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# Community Health & Disease Surveillance Newsletter

***Sultanate of Oman*** ***Ministry of Health***



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## Elimination of Rubella & CRS in Oman by 2005

### Background

Rubella is a common cause of childhood rash and fever; its public health importance relates to the teratogenic effects of primary Rubella infection in pregnant women the **Congenital Rubella Syndrome (CRS)** is a significant cause of deafness, blindness and mental retardation. CRS occurs in up to 90% infants born to women who are infected with Rubella during the first trimester of pregnancy; the risk of a single congenital defect falls to approximately 10% - 20% by the 16$^{th}$ week and defects are seen when the maternal infection occurs after the 20$^{th}$ week of gestation.

Congenital infection with rubella virus can affect virtually all organ systems. **Deafness** is the most common and often the sole manifestation of congenital rubella infection, especially after the 4th month of gestation. **Eye defect**s, including cataracts, glaucoma, retinopathy, and microphthalmia may occur. **Cardiac defects** such as patent ductus arteriosus, ventricular septal defect, pulmonic stenosis, and coarctation of the aorta are possible. **Neurologic abnormalities,** including microcephaly and mental retardation, and other abnormalities, including bone lesions, splenomegaly, hepatitis, and thrombocytopenia with purpura may occur.

In addition, progressive encephalopathy resembling subacute sclerosing panencephalitis (SSPE) has been observed in some older children with CRS.

Although infants with CRS may shed rubella virus for an extended period, a true carrier state has not been described.

### RUBELLA & CRS DISEASE BURDEN

### Introduction

In 1994 Rubella vaccination was introduced by a catch-up mass campaign with MR targeted to all children between 15 months to 18 years during which 95% coverage was achieved. Since 1994, MR/MMR coverage has been sustained above 95%. In 1997 (Oct) however, MMR replaced MR at 15 months. There has never been a Rubella vaccine requirement neither for school age children nor women of childbearing age. Furthermore, there has never been any requirement for Rubella screening among pregnant women.

In 1988-1989 serum samples from 207 pregnant women in different regions showed that 190 (92%) had IgG antibodies to Rubella, while 17 (8%) remained susceptible.

Since 1985, two large scale outbreaks of Rubella were identified in Oman. The first was in 1988, in which more than 211 cases were reported giving a rate of 12 per 100,000 population. The outbreak continued in 1993, when 1253 cases reported (attack rate 62 per 100,000 population). All the regions were affected except Musandum.

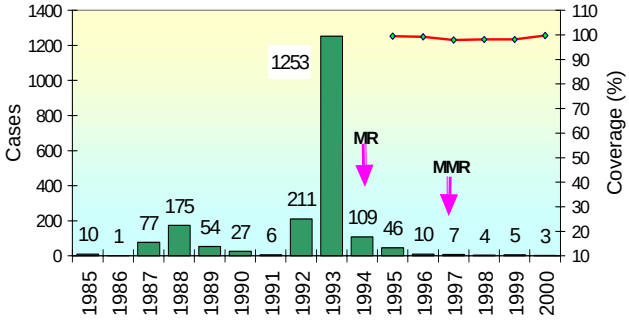
Thereafter the number of Rubella cases reported declined until 1999. The average reported cases of Rubella 6, between 1996-1999 (Fig-1)

*"**Congenital Rubella Syndrome (CRS)** is a significant cause of deafness, blindness and mental retardation. CRS occurs in up to 90% infants born to women who are infected with Rubella during the first trimester of pregnancy"*

## Surveillance of Rubella & CRS

In Oman Rubella and CRS are notifiable diseases under Group 'A'. Since 1991, standard clinical and laboratory case definitions were also available.

***Fig-1***
**Rubella Cases & Immunization Coverage**




### Suspect Rubella case

Acute onset of generalized maculopapular rash &

- Temperature > 37°C (if measured) &
- Arthralgia/Arthritis or Lymphadenopathy or Conjunctivitis

### Confirmed Rubella case

- Positive IgM rubella antibody test or Epidemiologically linked to a Rubella case.

### Clinical case definition for CRS (suspect)

An infant having at least 2 manifestations from Group A or 1 from Group A and 1 from B.

***Group A:*** Cataract and/or congenital glaucoma, congenital heart disease, hearing loss, pigmentary retinopathy.

***Group B:*** Purpura, splenomegaly, microcephaly, mental retardation, meningoencephalitis, radioluscent bone disease, jaundice

### Confirmed CRS case

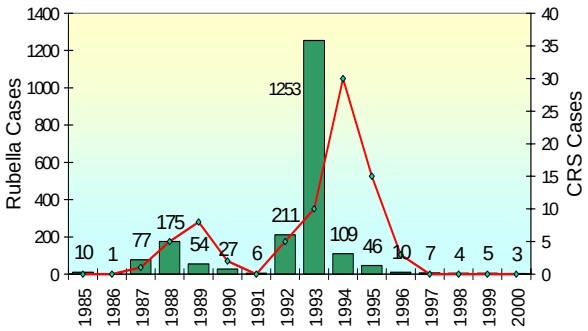
A suspect case, with positive Rubella IgM test.

Both Measles and Rubella are considered as part of fever/rash surveillance, which was initiated in April 1996. All blood samples collected from suspect cases were subjected to serological tests for Measles and Rubella.

## Reported CRS Cases

As a result of the outbreaks of Rubella in 1998/89 and 1992/93 there was an increased incidence of CRS during the following years (Fig. 2). At present 79 CRS cases have been identified and are included in the national registry.

***Fig-2***
**Rubella & CRS Cases**
**1985-2000 (Sep)**




## Follow-up of CRS cases (1999)

Out of the 79 registered CRS cases 40 (51%) were traceable. Out of these 22 (28%) were alive and 18 (23%) were dead. 39 (49%) cases were untraceable. CRS sequelae were observed in the living children. Table-1 gives the details of abnormalities seen.

***Table-1***
**CRS Sequelae in the Living Cohort**

| | |
|---|---|
| **No abnormalities** | **6** |
| **Deaf** | **2** |
| **Deaf & CHD** | **1** |
| **Deaf & Delayed milestone** | **1** |
| **Deaf & Dumb** | **2** |
| **Deaf & Hearing Aid** | **1** |
| **CHD & Pigmentory Retinopathy** | **1** |
| **Cataract & Splenomegaly & MR** | **2** |
| **Cataract & Micropthalmos & MR** | **3** |
| **Cerebral Palsy** | **1** |
| **Weak vision & Hearing & Speech** | **1** |
| **Global Developmental delay** | **1** |

*(Note: CHD– Congenital Heart Defects; MR-Mental retardation)*

## CRS Registry

With the aim of elimination of CRS both active and passive surveillance is being intensified in Oman. Long term follow-up of the cohort is required for late manifestation of CRS as well as for rehabilitation.

## National Workshop on Rubella & CRS

A National Workshop on Rubella and CRS was conducted on 14th October 2000 aiming to strengthen the CRS surveillance activities in the country, to establish CRS registry and to formulate additional strategies for CRS elimination. Following recommendations were made:

### 1. Vaccination strategy

- To continue routine vaccinations of Rubella (MMR) as part of EPI Programme with sustained high coverage
- To introduce a single dose of Rubella vaccine to all postpartum women who do not have documentation of vaccination. Screening is not needed
- To vaccinate other high risk groups viz. Ophthalmologists, staff nurses, laboratory technicians etc.

### 2. Surveillance

- To continue fever/rash surveillance
- Active case finding for CRS cases
- Sero-survey of antenatal cases should be undertaken to look at the trend of seropositivity in different regions.

Regional focal points have been assigned for follow-up and maintaining regional (provincial) registry of all identified cases.

Thus the CRS surveillance will be further strengthened with a national goal and commitment to CRS elimination by 2005.

*"Manifestations of CRS may be delayed from 2 to 4 years. Diabetes mellitus appearing in later childhood occurs frequently in children with CRS. "*

# Primary Amebic Meningoencephalitis (PAM)

## *A CASE REPORT*

### Introduction

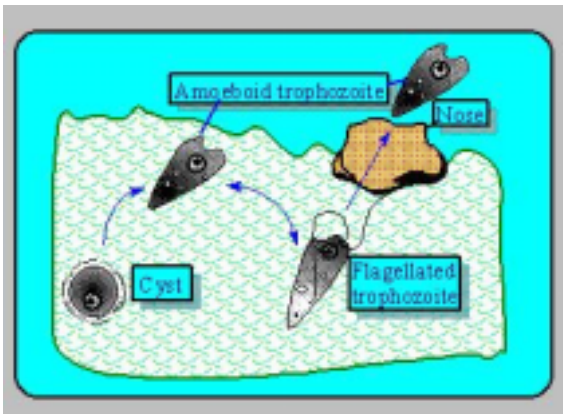
A case of Primary Amoebic Meningoencephalitis (PAM) was reported for the **first time** in Oman from Rustaq hospital in South Batinah region on 18th June 2000.

### Background

*"Amoebic meningoencephalitisitis is a rare disease; only 100 to 200 cases have so far been reported. However, its prevalence has probably been underestimated because of difficulty in making the diagnosis"*

Primary amoebic meningoencephalitis (PAM) is a fulminant, purulent, infection of the gray matter of the brain. The causative organism, ***Naegleria fowleri***, is a ubiquitous, free-living amoeba that thrives in warm, fresh water, particularly if it is stagnant or slow moving. The reported cases have occurred primarily in boys & adolescent males & females

Cases of PAM have been reported from USA, India and it is also well known in hotter States like Western Australia, Queensland and the Northern Territory. Despite its notoriety, amoebic meningitis is a very rare infection. It is caught from stagnant water in waterholes and in poorly chlorinated swimming pools, especially when the water temperature rises above 30$^{o}$ C. Children can become infected when contaminated water is forced up the nose. The organism then reaches the base of the brain directly. The amoebae, which has a flagellate stage, enters the host through the mouth or nose (cribriform plate). It is thought that they invade the mucosal lining of the nasal passages and migrate up the olfactory nerves into the brain.




*Naegleria fowleri transmission*

**Clinical characteristics**

- Fever
- Headache
- Vomiting
- Signs of meningeal irritation
- Encephalitis with rapid progression to coma & death

If untreated it leads to rapid death. Although early treatment with ***Amphotericin B*** is credited to be effective, the relative rarity of the disease and its rapid progression, often results in death because of late or incorrect diagnosis. There have been a few survivors on record who were treated with ***Amphotericin B*** alone or in combination with ***Micronazole*** administered both intravenously and intrathecally or intraventrically.

A patient's age and swimming history may suggest that the CSF be examined for the presence of motile amoebae with contractile excretory vacuoles. Confirmation of ***N. fowleri*** is the demonstration of a stage transformation unique to this organism. When placed into clean water away from ready source of food, ***N. fowleri*** transforms from an amoeba into a biflagellate form over a period of 2 hours to 4 days.

## Case # 1

A 14 year old boy was referred from Wadi Himli hospital, Wilayat Rustaq on 18th July 2000 with a history of fever, headache, vomiting and photophobia of one day duration indicating a rapid progression of the illness.

The patient was examined in Rustaq hospital with following significant findings:

- Febrile ($39.4^0$ C), drowsy, neck rigidity ++, no rash, no motor/sensory deficit, no cranial nerve palsy
- **CSF:** turbid, WBC 5700, Polymorphs 90%, Lymphocytes 10%, RBC 800/ml, Glucose 30 mg%, Protein 320 mg%, C/S, Gram stain, Bacterial antigen, AFB Negative, Wet film: motile amoebae seen.

Patient's condition deteriorated rapidly within 5 hours. The child was declared dead after 18 hours of admission.

Case was notified with CSF microscopy findings to DSDC after confirmation by Central Public Health Laboratory. The motility and morphology of the amoeba in CSF was confirmed.

## Field visit

A field visit was made to Wadi Himli hospital on 23rd July. The doctor was interviewed and the hospital records were scrutinized. The implicated water reservoir used by the village boys for swimming during hot months of the year was also visited.

*Wadi Himli showing the reservoir of stagnant fresh water used by village boys for swimming during the hot climate*

The records showed that the symptoms were acute in an apparently healthy boy. The child was swimming along with other children in the pond for the last 2 weeks prior to taken suddenly ill. There was a flowing ***falaj (stream)*** of fresh water which had formed a stagnant pool (as seen in the picture) and with high ambient temperature at around $47^0$ C, the situation appeared to be ideal for the growth of free living amoeba.

Water samples were collected and sent to Central Public Health Laboratory to isolate ***N. fowleri.*** However the isolation and final confirmation could not be done.

*" It is **NOT** possible to clinically differentiate the case from any other type of meningitis except for the visualization of motile amoebae in the CSF. The amoeba can be easily mistaken for lymphocytes by an inexperienced observer"*

## Case #2

Another case with similar presentation was epidemiologically linked to case #1.

A 7 years old boy from the same village was admitted to Wadi Himli hospital on 13th May 2000. The onset was acute with fever, vomiting, petechial rash. The patient was referred to Rustaq hospital on the same day.

On arrival the patient was drowsy and in shock (BP 90/40 mm of Hg). No meningeal signs were observed. Heart rate was 120/m and there was generalized acchymotic rash.

CSF examination was not done. Blood culture after 48 hours showed no growth. Patient deteriorated and died on the same day, after 6 hours of admission.

Investigations revealed TLC 5000/L, $P_{81}L_{16,}$ Widal – negative, Skin scrapping — no organisms seen.

Discreet enquiries were made with the relatives and it was learnt that the boy was also swimming in the same pond in the village of Wadi Himli from where the case #1 was reported after almost two month. In Oman May to August are generally considered the hottest month during the year.

The case was diagnosed as a probable case of Meningococcal meningitis. However except for the clinical impression of the treating paediatrician there was no other laboratory evidence in favour of the diagnosis.

*"During hot months, **N. fowleri** infection should be included in the differential diagnosis of cases with meningoencephalitis with no other immediately apparent etiology".*

*Ministry of Health staff counselling the village boys*

## Conclusions

1. The specific behavioral, physiologic, or anatomic risk factors for this disease are unknown.
2. More aggressive diagnosis and reporting of disease may assist in clarifying the risk factors and improving therapeutic interventions.
3. The nonspecific clinical presentation of PAM hinders prompt diagnosis and initiation of appropriate treatment. Hence During hot months, ***N. fowleri*** infection should be included in the differential diagnosis of cases with meningoencephalitis with no other immediately apparent etiology. The patient's age and a history of swimming may suggest that the CSF should be carefully examined with wet mount for the presence of ***N. fowleri***.
4. Although the only preventive measure is to avoid swimming in the bodies of water epidemiologically associated with the infection (PAM), the estimated risk is minimal (probably less than one in a million).

# Hib Disease Burden Estimation in Oman

## Background

Prior to the introduction of Haemophilus influenzae, Type B (Hib) conjugate vaccine was introduced in late 80s, Hib was the leading cause of meningitis and one of the leading causes of bacterial pneumonia and sepsis among young children.

The Hib disease burden in the developed countries has been virtually eliminated after the introduction of the vaccine. However the high cost of the vaccine has prevented its extensive use in developing countries. Another obstacle is that the policy makers have not seen convincing evidence of the Hib disease burden in their country to justify the vaccine cost.

Hib disease generally is difficult to diagnose & the cases that are identified account for only a fraction of the true disease burden, hence the need for developing a tool for estimation of the burden. A rapid assessment tool was being developed to estimate the Hib disease burden in a country by a team with members from WHO HQ, WHO EMRO and CDC. Oman was chosen as a field site for several reasons including a well-developed health facility infrastructure and the strength of the national surveillance system. The period of assessment was from 10th to 17th June 2000.

*Following methods were utilized viz.*

1. Review of available national disease surveillance data
2. Clinic and laboratory visits & interviews with the clinicians & laboratory personnel.
3. Review of available scientific literature on Hib disease.

## Tool for the Rapid Assessment of Hib Disease Burden

Hib disease burden is defined as the annual number for each of the following in children < 5 yr old.

1. Total Hib meningitis cases
2. Total Hib pneumonia cases
3. Deaths due to both

The team visited the Department of Surveillance and Disease Control, Paediatrics Department and Laboratory of Royal Hospital, Central Public Health Laboratory. Two regions from where the least (Dakhliyah) and the most (Dhofar) cases of Hib meningitis were reported were also included in the visit programme.

Some of the significant findings leading to the underreporting of Hib meningitis cases that were elicited were:

1. High refusal (almost 40%) for lumbar puncture (LP)
2. High prevalence of antibiotic usage prior to admission (approximately 60%)
3. The chocolate agar is used for culture in one region however in another expired human blood is used. The X & V factors are not added to the agar. This practice could lead to a low yield.

Comparisons were made between medical records, clinical and laboratory records and surveillance data to note any missed cases. This information was further supplemented with articles from local scientific literature and surveillance data from DSDC.

Results showed that in 1999, the Hib meningitis incidence in Dakhliyah and Dhofar region was 23.5 cases and 41.2 per 100,000 underfive children respectively. The differences were attributed to variation in the an-

*"Oman was chosen as a field site for several reasons including a well-developed health facility infrastructure & the strength of the national surveillance system".*

tibiotic usage, upon referral and laboratory culture methods. Using these regional estimates, national estimates of Hib disease burden were calculated for the annual birth cohort.

The calculation of the burden was done using the estimated incidence rate of Hib meningitis. Following assumptions were also included in the model:

- Hib meningitis case fatality rate of 10% (1 death among the 10 admitted in SQ hospital). CFR is 10 to 45% according to international data.
- Ratio of Hib Pneumonia to Hib meningitis of 5:1 (based on vaccine probe studies in developing countries).
- Hib pneumonia case fatality rate of 6% (international data—2 to 25%).

Results are summarized in Table 1.

*"Hib disease is difficult to diagnose & the cases of Hib disease that are identified account for only a fraction of the true disease burden, hence the need for developing a tool for estimation of the burden".*

***Table 1***
**Estimated Cases of Hib Disease**

| Hib Meningitis Incidence Method | Meningitis Cases | Pneumonia Cases | Meningitis Deaths | Pneumonia Deaths |
|---|---|---|---|---|
| **Dhofar (41.2)** | 112 | 560 | 11 | 34 |
| **Dakhliyah (23.5)** | 65 | 322 | 7 | 26 |

The incidence rates for Dakhliyah and Dhofar differ substantially.

The probable reasons for this difference as mentioned earlier could be due to differences in:

- Prior antibiotic usage
- Method of preparing chocolate agar (expired human or horse blood)
- Single referral hospital in the geographically isolated region of Dhofar while cases from Dakhliyah could have gone to other hospitals hence missed in the calculation.
- The difference in the rates could be real. Some international studies have shown higher rates among populations within a country that have a unique demographic characteristics.

## Estimation of the Cost

The estimation of cost was calculated on the basis of

- Average duration of stay in paediatric ward for a Hib meningitis & pneumonia cases of 18 & 5 days respectively.
- Average cost per day for a Hib meningitis & pneumonia case of RO 110 (Royal hospital).

These costs reflect the cost of treatment alone and do not include the cost of long term sequelae, rehabilitation and loss of lifetime productivity due to deaths of children.

Total estimated cost of hospitalization varies between RO 306,000 to 530,000

The cost of Hib vaccine for the birth cohort as mono, Tetra or Penta varies between RO 142,000 to 220,000.

Comparison of treatment costs to program costs shows clearly that given the estimated annual burden of Hib disease in the Omani population, vaccination of all infants in the birth cohort will result in a net cost saving for the Ministry of Health of Oman

## Conclusion

In anticipation Ministry of Health has already taken a decision to introduce Hib vaccine in the infant EPI schedule by mid 2001 in Oman.

# Assessment of Dental Fissure Sealing Programme

## Background

Fissure sealant programme started in performance as well as to measure the impact of the FSP on the incidence of dental caries. The objectives were:

- To measure the % of teeth retaining the sealant
- To measure the % of teeth with broken sealant
- To measure the % of sound teeth
- To measure % of decay, missing & filling (DMF)

## Methods

A sample size of 912 was randomly chosen from Grade II School children, who received fissure sealant during the previous year. All regions were represented involved in the study expect Al-Wustah & Musandum. A proforma was prepared for the study and OHP and DSC had carried out the data entry.

## Results

It was found that the healthy teeth represented 82.41% of the total teeth examined with a range between 74% as the lowest (North Batinah) and 94.4% as the highest (Dhofar). While the caries represented 14.77% of the total. North Batinah region had the highest caries with mean of 23.23%. Missing & filled teeth represented a very small proportion (missing 0.79 & filling 2.03%).

Regarding the sealant situation it was observed that the sealant was retained in only 28.30%. Broken sealant was seen in 13.22%. While absent sealant represent the highest 46.96% of teeth examined.

On national level oral cleanliness as measured by presence of plaque showed the incidence of 65% of the teeth examined. There was a wide variation within the regions. Dhofar and South Batinah regions had the lowest incidence at 20 & 23% respectively while the highest was observed in Al-Dakhliyah region at 88.89%.

## Discussion

Of the 7 years old students examined, 28.3% had fissure sealant retained in their first permanent. This figure is considered very low compared to the high inputs of the programme. According to earlier studies the loss of resin is most marked in the first 6 months and there is a further progressive loss of about 10% per annum. The retention depends on proper technique that is followed by the dental staff and the instructions given to the child after applying the fissure sealant.

Regarding the broken sealant, it represents a risk factor for the child, as it will cause food accumulation on the tooth surface and consequently caries will develop. From the study the National figure was 13.22%, with variation in different regions, the lowest was in North Sharqiyah 6.48% and the highest was in North Batinah 22.26%.

## Comments & Recommendations

Fissure sealant is the most cost effective when applied on particular teeth that are most likely to become decayed at any given time than in applying it for all molars & premolars. Choosing the first permanent as target teeth will satisfy this fact and will reduce the number of first permanent molars getting caries as these

*(Continued on page 11)*

*The retention of Fissure Sealant depends on proper technique that is followed by the dental staff and the instructions given to the child after applying the fissure sealant."*

# Early detection of Hearing loss

*"Sultanate of Oman addresses the problem of '**Hearing Loss**' through 'Identified Specific Diseases control Programme of Ministry of Health in its 5th & 6th Five Year Plan.".*

## Neonatal Screening

Normal hearing is essential for speech development in children. National Health Program aiming at reducing hearing disability and its complications will be undertaking screening activities for children at early age.

The activities related to ear care were launched at all health facilities in 1999. The programme has adopted the strategy of strengthening primary ear care to detect hearing loss and common ear diseases in early stages.

At present in Oman, the hearing surveillance attempts to cover high-risk neonates and children at school entry age. Unfortunately, the diagnosis of hearing loss is done at an average age of 2 to 2 ½ years, which is late for effective intervention. 50% of the children who end up with permanent hearing loss do not show systemic manifestation so that they are not grouped as high-risk neonates. These observations strongly stress the need for universal screening for hearing in neonates.

In the sultanate, around 48,000 live births takes place annually. The limited available audiometers cannot detect the hearing disabled in children below 4 years. An equipment in which child does not have to respond was needed to detect hearing loss especially in neonates. **Otoacoustic Emission (OAE) test is the answer for the problem.**

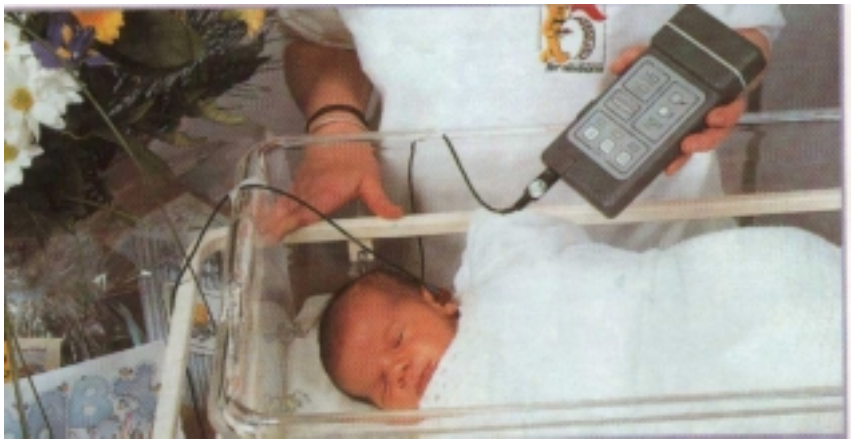
The internal mechanism of healthy ear creates low sound vibrations and these ear-sounds- OAE can be recorded by a microphone probe fitted within ear canal. This invention by British physicist David Kemp has been commercially applied in the equipment known as ***Echocheck***. This is a hand held screening device designed to detect transiently evoked OAE from healthy ears of all ages. It is a fast and reliable indicator of cochlear status. It is portable and has arrangements for automatic adjusting of stimulus and full noise artifact rejection. The machine is a good diagnostic tool for hearing disability detection in infants, handicapped persons, elderly, malingers, employee working in industries with risk of noise induced hearing loss and as monitoring tool for patients on ototoxic drugs or those undergoing acoustic neuroma surgery.

The advantages of the screening by OAE tests are; it is rapid, highly sensitive, easily administered by trained personnel, reliable and repeatable, ear specific and can detect early hearing loss. It is also a non-invasive procedure, inexpensive, objective and has a good threshold evaluation at 1 – 4 kHz which the frequency of normal speech.

The limitation of OAE tests are; Affected by noise, ear canal debris, does not provide information on degree of hearing loss and can miss any lesion affecting neural conduction pathway resulting in hearing loss. To overcome these limitation, the test should be done in quiet area, ear canal should be clean and complemented with ABR screening.

Ministry of Health aims to introduce universal screening of neonates for hearing with the help of ***Ecocheck*** machines from year 2001. Regions are procuring these instruments as per the re-

quirement. Standard protocol for screening, reporting and referring suspected case with hearing loss would be prepared and distributed soon by the experts in rehabilitation of hearing disabled at tertiary ENT unit. The regions would identify the staff, which will be involved in the screening and the company supplying this equipment would train them.
Screening of hearing will not only help to provide quality ear care but also will assist the pediatrician providing comprehensive care to the child with multisystem disorders like CRS, Down Syndrome, etc. The knowledge of this new development would definitely build capacity of health staff and would prepare them to undertake hearing screening when the equipment are available in their institutions.



*The ECHOCHECK handheld screening device for use in hearing assessment program in newborns to adults.*

*" The advantages of the screening by OAE tests are; it is rapid, highly sensitive, easily administered by trained personnel, reliable and repeatable, ear specific and can detect early hearing loss".*

*(Continued from page 9)*

teeth are liable to decay shortly after eruption.

Result of study showed that the number of caries free teeth is high & conversely also showed that the number of teeth with retained sealant is very low 28.3%.

Every effort should be undertaken to strengthen the fissure sealant programme, and this can be done by:

- Strengthening the training of the dentists involved in the programme
- To increase the number of mobile clinics
- Maintaining the available dental mobile clinics
- To increase the number of hygienist to take over the programme

More reliance should be put on Oral Health Education and emphasizing on low consumption of sugary snacks & soft drinks and encouraging the use of brush & fluoride toothpaste

***Report 1***

# Communicable Diseases Quarterly Report

## *Third Quarter (July to September 2000)*

| ICD Code | Diseases | 2000 Third Quarter Jul | Aug | Sep | Total | 1999 Q3 Jul–Sep | Q4 Oct-Dec | 2000 Q1 Jan-Mar | Q2 Apr-Jun |
|---|---|---|---|---|---|---|---|---|---|
| **GROUP 'A' DISEASES** | | | | | | | | | |
| A00 | Cholera | 2 | 1 | 2 | **5** | 5(i) | 2(i) | - | 2 |
| A20 | Plague | *Never reported* | | | | | | | |
| A36 | Diphtheria | *Last case 1992* | | | | | | | |
| A39 | Meningococcal infection | 0 | 1 | 3 | **4** | 1 | - | 4 | 18 |
| A80 | Poliomyelitis | *Last case 1993* | | | | | | | |
| | ***Acute Flaccid Paralysis*** | - | - | - | **0** | 6 | 7 | 4 | 1 |
| B05 | Measles | 1 | 1 | 1 | **3** | 4 | 3 | 1 | 10 |
| B06 | Rubella & CRS | - | - | - | **0** | 1 | - | - | 3 |
| A95 | Yellow fever | *Never reported* | | | | | | | |
| A82 | Rabies | - | - | - | **0** | - | - | - | - |
| A75.0 | Louse-borne typhus | *Never reported* | | | | | | | |
| A68 | Relapsing fever | *Last case 1997* | | | | | | | |
| A33 | Tetanus Neonatorum (NNT) | *Last case 1995* | | | | | | | |
| A99 | Viral Hemorrhagic fever | - | - | - | **0** | 2 | - | - | - |
| **GROUP 'B' DISEASES** | | | | | | | | | |
| A03.0 | Typhoid fever | 5 | 16 | 19 | **40** | 37 | 23 | 22 | 24 |
| A01.4 | Paratyphoid fever | 2 | - | 3 | **5** | 1 | 5 | 2 | 11 |
| A02 | Food poisoning | 120 | 115 | 126 | **361** | 308 | 91 | 95 | 313 |
| A22 | Anthrax | *Never reported* | | | | | | | |
| A23 | Brucellosis | 27 | 36 | 41 | **104** | 91 | 63 | 70 | 76 |
| A37 | Pertussis | 48 | 22 | 9 | **79** | 41 | 22 | 42 | 58 |
| A35 | Tetanus (Excluding NNT) | 1 | - | - | **1** | 1 | - | 1 | 3 |
| A90 | Dengue | *Never reported* | | | | | | | |
| | Viral Hepatitis - Total | **82** | **73** | **98** | **253** | **283** | **232** | **273** | 296 |
| B15.9 | Viral Hepatitis - HBsAg Positive (ELISA) | 5 | 3 | 3 | **11** | 17 | 16 | 11 | 14 |
| B15.0 | Viral Hepatitis - HBsAg Negative | 61 | 50 | 69 | **180** | 224 | 198 | 196 | 217 |
| B17 | Viral Hepatitis - Unspecified | 16 | 20 | 26 | **62** | 42 | 18 | 66 | 65 |
| B55 | Leishmaniasis | 1 | 1 | - | **2** | 3 | 5 | 4 | 1 |
| B65 | Schistosomiasis | - | - | 2 | **2** | 1(i) | 2(i) | - | 1 |
| B74 | Filariasis | - | 1 | - | **1(i)** | - | - | - | 1(i) |
| B72 | Dracunculiasis | *Certified by WHO as Eradicated from Oman* | | | | | | | |
| G00.0 | Haemophilus Meningitis | 3 | - | 2 | **5** | 4 | 13 | 4 | 4 |
| G00-G03 | Meningitis - (All others) | 13 | 19 | 9 | **41** | 31 | 43 | 35 | 45 |
| A30 | Leprosy | - | 2 | 2 | **4** | 13 | 8 | 3 | 1 |
| A15-A19 | Pulm. Tuberculosis Sputum Positive | 17 | 9 | 7 | **33** | 26 | 22 | 32 | 29 |
| | Pulm. Tuberculosis Sputum Negative | 2 | 2 | 1 | **5** | 10 | 14 | 9 | 13 |
| | Extra Pulmonary Tuberculosis | 15 | 9 | 9 | **33** | 22 | 12 | 21 | 29 |
| B50-B54 | Malaria (All sources) | 78 | 105 | 98 | **281** | 138 | 165 | 117 | 147 |
| A50-A53 | Syphilis | 19 | 23 | 22 | **64** | 58 | 47 | 49 | 58 |
| A54 | Gonococcal Infections | 30 | 26 | 35 | **91** | 96 | 96 | 71 | 94 |
| **GROUP 'C' DISEASES** | | | | | | | | | |
| A03 | Shigellosis | 100 | 159 | 113 | **372** | 367 | 330 | 349 | 348 |
| A06 | Amoebiasis | 388 | 354 | 352 | **1,094** | 1,099 | 1,136 | 914 | 1,069 |
| A09 | Acute Gastro-Enteritis & Diarrhoea | 7,034 | 9,861 | 8,960 | **25,855** | 22,413 | 27,239 | 29,301 | 23,461 |
| B01 | Chicken Pox | 982 | 697 | 525 | **2,204** | 2,147 | 2,320 | 4,763 | 5,996 |
| B26 | Mumps | 740 | 475 | 248 | **1,463** | 2,039 | 2,986 | 3,556 | 4,842 |
| A71 | Trachoma | 74 | 94 | 107 | **275** | 302 | 252 | 296 | 297 |
| J10-J11 | Influenza | 177 | 290 | 383 | **850** | 983 | 1,135 | 1,279 | 1,077 |

***Report 2***

# Communicable Diseases Quarterly Report by Regions

## *Third Quarter (July to September 2000)*

| ICD Code | Diseases | Total | Muscat | Dhofar | Dakhliyah | North Sharqiya | South Sharqiya | North Batinah | South Batinah | Dhahira | Musan-dum | Al–Wustah |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **GROUP 'A' DISEASES** | | | | | | | | | | | | |
| A00 | Cholera | **5** | - | - | 1 | - | - | 1 | - | 3 | - | - |
| A20 | Plague | *Never Reported* | | | | | | | | | | |
| A36 | Diphtheria | *Last case 1992* | | | | | | | | | | |
| A39 | Meningococcal infection | **4** | - | - | - | 1 | - | 1 | 1 | 1 | - | - |
| A80 | Poliomyelitis | *Last case 1993* | | | | | | | | | | |
| | ***Acute Flaccid Paralysis*** | **0** | - | - | - | - | - | - | - | - | - | - |
| B05 | Measles | **3** | 2 | - | - | - | 1 | - | - | - | - | - |
| B06 | Rubella & CRS | **0** | - | - | - | - | - | - | - | - | - | - |
| A95 | Yellow fever | *Never Reported* | | | | | | | | | | |
| A82 | Rabies | **0** | - | - | - | - | - | - | - | - | - | - |
| A75.0 | Louse borne typhus | *Never Reported* | | | | | | | | | | |
| A68 | Relapsing fever | *Last case 1997* | | | | | | | | | | |
| A33 | Tetanus Neonatorum (NNT) | *Last case 1995* | | | | | | | | | | |
| A99 | Viral Haemorrhagic fever | **0** | - | - | - | - | - | - | - | - | - | - |
| **GROUP 'B' DISEASES** | | | | | | | | | | | | |
| A03.0 | Typhoid fever | **40** | 10 | 5 | 7 | 5 | 2 | 7 | 3 | 1 | - | - |
| A01.4 | Paratyphoid fever | **5** | - | - | - | 1 | 2 | 1 | - | 1 | - | - |
| A02 | Food poisoning | **361** | 56 | 21 | 69 | 25 | 5 | 82 | 35 | 67 | - | 1 |
| A22 | Anthrax | *Never Reported* | | | | | | | | | | |
| A23 | Brucellosis | **104** | - | 104 | - | - | - | - | - | - | - | - |
| A37 | Pertussis | **79** | 17 | 11 | 8 | - | - | 6 | 2 | 34 | - | 1 |
| A35 | Tetanus (Non NNT) | **1** | - | - | - | 1 | - | - | - | - | - | - |
| A90 | Dengue | *Never Reported* | | | | | | | | | | |
| | **Viral Hepatitis - Total** | **253** | **30** | **25** | **37** | **33** | **25** | **37** | **35** | **10** | **5** | **16** |
| B15.9 | Viral Hepatitis - HBsAg Positive (ELISA) | **11** | - | 1 | 4 | 1 | 1 | 3 | 1 | - | - | - |
| B15.0 | Viral Hepatitis - HBsAg Negative | **180** | 12 | 22 | 29 | 27 | 14 | 26 | 32 | 2 | 2 | 14 |
| B17 | Viral Hepatitis - Not Tested | **62** | 18 | 2 | 4 | 5 | 10 | 8 | 2 | 8 | 3 | 2 |
| B55 | Leishmaniasis | **2** | - | 1 | - | 1 | - | - | - | - | - | - |
| B65 | Schistosomiasis | **2** | 1 | - | - | - | - | - | 1 | - | - | - |
| B74 | Filariasis | **1(i)** | 1 | - | - | - | - | - | - | - | - | - |
| B72 | Dracunculiasis | *Certified by WHO as Eradicated from Oman* | | | | | | | | | | |
| G00.0 | Haemophilus Meningitis | **5** | 2 | 2 | - | - | - | - | 1 | - | - | - |
| G00-G03 | Meningitis (Others) | **41** | 16 | - | 9 | 1 | 2 | 8 | 3 | 1 | - | 1 |
| A30 | Leprosy | **4** | 2 | - | - | 1 | - | - | - | - | - | 1 |
| A15-A19 | Pulm. Tuberculosis Sputum Positive | **33** | 7 | 4 | 4 | 1 | 1 | 7 | 6 | 1 | 2 | - |
| | Pulm. Tuberculosis Sputum Negative | **5** | - | - | - | - | - | 2 | 1 | 2 | - | - |
| | Extra Pulmonary Tuberculosis | **33** | 7 | 13 | 1 | 1 | - | 3 | 3 | 2 | 2 | 1 |
| B50-B54 | Malaria (All sources) | **281** | 151 | 5 | 14 | 14 | 8 | 31 | 30 | 22 | 2 | 4 |
| A50-A53 | Syphilis | **64** | 21 | 5 | 12 | - | 5 | 11 | 4 | 5 | 1 | - |
| A54 | Gonococcal Infections | **91** | 13 | 23 | 7 | - | 20 | 11 | 2 | 11 | 1 | 3 |
| **GROUP 'C' DISEASES** | | | | | | | | | | | | |
| A03 | Shigellosis | **372** | 55 | 83 | 32 | 46 | 98 | 3 | 27 | 12 | 8 | 8 |
| A06 | Amoebiasis | **1094** | 99 | 15 | 212 | 159 | 131 | 188 | 57 | 121 | 1 | 111 |
| A09 | Acute Gastro-Enteritis & Diarrhoea | **25,855** | 3,216 | 4,942 | 2,437 | 2,030 | 3,546 | 4,200 | 3,664 | 1,265 | 189 | 366 |
| B01 | Chicken Pox | **2,204** | 346 | 79 | 340 | 168 | 105 | 491 | 419 | 243 | 10 | 3 |
| B26 | Mumps | **1,463** | 228 | 53 | 139 | 76 | 380 | 157 | 102 | 324 | 2 | 2 |
| A71 | Trachoma | **275** | 30 | - | 115 | 26 | 3 | 10 | 79 | 12 | - | - |
| J10-J11 | Influenza | **850** | 297 | 14 | 3 | 2 | 1 | 304 | 7 | 222 | - | - |

*Report 3*

## Selected Communicable Diseases by Wilayat, Third Quarter 2000

| Region | Wilayat | Acute Flaccid Paralysis | Measles | Rubella | Pertussis | TB (Total) | TB Sputum Positive | Tetanus (Ex. NNT) | Malaria (All) | Viral Hepatitis (Total) | Leprosy | Meningo. Infection | Leishma-niasis |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MUSCAT | Muscat | - | - | - | 2 | 2 | - | - | 8 | 7 | - | - | - |
| | Seeb | - | - | - | 6 | 6 | 3 | - | 48 | 7 | 2 | - | - |
| | Muttrah | - | 1 | - | 1 | 1 | 1 | - | 28 | 5 | - | - | - |
| | Bowsher | - | 1 | - | 6 | 2 | | - | 45 | 8 | - | - | - |
| | Al-Amerat | - | - | - | 1 | 1 | 1 | - | 18 | - | - | - | - |
| | Quriyat | - | - | - | 1 | 2 | 2 | - | 4 | 3 | - | - | - |
| DHOFAR | Salalah | - | | - | 6 | 10 | 3 | - | 5 | 21 | | | 1 |
| | Thumrait | - | - | - | 1 | 3 | - | - | - | 3 | - | - | - |
| | Taqah | - | - | - | 4 | 2 | 1 | - | - | - | - | - | - |
| | Mirbat | - | - | - | - | 1 | - | - | - | - | - | - | - |
| | Sudah | - | - | - | - | - | - | - | - | - | - | - | - |
| | Rakhyut | - | - | - | - | 1 | - | - | - | - | - | - | |
| | Dhalqut | - | - | - | - | - | - | - | - | 1 | - | - | - |
| | Muqshan | - | - | - | - | - | - | - | - | - | - | - | - |
| | Shaleem | - | - | - | - | - | - | - | - | - | - | - | - |
| N. BATINAH | Sohar | - | - | - | 1 | 2 | 1 | - | 18 | 4 | - | - | - |
| | Shinas | - | - | - | 1 | 4 | - | - | 1 | 3 | - | - | - |
| | Liwa | - | - | - | - | 1 | 1 | - | 1 | 4 | - | - | - |
| | Saham | - | - | - | 2 | 4 | 4 | - | 6 | 9 | - | - | - |
| | Khabura | - | - | - | - | 1 | 1 | - | 2 | 6 | - | - | - |
| | Suwaiq | - | - | - | 2 | - | - | - | 3 | 11 | - | - | - |
| S. BATINAH | Rustaq | - | - | - | 1 | 3 | 2 | | 8 | 19 | - | 2 | - |
| | Nakhl | - | - | - | - | 1 | 1 | - | 1 | 5 | - | - | - |
| | W.Maawil | - | - | - | - | - | - | - | - | - | - | - | - |
| | Al-Awabi | - | - | - | - | - | - | - | 2 | - | - | - | - |
| | Musanah | - | - | - | - | 3 | 2 | | 4 | 3 | - | - | - |
| | Barka | - | - | - | 1 | 3 | 1 | - | 15 | 8 | - | - | - |
| DAKHLIYAH | Nizwa | - | - | - | 5 | 1 | 1 | - | 2 | 22 | - | - | - |
| | Bahla | - | - | - | 2 | 2 | 2 | - | 4 | 2 | - | - | - |
| | Adam | - | - | - | - | 1 | 1 | - | 2 | 1 | - | - | - |
| | Hamra | - | - | - | - | - | - | - | - | - | - | - | - |
| | Manah | - | - | - | - | - | - | - | 2 | - | - | - | - |
| | Sumail | - | - | - | 1 | - | - | - | 3 | 4 | - | - | - |
| | Izki | - | - | - | - | 1 | - | - | 1 | 6 | - | - | - |
| | Bid Bid | - | - | - | - | - | - | - | - | 2 | - | - | - |
| DHAHIRA | Ibri | - | - | - | 25 | 2 | - | - | 11 | 3 | - | 1 | - |
| | Yanqul | - | - | - | 3 | - | - | - | - | - | - | - | - |
| | Dhank | - | - | - | - | - | - | - | 1 | 1 | - | - | - |
| | Buraimi | - | - | - | 6 | 3 | 1 | - | 8 | 5 | - | - | - |
| | Mahda | - | - | - | - | - | - | - | 2 | 1 | - | - | - |
| N. SHARQIYAH | Ibra | - | - | - | - | - | - | - | 5 | 5 | - | - | - |
| | Mudhaibi | - | - | - | - | 2 | 1 | - | 5 | 11 | - | 1 | - |
| | Bidiyah | - | 1 | - | - | - | - | - | 2 | 3 | - | - | - |
| | Al-Qabel | - | - | - | - | - | - | - | 2 | 3 | - | - | 1 |
| | Dima Al-Tayeen | - | - | - | - | - | - | 1 | - | 9 | - | | - |
| | W. B. Khalid | - | - | - | - | - | - | - | - | 2 | 1 | - | - |
| S. SHARQIYAH | Sur | - | - | - | - | 1 | 1 | - | 2 | 6 | - | - | - |
| | Masirah | - | - | - | - | - | - | - | - | 6 | - | - | - |
| | Kamil & Wafi | - | - | - | - | - | - | - | 3 | 1 | - | - | - |
| | BBB Ali | - | - | - | - | - | - | - | 2 | 10 | - | - | - |
| | BBB Hassan | - | - | - | - | - | - | - | 1 | 2 | - | - | - |
| MUSANDUM | Khasab | - | - | - | - | 4 | 2 | - | 3 | 1 | - | - | - |
| | Dibba | - | - | - | - | - | - | - | 1 | 3 | - | - | - |
| | Bukha | - | - | - | - | - | - | - | - | 1 | - | - | - |
| | Madha | - | - | - | - | - | - | - | - | - | - | - | - |
| AL-WUSTAH | Haima | - | - | - | - | - | - | - | 2 | 1 | - | - | - |
| | Duqum | - | - | - | - | - | - | - | - | 8 | - | - | - |
| | Mahoot | - | - | - | 1 | 1 | - | - | - | - | 1 | - | - |
| | Al-Jazer | - | - | - | - | - | - | - | - | 7 | - | - | - |
| **NATIONAL TOTAL** | | **0** | **3** | **0** | **79** | **71** | **33** | **1** | **281** | **253** | **4** | **4** | **2** |

***Report 4***

# Age Distribution of Communicable Diseases

## *Third Quarter (July to September 2000)*

| ICD Code | Diseases | Total | Age Groups in Years | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | < 1 | 1-4 | 5-9 | 10-14 | 15-19 | 20-24 | 25-34 | 35-44 | > 45 |
| **GROUP 'A' DISEASES** | | | | | | | | | | | |
| A00 | Cholera | **5** | - | 1 | - | - | 1 | 1 | 2 | - | - |
| A20 | Plague | *Never Reported* | | | | | | | | | |
| A36 | Diphtheria | *Last Case 1992* | | | | | | | | | |
| A39 | Meningococcal infection | **4** | - | 2 | 2 | - | - | - | - | - | - |
| A80 | Poliomyelitis | *Last Case 1993* | | | | | | | | | |
| | ***Acute Flaccid Paralysis*** | **2** | - | - | 1 | 1 | - | - | - | - | - |
| B05 | Measles | **3** | 3 | - | - | - | - | - | - | - | - |
| B06 | Rubella & CRS | **0** | - | - | - | - | - | - | - | - | - |
| A95 | Yellow fever | *Never Reported* | | | | | | | | | |
| A82 | Rabies | **0** | - | - | - | - | - | - | - | - | - |
| A75.0 | Louse borne typhus | *Never Reported* | | | | | | | | | |
| A68 | Relapsing fever | *Last Case 1997* | | | | | | | | | |
| A33 | Tetanus Neonatorum | *Last Case 1995* | | | | | | | | | |
| A99 | Viral Haemorrhagic fever | **0** | - | - | - | - | - | - | - | - | - |
| **GROUP 'B' DISEASES** | | | | | | | | | | | |
| A03.0 | Typhoid fever | **40** | 1 | 7 | 5 | 8 | 3 | 6 | 9 | 1 | - |
| A01.4 | Paratyphoid fever | **5** | - | 2 | - | - | 1 | 1 | - | - | 1 |
| A02 | Food poisoning | **361** | 3 | 36 | 86 | 77 | 53 | 32 | 45 | 20 | 9 |
| A22 | Anthrax | *Never Reported* | | | | | | | | | |
| A23 | Brucellosis | **104** | 1 | 12 | 20 | 22 | 6 | 13 | 14 | 9 | 7 |
| A37 | Pertussis | **79** | 26 | 7 | 26 | 17 | 1 | - | 1 | 1 | - |
| A35 | Tetanus (Non NNT) | **1** | - | - | - | - | - | - | - | - | 1 |
| A90 | Dengue | *Never Reported* | | | | | | | | | |
| | **Viral Hepatitis - Total** | **253** | **1** | **46** | **124** | **32** | **9** | **15** | **8** | **10** | **8** |
| B15.9 | V. Hepatitis - HBsAg Positive (ELISA) | **11** | - | - | 1 | 1 | 2 | 2 | - | 4 | 1 |
| B15.0 | V. Hepatitis - HBsAg Negative | **180** | - | 41 | 100 | 19 | 6 | 7 | 4 | 2 | 1 |
| B17 | V. Hepatitis - Unspecified | **62** | 1 | 5 | 23 | 12 | 1 | 6 | 4 | 4 | 6 |
| B55 | Leishmaniasis | **2** | - | - | - | 1 | - | - | - | - | 1 |
| B65 | Schistosomiasis | **2** | - | - | - | - | 1 | - | - | 1 | - |
| B74 | Filariasis | **1** | - | - | - | - | - | - | 1 | - | - |
| B72 | Dracunculiasis | *Certified by WHO as Eradicated from Oman* | | | | | | | | | |
| G00.0 | Haemophilus Meningitis | **5** | 3 | 2 | - | - | - | - | - | - | - |
| G00-G03 | Meningitis (Others) | **41** | 14 | 6 | 9 | 5 | 2 | - | 4 | - | 1 |
| A30 | Leprosy | **4** | - | - | - | - | - | - | 3 | - | 1 |
| A15-A19 | Tuberculosis: Sputum Positive | **33** | - | - | - | - | 2 | 2 | 8 | 3 | 18 |
| | Tuberculosis: Sputum Negative | **5** | - | - | - | 1 | - | 3 | - | 1 | - |
| | TB Extra-Pulmonary | **33** | - | - | 1 | 3 | 4 | 3 | 8 | 6 | 8 |

***Note:***

1. *The quarterly data are provisional & should be scrutinized & verified at the source.*
2. *Previous quarter data will be finalized in the subsequent quarter after receiving feedback from the regions.*
3. *Tuberculosis data are for Nationals only*
4. *(i) = imported case*

*Report 4*

# Animal Bite Surveillance by Regions of Oman

## *Third Quarter (July to September 2000)*

| Region | Population at Risk | Type of Animal | | | | | Total Animal Bites reported | Rate/ 10,000 Population |
|---|---|---|---|---|---|---|---|---|
| | | *Fox or Wild* | *Dog* | *Cat* | *Other Domestic Animals* | Others (unknown) | | |
| *Muscat* | *636,560* | *0* | *32* | *16* | *2* | *2* | *52* | *0.82* |
| *Dhofar* | *217,630* | *1* | *5* | *5* | *1* | *2* | *14* | *0.64* |
| *North Batinah* | *411,290* | *0* | *21* | *7* | *3* | *0* | *31* | *0.75* |
| *South Batinah* | *236,650* | *4* | *19* | *18* | *5* | *0* | *46* | ***1.94*** |
| *Dakhliyah* | *264,630* | *4* | *2* | *36* | *1* | *0* | *43* | ***1.62*** |
| *Dhahira* | *208,550* | *0* | *4* | *8* | *1* | *0* | *13* | *0.62* |
| *North Sharqiyah* | *136,240* | *2* | *5* | *25* | *10* | *0* | *42* | ***3.08*** |
| *South Sharqiyah* | *161,000* | *1* | *12* | *4* | *6* | *0* | *23* | *1.43* |
| *Musandum* | *33,010* | *0* | *2* | *4* | *0* | *0* | *6* | ***1.82*** |
| *Al-Wustah* | *19,570* | *1* | *0* | *2* | *3* | *0* | *6* | ***3.07*** |
| *National Total* | *2,325,460* | *13* | *102* | *125* | *32* | *4* | *276* | *1.19* |

*Note: Rodent Bites excluded*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