and, if possible, animal populations to provide up-to-date information for vaccine preparation.** The WHO conducts worldwide surveillance throughout the epidemic and inter-epidemic periods to identify influenza viruses circulating so that emerging strains (due to antigenic 'drift') and viruses capable of pandemics (due to antigenic "shift") are quickly identified.

The main purpose of the surveillance programs is to identify and characterize influenza viruses circulating within the EMR. Isolated and typed influenza viruses will be sent to the *"WHO Collaborating Centre on Influenza Viruses"* for further characterization and evaluation. Information on influenza viruses from this region will be used to help evaluate which viruses should be incorporated into the next year's influenza vaccine and may be useful in determining the effectiveness of the vaccine in the Middle East in any given year. Currently, influenza surveillance in the Middle East and WHO EMR is limited. This program will initiate a structured active surveillance program in Oman that will compliment the existing EMR participants.

Influenza Surveillance in Oman

The viral pathogens causing acute respiratory infections in Oman are unknown and the public health measures to decrease the impact of ILIs will vary depending on the type of viruses present. Hence the useful of the study. Up to 50% of ILIs can be diagnosed using virus isolation. This method of identification is (1) easy for the patient (because only a throat swab is taken), (2) definitive, and (3) yields a virus that can be typed with any degree of precision desired and stored for comparison with the future isolates. The method used to collect samples for this protocol, freezing of a throat swab in liquid nitrogen, is a logistically easy and inexpensive way to obtain samples for virus isolation. In addition, knowledge base on the viral infectious diseases circulating in the Middle East is of general interest as a component of the global surveillance.

Recruitment of Study Subjects

Subjects were recruited from patients attending outpatient clinics during routine clinic hours. There was no age or gender exclusion. Outpatient clinical staffs would identify patients who met the case definition and then were asked to volunteer for the study.

Inclusion Criteria

Any individual who met the case definition was enrolled. It was ensured that the individual was in Oman for past five days. No more than two individuals from any given household presenting with similar symptoms during the same time frame were asked to volunteer.

Case Definition

Following modified WHO case definition was used for the surveillance activity:

- Abrupt onset of fever ›38.0° C (37.5°C axillary)
- Respiratory manifestations of cough, sore throat, or coryza)
- Myalgia or headache (for ages ›5)

In addition to the above symptoms, the onset of influenza like illness (ILI) must be within the previous 72 hrs. (*Influenza A cannot be routinely isolated from clinically ill individuals after approximately 3 days*)

Study Sites

Bawsher Polyclinic, Muscat and Sultan Qaboos Hospital, Salalah

Study Period

August—November 2001.

Sample Size

The present study is a surveillance program for which there is no available incidence data on specific pathogens. Based on past seasonal distribution of acute respiratory infections (ARI) approximately 240 samples per site during one calendar year was considered adequate.

Ethical Considerations

Collection of throat swabs is a minimal risk procedure and hence offers no special risk to participants of any age. No sample was collected if the attending physician felt that the procedure may compromise the well-being of the patient.

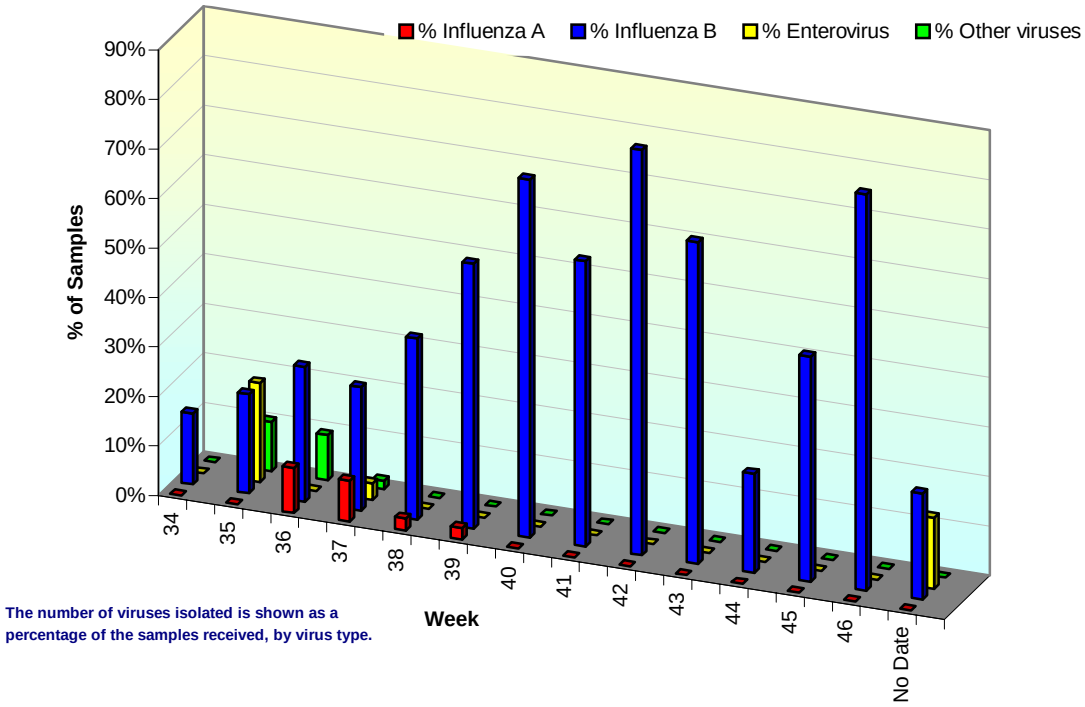
Methodology

Clinical Questionnaires were filled at the time of recruitment.

A dry polyester fiber-tipped applicator was used to swab both tonsils and posterior pharynx. The tip of swab was placed into a *Cryovial* containing virus transport medium and was then immediately placed into a liquid nitrogen tank kept in the OPD.

"The viral pathogens causing acute respiratory infections in Oman are largely unknown & the public health measures to decrease the impact of ILIs will vary depending on the type of viruses present."

Fig. 2
Oman Influenza Surveillance Report
Virus Isolation by Week: Aug to Nov 2001



The number of viruses isolated is shown as a percentage of the samples received, by virus type.

"Viruses were isolated on tissue culture cells & were identified using immunofluorescent staining. Subtyping of virus isolates was done by haemagglutination inhibition using WHO Influenza Subtyping Kits."

The samples were transported to Central Public Health Laboratory and subsequently shipped to *NAMRU-3* (Naval Research Unit), Cairo.

Viruses were isolated on tissue culture cells and were identified using immunofluorescent staining. Subtyping of influenza virus isolates was done by haemagglutination inhibition using *WHO Influenza Subtyping Kits*.

Respiratory Viruses Isolated in Oman
Aug to Nov 2001

Virus	# Isolates	% Isolates
Influenza A	8	5
Influenza B	141	79
Enteroviruses	6	3
Other viruses	3	13
Total Viruses	158	100%

Future Plans

The Influenza surveillance in Oman is an ongoing process hence the activities would continue.

The Bowsher polyclinic would be withdrawn from the influenza surveillance sites. It is considered unsuitable since from early 2003 the polyclinic would entertain only referred cases. In its place, from October 2003, three other sites in Muscat would be enlisted as sentinel sites for influenza surveillance viz. Al Amerat HC, Mutrah HC and Al Khod HC along with Sultan Qaboos Hospital, Salalah.

Central Public Health Laboratory, Darsait would process the samples and do the primary virus isolation and typing. Untypable viruse isolates would be forwarded to reference laboratory so also all influenza virus isolates for the purpose of sequencing.

Frequently Asked Questions (FAQ): Penta

Q1: What is PENTA?

Ans.: "*Penta*" is a new generation vaccine. *Penta* literary means "five" that refers to the combined vaccine containing 5 different antigens. We all know of the Triple (three) vaccine since a long time i.e. DTP that combines *Diphtheria, Tetanus & Pertussis.*

Q2: Which diseases are prevented?

Ans.: The Penta introduced in Oman contains vaccine components against diseases viz. *Diphtheria, Tetanus, Pertussis, Hepatitis-B & Haemophilus influenzae type b.*

Q3: What is the vaccination schedule?

Ans.: The Penta is offered as a three doses schedule administered at 1 ½ months (40 days or *Al Arbayeen*), 3 months and 5 months .

Q4: Is there a special technique of administration ?

Ans.: The Penta is available as liquid (*DTP+ HepB*) and freeze-dried powder (*Hib*) in separate single dose vials. The liquid is withdrawn from the first vial and added to the second vial with powder. After mixing the reconstituted Penta vaccine is ready for administration.

Q5: What is the recommended dose?

Ans.: Recommended dose is ½ ml (0.5 ml).

Q6: Is the vaccine safe?

Ans.: The safety of the Penta vaccine has been proven. There is no additional risk of adverse events exists besides if individual vaccine was offered separately. However minor adverse reactions locally would be expected in few cases due to the DTP component.

Q7: How long the immunity lasts?

Ans.: The individual components of Penta vaccine are the same antigens available separately and hence would induce similar immunity i.e. combination of antigens does not reduce antigenicity of the individual components.

Q8: Are booster doses required?

Ans.: There are no boosters recommended for Penta vaccine. The hepatitis B and the Hib components do not require boosters. DTP booster at 1 year and DT and dT boosters would continue as before.

Q9: Can we offer the vaccine to immunocompromised children?

Ans.: **Yes.** Since the Penta vaccine does not contain any live vaccine component it is safe for the immunocompromised.

Q10: Is the vaccine available in all health facilities?

Ans.: **Yes.** The Penta vaccine is available in all health facilities in Oman, Government and private. All children born after July 1st, 2003 are eligible to receive the same.

"The PENTA vaccine has been introduced in the Expanded Programme of Immunization (EPI) of Oman from 1st July 2003."

Communicable Diseases Quarterly Report

Third Quarter (July to September 2003)

ICD Code	Diseases	2003 Third Quarter Jul	Aug	Sep	Total	2002 Q3 Jul-Sep	Q4 Oct-Dec	2003 Q1 Jan-Mar	Q2 Apr-Jun
GROUP 'A' DISEASES									
A00	Cholera	1 (i)	-	2	**2+1 (i)**	1	-	-	-
A20	Plague	*Never Reported*							
A36	Diphtheria	*Last Case in 1992*							
A39	Meningococcal infection	1	-	1	**2**	1	-	1	4
A80	Poliomyelitis	*Last Case in 1993*							
	Acute Flaccid Paralysis	-	2	-	**2**	5	5	4	3
B05	Measles	-	-	-	**0**	-	1	1	-
B06	Rubella & [CRS]	-	-	-	**0**	-	-	-	-
A95	Yellow fever	*Never Reported*							
A82	Rabies	-	-	1	**1**		-	-	-
B20-24	HIV & [AIDS]	2 [2]	3 [1]	1 [2]	**6 [5]**	15 [11]	17 [3]	5 [5]	10 [6]
A75.0	Louse-borne typhus	*Never Reported*							
A68	Relapsing fever	*Last Case in 1997*							
A33	Tetanus Neonatorum (NNT)	*Last Case in 1995*							
A99	Viral Hemorrhagic fever	-	-	-	**0**	-	-	-	-
	Severe Acute Respiratory Syndrome (SARS)	-	-	-	**0**				-
GROUP 'B' DISEASES									
A03.0	Typhoid fever	2	6	5	**13**	25	10	9	17
A01.4	Paratyphoid fever	1	1	-	**2**	2	4	4	2
A02	Food poisoning	196	74	37	**307**	365	150	201	256
A22	Anthrax	*Never Reported*							
A23	Brucellosis	22	16	19	**57**	26	29	50	55
A37	Pertussis	18	14	11	**43**	17	15	30	49
A35	Tetanus (Excluding NNT)	-	-	1	**1**	-	2	-	-
A90	Dengue	1 (i)	-	-	**1 (i)**	-	1 (i)	-	2 (i)
	Acute Viral Hepatitis - Total	**86**	**80**	**103**	**269**	**393**	**322**	**416**	**361**
B15	Viral Hepatitis 'A'	18	35	38	**91**	167	75	121	53
B16	Viral Hepatitis 'B'	5	6	3	**14**	18	4	7	18
B17.1	Viral Hepatitis 'C'	4	2	2	**8**	5	2	-	2
B17.0	Viral Hepatitis 'D' among 'B'	-	-	-	**0**	-	1	-	-
B17.2	Viral Hepatitis 'E'	1	1	1	**3**	1	-	1	-
B19/B17.8	Viral Hepatitis (Unspecified)	58	36	59	**153**	202	240	287	288
B55	Visceral Leishmaniasis	-	-	-	**0**	-	-	-	-
B55.1	Cutaneous Leishmaniasis	1	2	-	**3**	-	4	9	1
B65	Schistosomiasis	16	-	25	**41**	-	1	15	24
B74	Filariasis	-	1 (i)	-	**1 (i)**	1 (i)	-	-	1 (i)
B72	Dracunculiasis	*Certified by WHO as Eradicated from Oman*							
G00.0	Haemophilus influenzae type b, Meningitis	1	1	1	**3**	4	3	1	-
G00.1-9	Bacterial meningitis other than Nm & Hib	1	4	3	**8**	23	10	11	10
A87	Viral meningitis	1	5	2	**8**	10	1	6	2
G03	Meningitis - Unspecified	-	3	10	**13**	5	4	11	1
A30	Leprosy	-	2	-	**2**	1	2	3	1
A15	Pulmonary Tuberculosis Sputum Positive	12	5	7	**24**	24	24	16	27
A16	Pulmonary Tuberculosis Sputum Negative	3	1	3	**7**	8	3	9	11
A17-19	Extra-Pulmonary Tuberculosis	7	5	6	**18**	38	16	21	32
B50-54	Malaria (All sources)	66	77	143	**286**	227	99	58	124
A50-53	Syphilis	11	12	9	**32**	25	32	31	30
A54	Gonococcal Infections	11	17	34	**62**	46	46	23	58
GROUP 'C' DISEASES									
A03	Shigellosis	54	60	57	**171**	203	417	238	234
A06	Amoebiasis	319	372	462	**1153**	1,178	1,624	1667	1,259
A09	Acute Gastro-Enteritis & Diarrhoea	5,937	8,541	8,254	**22,732**	23,023	37,823	36,282	24,205
B01	Chicken Pox	1,453	1,409	1,451	**4,313**	2,296	4,409	5,476	7,349
B26	Mumps	101	82	105	**288**	415	571	376	639
A71	Trachoma	32	29	39	**100**	58	74	176	65
J10-J11	Influenza	166	114	180	**460**	651	1,202	468	425

Communicable Diseases Quarterly Report by Regions

Third Quarter (July to September 2003)

ICD Code	Diseases	Total	Muscat	Dhofar	Dakhli-yah	North Sharqi-yah	South Sharqi-yah	North Batinah	South Batinah	Dhahira	Musan-dam	Al-Wustah
GROUP 'A' DISEASES												
A00	Cholera	**2+1 (i)**	-	1 (i)	-	-	-	-	2	-	-	-
A20	Plague	*Never Reported*										
A36	Diphtheria	*Last Case in 1992*										
A39	Meningococcal infection	**2**	-	1	-	-	-	-	1		-	-
A80	Poliomyelitis	*Last Case in 1993*										
	Acute Flaccid Paralysis	**2**	1	-	-	-	1	-	-	-	-	
B05	Measles	**0**	-	-	-	-	-	-	-		-	-
B06	Rubella & [CRS]	**0**	-	-	-	-	-	-	-	-	-	-
A95	Yellow fever	*Never Reported*										
A82	Rabies	**1**	-	1	-	-	-	-	-	-	-	-
B20-24	HIV [AIDS]	**6 [5]**	1 [0]	0 [1]	0 [1]	-	-	2 [2]	0 [1]	3 [0]	-	-
A75.0	Louse borne typhus	*Never Reported*										
A68	Relapsing fever	*Last Case in 1997*										
A33	Tetanus Neonatorum (NNT)	*Last Case in 1995*										
A99	Viral Haemorrhagic fever	**0**	-	-	-	-	-	-	-	-	-	-
	Severe Acute Respiratory Syndrome (SARS)	**0**	-	-	-	-	-	-	-	-	-	-
GROUP 'B' DISEASES												
A03.0	Typhoid fever	**13**	4	2	1	-	-	1	2	3	-	-
A01.4	Paratyphoid fever	**2**	1	-	1	-	-	-	-	-	-	-
A02	Food poisoning	**307**	18	16	40	9	2	66	136	18	-	2
A22	Anthrax	*Never Reported*										
A23	Brucellosis	**57**	-	56	-	-	1	-	-	-	-	-
A37	Pertussis	**43**	11	3	4	2	2	16	1	4	-	-
A35	Tetanus (Non-NNT)	**1**	1	-	-	-	-	-	-	-	-	-
A90	Dengue	**1 (i)**	1 (i)	-	-	-	-	-	-	-	-	-
	Acute Viral Hepatitis - Total	**269**	**19**	**31**	**24**	**24**	**38**	**77**	**25**	**20**	**3**	**8**
B15	Viral Hepatitis 'A'	**91**	4	-	11	2	16	28	22	2	1	5
B16	Viral Hepatitis 'B'	**14**	2	-	5	-	1	3	1	2	-	-
B17.1	Viral Hepatitis 'C'	**8**	2	1	3	-	-	-	1	1	-	-
B17.0	Viral Hepatitis 'D' among 'B positive'	**0**	-	-	-	-	-	-	-	-	-	-
B17.2	Viral Hepatitis 'E'	**3**	-	-	2	-	-	1	-	-	-	-
B19/17.8	Viral Hepatitis Unspecified	**153**	11	30	3	22	21	45	1	15	2	3
B55	Visceral Leishmaniasis	**0**	-	-	-	-	-	-	-	-	-	-
B55.1	Cutaneous Leishmaniasis	**3**	-	1	-	-	-	-	-	-	-	-
B65	Schistosomiasis	**41^**	-	41^	-	-	-	-	-	-	-	-
B74	Lymphatic Filariasis	**1 (i)**	-	-	-	-	-	-	-	1 (i)	-	
B72	Dracunculiasis	*Certified by WHO as Eradicated from Oman*										
G00.0	Haemophilus influenzae type b, Meningitis	**3**	-	1	1	-	-	-	1	-	-	-
G00.1-9	Bacterial meningitis except Nm & Hib	**8**	2	-	1	4	-	-	1	-	-	-
A87	Viral meningitis	**8**	1	-	-	-	1	2	1	3	-	-
G03	Meningitis - Unspecified	**13**	2	-	-	-	2	8	-	-	-	-
A30	Leprosy	**2**	-	2	-	-	-	-	-	-	-	-
A15	Pulmonary Tuberculosis Sputum Positive	**24**	12	-	1	1	2	6	2	-	-	-
A16	Pulmonary Tuberculosis Sputum Negative	**7**	4	2	-	-	-	-	1	-	-	-
A17-19	Extra-Pulmonary Tuberculosis	**18**	5	4	2	-	1	4	-	2	-	-
B50-B54	Malaria (All sources)	**286**	123	8	18	15	15	33	22	30	1	21
A50-A53	Syphilis	**32**	7	-	-	-	7	8	-	10	-	-
A54	Gonococcal Infections	**62**	14	16	-	-	15	4	6	2	3	2
GROUP 'C' DISEASES												
A03	Shigellosis	**171**	26	4	36	53	23	3	5	15	4	2
A06	Amoebiasis	**1153**	84	3	143	169	310	91	34	190	10	119
A09	Acute Gastroenteritis & Diarrhoea	**22732**	3443	3542	2563	2157	3176	3683	2246	1197	371	354
B01	Chicken Pox	**4313**	1046	281	514	345	292	760	458	427	127	63
B26	Mumps	**288**	68	9	51	21	8	32	33	61	3	2
A71	Trachoma	**100**	30	1	14	12	-	9	16	18	-	-
J10-J11	Influenza	**460**	107	-	50	-	-	48	1	254	-	-

Selected Communicable Diseases by Wilayat

Third Quarter (July to September 2003)

Region	Wilayat	AFP	Measles	Rubella	Pertus-sis	TB (Total)	TB Sputum Positive	Tetanus (Ex. NNT)	Malaria (All)	Viral Hepatitis (Total)	Leprosy	Meningo. Infection	Hib Men-ingitis	Leishma-niasis Visceral	Leishma-niasis Cutaneous
MUSCAT	Muscat				2	2	1		6	3					
	Seeb				3	7	4		52	4					
	Muttrah				1	6	4		20	2					
	Bowsher	1				2			29	2					
	Al Amerat				4	3	2		16	3					
	Quriyat				1	1	1			5					
DHOFAR	Salalah				3	3			8	11	1	1	1		1
	Thumrait									2					
	Taqah					1									
	Mirbat									4					
	Sudah										1				
	Rakhyut					1									
	Dhalqut					1				14					
	Muqshan														
	Shaleem														
NORTH BATINAH	Sohar				5	5	3		19	19					1
	Shinas					1	1		2	6					
	Liwa								1	29					
	Saham					1			3	11					1
	Khabura				3	2	1	1	1	2					
	Suwaiq				8	1	1		7	10					
SOUTH BATINAH	Rustaq					2			8	13			1		
	Nakhl														
	Wadi Maawil														
	Al Awabi														
	Musanah								1	9					
	Barka				1	1	1		13	3		1			
DAKHLIYAH	Nizwa								5	8					
	Bahla				1	2	1		4	2					
	Adam								2	2					
	Hamra				1					2					
	Manah								1				1		
	Sumail								1	3					
	Izki				1	1			2	7					
	Bid Bid				1				3						
DHAHIRA	Ibri				4				7	9					
	Yanqul									2					
	Dhank								1	1					
	Buraimi					1			19	8					
	Mahda					1			3						
NORTH SHARQIYAH	Ibra				2				4	4					
	Mudhaibi								6	7					
	Bidiyah					1	1			11					
	Al-Qabel								2	2					
	Dima Al-Tayeen								2						
	Wadi Bani Khalid								1						
SOUTH SHARQIYAH	Sur	1			2	2	2		11	11					
	Masirah									1					
	Al Kamil & Al Wafi								2	2					
	BBB Ali					1			1	15					
	BBB Hassan								1	9					
MUSANDUM	Khasab								7						
	Dibba								12						
	Bukha								2						
	Madha														
AL-WUSTAH	Haima								1	1					
	Duqum									6					
	Mahoot														
	Al-Jazer									4					
NATIONAL TOTAL		**2**	**0**	**0**	**43**	**49**	**24**	**1**	**286**	**269**	**2**	**2**	**3**	**0**	**3**

Age Distribution of Communicable Diseases

Third Quarter (July to September 2003)

ICD Code	Diseases	Total	Age Groups in Years								
			< 1	1-4	5-9	10-14	15-19	20-24	25-34	35-45	45+
GROUP 'A' DISEASES											
A00	Cholera	**2+1 (i)**	-	-	-	2	-	-	1 (i)	-	-
A20	Plague	*Never Reported*									
A36	Diphtheria	*Last Case in 1992*									
A39	Meningococcal infection	**2**	1	1	-	-	-	-	-	-	-
A80	Poliomyelitis	*Last Case in 1993*									
	Acute Flaccid Paralysis	**2**	1	1	-	-	-	-	-	-	-
B05	Measles	**0**	-	-	-	-	-	-	-	-	-
B06	Rubella & [CRS]	**0**	-	-	-	-	-	-	-	-	-
A95	Yellow fever	*Never Reported*									
A82	Rabies	**1**	-	-	-	-	-	-	-	-	1
B20-24	HIV [AIDS]	**6 [5]**	-	-	-	-	-	1 [1]	4 [1]	0 [2]	1 [1]
A75.0	Louse borne typhus	*Never Reported*									
A68	Relapsing fever	*Last Case in 1997*									
A33	Tetanus Neonatorum	*Last Case in 1995*									
A99	Viral Haemorrhagic fever	**0**	-	-	-	-	-	-	-	-	-
	Severe Acute Respiratory Syndrome (SARS)	**0**	-	-	-	-	-	-	-	-	-
GROUP 'B' DISEASES											
A03.0	Typhoid fever	**13**	1	3	2	-	1	2	1	3	-
A01.4	Paratyphoid fever	**2**	-	-	-	-	-	-	1	1	-
A02	Food poisoning	**307**	2	27	52	64	60	29	35	22	16
A22	Anthrax	*Never Reported*									
A23	Brucellosis	**57**	-	9	19	12	2	-	6	4	5
A37	Pertussis	**43**	25	7	4	6	1	-	-	-	-
A35	Tetanus (Non NNT)	**1**	-	-	-	-	-	-	-	1	-
A90	Dengue	**1**	-	-	-	-	-	-	-	-	1
	Viral Hepatitis - Total	**269**	**3**	**41**	**106**	**48**	**13**	**8**	**18**	**9**	**23**
B15	Viral Hepatitis 'A' (ELISA)	**91**	-	20	52	15	-	-	2	-	2
B16	Viral Hepatitis 'B' (ELISA)	**14**	1	-	-	-	2	3	2	1	5
B17.1	Viral Hepatitis 'C' (ELISA)	**8**	-	-	1	-	-	-	1	1	5
B17.0	Viral Hepatitis 'D' (ELISA) among 'B'	**0**	-	-	-	-	-	-	-	-	-
B17.2	Viral Hepatitis 'E' (ELISA)	**3**	-	-	-	1	-	-	1	1	-
B19/B17.8	Viral Hepatitis Unspecified	**153**	2	21	53	32	11	5	12	6	11
B55	Visceral Leishmaniasis	**0**	-	-	-	-	-	-	-	-	-
B55.1	Cutaneous Leishmaniasis	**3**	-		-	-	2	-	1	-	-
B65	Schistosomiasis	**41^**	-	-	5	6	8	5	5	8	4
B74	Lymphatic Filariasis	**1 (i)**	-	-	-	-	-	-	1 (i)	-	-
B72	Dracunculiasis	*Certified by WHO as Eradicated from Oman*									
G00.0	Haemophilus influenzae meningitis type b	**3**	1	2	-	-	-	-	-	-	-
G00.1-9	Bacterial meningitis other than Nm & Hib	**8**	2	4	-	2	-	-	-	-	
A87	Viral meningitis	**8**	1	1	1	5	-	-	-	-	-
G03	Meningitis - Unspecified	**13**	1	1	8	2	-	-	-	-	1
A30	Leprosy	**2**	-	-	-	-	-	-	-	1	1
A15	Tuberculosis: Sputum Positive	**24**	-	-	-	-	2	3	2	5	12
A16	Tuberculosis: Sputum Negative	**7**	-	-	1	-	2	1	2	-	1
A17-19	TB Extra-Pulmonary Tuberculosis	**18**	-	-	-	4	3	2	4	3	2

Note:

1. *The quarterly data are provisional & should be scrutinized & verified by the focal point of communicable diseases (Epidemiologist) in the regions. Previous quarter data would be finalized in the following quarter after receiving the feedback.*
2. *Tuberculosis, Leprosy & HIV [AIDS] data are for nationals only.*
3. *(i) = imported case.*
4. *Currently laboratory diagnostic procedures are in the process of being laid down and standardized to classify Viral hepatitis into different types. Hence cases not subjected to testing are being classified as 'unspecified viral hepatitis'.*
5. *^Schistosomiasis cases are discovered during active surveillance (contact screening) &/or population survey in Salalah Wilayat, Dhofar.*

Animal Bite Surveillance by Regions

Third Quarter (July to September 2003)

Region	Estimated Population at Risk (2002)	Type of Animal					Total Animal Bites Notified	Rate per 10,000 population	Annualized Rates of Animal Bites in Previous Quarters			
		Fox or Wild	Dog	Cat	Other Domestic	Others (unknown)			2002		2003	
									Q3	Q4	Q1	Q2
Muscat	709,776	-	16	19	2	-	**37**	2.1	4.1	3.5	2.0	2.1
Dhofar	237,523	-	-	6	2	-	**8**	1.3	1.0	1.0	1.5	1.3
North Batinah	443,967	-	29	16	5	-	**50**	**4.5**	0.9	1.7	4.1	**5.1**
South Batinah	255,383	-	9	39	4	-	**52**	**8.1**	**10.1**	**7.5**	**9.6**	**7.0**
Dakhliyah	285,312	-	10	25	1	-	**36**	**5.0**	4.1	**4.8**	3.4	**4.2**
Dhahira	226,627	-	3	-	-	-	**3**	0.5	2.5	3.5	2.1	2.8
North Sharqiyah	147,377	-	2	27	5	-	**34**	**9.2**	**15.5**	**15.4**	**10.3**	**14.1**
South Sharqiyah	174,558	-	9	4	1	-	**14**	3.2	1.4	2.7	**4.6**	3.0
Musandam	35,941	-	1	2	1	-	**4**	**4.5**	**5.7**	2.9	3.3	2.2
Al-Wustah	21,278	-	-	1	2	-	**3**	**5.6**	**7.6**	**8.6**	**15.0**	**7.5**
Total	**2,537,742**	**0**	**79**	**139**	**23**	**0**	**241**	**3.8**	**4.3**	**4.2**	**4.1**	**4.2**

Note: Rodent bites are excluded

An adult woman from the catchment area of Mudai health centre (90 km from Thumrait, Dhofar Governorate) was bitten on the leg by a fox in July 2003.

Rabies developed after two months of incubation. The case was admitted in SQ Hospital, Salalah and on 12th September she died.

This incident is yet another reminder that sylvatic rabies exists in Oman and the policy of a strong vigilance followed by prompt PET should continue unabated to prevent human rabies.

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This quarterly Newsletter is published by
Directorate General of Health Affairs
Ministry of Health, Oman

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