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Sultanate of Oman *Ministry of Health*

Inside this issue:

National Burden of Disease (NBD) Study: Oman

Background

In 1993 the Harvard School of Public Health in collaboration with the World Bank and WHO assessed the global burden of disease (GBD). Aside from generating the most comprehensive and consistent set of estimates of mortality and morbidity. GBD also introduced a new metric – disability adjusted life year (DALY) – to quantify the burden of disease. The use of DALY allows researchers to combine in a single indicator years of life lost from premature death and years of life lived with disabilities.

First such assessment based entirely on estimates was published by WHO in its annual report for the year 2000. As we are all aware that the Sultanate of Oman was ranked number one amongst the 191 member countries of WHO on the basis of performance of health system and 8th in overall performance. The entire world noticed and was awed by Oman's achievement in health care.

The WHO is now undertaking a new assessment of the GBD for the year 2000.

The specific objectives of GBD2000 are:

- To quantify the burden of premature mortality and disability by age, sex, and region for 135 major causes or groups of causes;
- To analyze the contribution to this burden of selected risk factors using a comparable framework; and
- To develop various projection scenarios of the burden of disease over the next 30 years.

Excerpts from speech...

"An important innovation at WHO is the creation of the cluster on Evidence and Information for Policy. Refining and further elaborating the Global Burden of Disease Study will be an important task of this cluster.

The burden of disease approach helps bring into focus the major health problems, whether or not they have vocal advocates.

It brings health more fully into public debate on the priority-setting in public policy, nationally and internationally."

Dr. Gro Harlem Brundtland,
Director-General
World Health Organization, Geneva, Switzerland, 15th December 1998

Over 30 countries in the world including Oman are in various stages of undertaking the National Burden of Disease study (NBD). These studies would prove to be of considerable usefulness in guiding health sector reform and for priority setting. NBD study in Oman has been undertaken primarily by the Directorate General of Planning in the Ministry of Health.

Summary Measures of Population Health

Summary measures of population health are measures that combine information on mor-

tality and non-fatal health outcomes (morbidity & sequelae) to represent the health of a particular population as a single number.

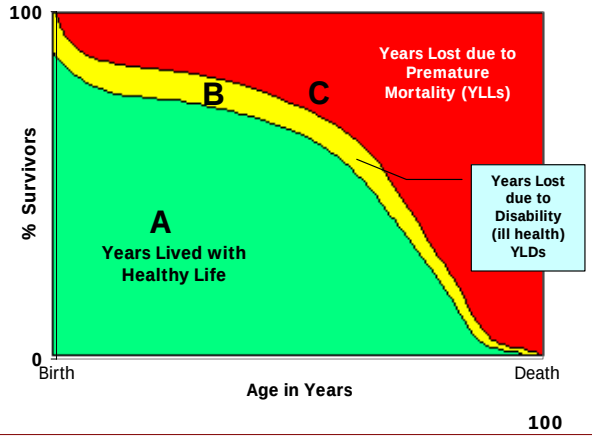
In the past decade, there has been an increased interest in the development, calculation and use of summary measures. Their range of potential applications include:

- Comparison of health conditions or overall health status between two populations or the same population over time;
- Quantification of health inequalities;
- Inclusion of non-fatal health outcomes to ensure these receive appropriate policy attention;
- Measurement of the magnitude of different health problems using a common currency;
- Analysis of the benefits of health interventions for use in cost-effectiveness studies; and
- Provision of information to assist in setting priorities for health planning, public health programs, research and development, and professional training.

Two classes of summary measure have been developed: ***health expectancies*** and ***health gaps***. Both classes of summary measure use TIME (years lived in health status or lost through premature death) as an appropriate common metric for measuring the impact of mortality and non-fatal health outcomes. These two classes of measures are complementary to each other (see Figure 1).

"Time-based health gaps measures offer the possibility of using a common metric for population health. A common metric is the key to linking economic evaluations of interventions, monitoring of health system outcomes, & the overall burden of diseases, injuries & health determinants in the population"

Fig 1
The Survivorship Curve



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The Figure 1 represents the survivorship curve from a hypothetical life table population. The curves represent hypothetical cohorts of survivors at each age x.

Green area A represents time lived in optimal health, yellow area B, time lived in suboptimal health, and the red area C represents time lost due to mortality. The total life expectancy (LE) at birth is given by the area under the curve:

Life Expectancy = A + B

Health Expectancies

Health expectancies are population indicators that estimate the average time (in years) that a person could expect to live in a defined state of health. Examples include disability-free life expectancy (DFLE), active life expectancy, disability-adjusted life expectancy (DALE) etc.

These extend the concept of life expectancy to refer to expectations of various states of health, not just of life per se. In terms of Figure-1, health expectancy is given by:

Health Expectancy = A + f (B)

where f is some function that assigns weights to years lived in suboptimal health. Optimal health has a weight of 1 while death has a weight of 0 and the weight of ill health ranges between 0 to 1.

Measures of potential years of life lost due to premature mortality have been used for many years to measure the mortality burden of various causes of death. These all measure the gap in years between age at death and some arbitrary standard (typically 65 years or 75 years).

As a summary measure of the burden of disability from all causes in a population, healthy life expectancy (*health-adjusted life expectancy*– HALE) is used.

Health Gaps

Health gaps measure the difference between actual population health and some specified norm or goal.

Health Gap= C + g (B)

where g is some function that assigns weights to health states lived during time B, but where a weight of 1 equates to time lived in a health state equivalent to death.

Time-based health gaps measures offer the possibility of using a common metric for population health. A common metric is the key to linking economic evaluations of interventions, monitoring of health system outcomes, and the overall burden of diseases, injuries and health determinants in the population.

The "*mortality gaps*", or the area labelled C in Figure-1, extend the notion of mortality gaps to include time lived in states of suboptimal health (i.e. part of area B in Figure-1).

Disability Adjusted Life Years (DALY)

The DALY is a health gap measure that combines both time lost due to premature mortality and non-fatal conditions and is based on the premise that the best approach for measuring the burden of disease is to use units of 'time'.

DALYs for a disease or health condition are calculated as the sum of the years of life lost due to premature mortality (YLL) in the population and the equivalent 'healthy' years lost due to disability (YLD) for incident cases of the specified health condition:

DALY = YLL + YLD

The loss of healthy life due to non-fatal health conditions requires estimation of the incidence of the health condition (disease or injury) in the specified time period.

Social Value Choices

The DALY measures the gap between a population's actual health status and some 'ideal' or reference status. There would be five explicit or implicit social value choices:

- How long 'should' people in good health are expected to live?
- Is a year of healthy life gained now worth more to society than a year of healthy life gained sometime in the future, for instance in next 20 years' time?
- How should we compare years of life lost through death with years lived with poor health or disability of various levels of severity?
- Are lost years of healthy life valued more at some ages than others? The GBD chose to value a year of life at young adult ages more than in old age or infancy.
- Are all people equal? Do all people lose the same amount of health through death at a given age, even if there are variations in current life expectancies between population groups?

The *Global Burden of Disease* Study used the same values for all regions of the world. In particular, it uses the same '*ideal*' life expectancy standard for all population subgroups, whether or not their current life expectancy is lower than that of other groups, it uses the same '*disability weight*' for everyone living a year in a specified health state, and it gives equal value to a year of healthy life lost at any age (equal '*age weights*').

Disability Weights – Making Time Lived Comparable to Time Lost

In order to use time as a common currency for non-fatal health states and for years of life lost due to mortality, we must define, measure and numerically value time lived in non-fatal health states. The '*valuation*' of time lived in non-fatal health states formalises and quantifies social preferences for different states of health as health state *weights*. Depending on how these weights are derived, they are referred to as disability measured as a number on a scale of 0 to 1, with 0 representing a state of optimal health (no loss) and 1 representing a state equivalent to death.

The term *disability* is used broadly in burden of disease analysis to refer to departures from optimal health in any of the important domains of health. These include mobility, self-care, participation in usual activities, pain and discomfort, anxiety and depression, and cognition and social participation. *Health* is given a broader meaning too. As well as implying absence of illness there are also no impairments or functional limitations due to previous illness or injury.

Thus *disability weights* and *years lost due to disability* (YLD) are used as shorthand terms for health state preferences and years of healthy life lost due to time lived in states other than

*"The term **"disability"** is used broadly in burden of disease analysis to refer to departures from optimal health in any of the important domains of health. These include mobility, self-care, participation in usual activities, pain & discomfort, anxiety & depression, & cognition & social participation."*

the reference state of optimal health.

Discounting

The DALY measures the future stream of healthy years of life lost due to each incident case of disease or injury. It is thus an incidence-based measure rather than a prevalence-based measure. The GBD applied a 3% time discount rate to years of life lost in the future to estimate the net present value of years of life lost. With this discount rate, a year of healthy life gained in 10 years' time is worth 24% less than one gained now.

Age Weighting

The GBD Study weighted a year of healthy life lived at young ages and older ages lower than for other ages. This choice was based on a number of studies that have indicated there is a broad social preference to value a year lived by a young adult more highly than a year lived by a young child or at older ages

"Estimating YLD is the most difficult component of an NBD study. It will frequently require an in-depth understanding of the epidemiology of particular diseases in order to identify alternative estimation methods & will involve the use of judgement & creativity."

Estimating Years of Life Lost (YLL)

For measuring the GBD due to premature mortality uses the expectation of life at each age based in some ideal standard to estimate the loss of years of life associated with a death. This has several advantages: a) deaths at all ages contribute to the calculation of the burden of disease; and b) deaths at the same age contribute equally to the burden of disease.

To define the standard, the highest life expectancy observed for any nation (i.e. the 82.5 years life expectancy of women in Japan) was chosen. The standard expectations are therefore based on a model life table, which have a life expectancy at birth for *Japanese* females. The male-female "biological" difference in survival potential was chosen as 2.5 years. As there is no male schedule with a life expectancy of 80 years, the standard life expectancy at birth for males of 80 years was based on the female schedule.

Estimating Years of Life Lost due to Disability (YLD)

YLD are the disability component of DALYs. Estimating YLD is the most difficult component of an NBD study. It will frequently require an in-depth understanding of the epidemiology of particular diseases in order to identify alternative estimation methods and will involve the use of judgement and creativity. Various methods have been developed to reconcile often fragmented and partial estimates available from different studies. A specific software tool based on a mathematical model of disease, "DISMOD II", was developed to ensure internally consistent estimates.

The data required to estimate YLDs are:

- Incidence
- Prevalence
- Remission
- Duration
- Case-fatality rates
- Mortality
- Relative risks of mortality

All of which must be disaggregated by age and sex. Any three variables are required as input and the software would generate the others.

NBD Study in Oman

The national task force was established with Ministerial Decree to undertake the study in Oman. The Department of Planning, Ministry of Health launched the NBD study from the year 2001 and the Director of the Department of Health Information has been nominated as the national focal point.

Year 2000 has been selected as the reference year. Reasons being...

- Baseline year for the 6th five-year health development plan.
- Year 2000 coincides with the GBD2000 study launched by WHO.

NBD study attempts to estimate DALYs for 162 important diseases and conditions and the countries are at a liberty to choose from this list of priority diseases and conditions most relevant to their country.

Three groups were formed within the Ministry, consisting of health care professionals, and program managers.

(Continued on page 10)

Nursing Adverse Incidents: A study

(Analysis of 5 years Data)

Background

Maintaining an error free practice environment is a challenge for all professions of health. No one is more on the front lines of safety than nurses and midwifes. They are the ones who administer medication, document patient information as well as teach.

Nurses and Midwifes in Oman abide by the professional code-of-conduct. The Code states in statement number one - 'Act always in such a manner as to promote and safeguard the interests and well-being of patients and clients'.

Most errors are the fault of system, not individuals. In order to prevent errors, we must first understand all the contributing factors. Systems must be designed to overcome the multiple conducive factors that create the potential for error.

Introduction

The Department of Nursing Affairs (DNA) has been encouraging nurses and midwifes to self-report any errors so that those can be documented and analyzed for future corrective actions. Likewise the nursing leaders have been encouraged to use the reporting in a positive manner and not to punish them for reporting.

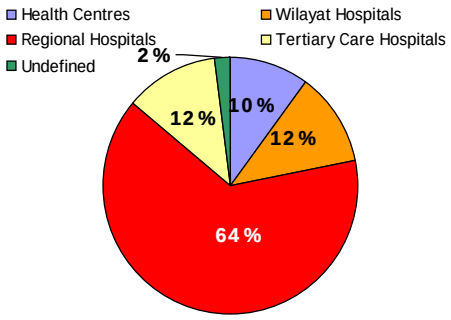
Since 1998 The DNA office has documented and anonymously disseminated reported errors/adverse events through its biennial publication titled *"Nursing Alert"*. The *Nursing Alert* is disseminated to all the health institutions in Oman through the office of the Regional Head of Nursing Services. The alert neither reveals the identity of the person involved nor the institution but provides corrective advice. More than 80% of events in the *Nursing Alert* revealed documentation and medication errors.

The present article reviews 70 errors/adverse events reported nationally during the period 1998 to 2002. Data were analyzed using SPSS software. Out of the 70 reported cases, 50 (71.4%) were categorized as clinical i.e. cases related to the direct patient care while the rest 20 (28.6%) incidents ranged from theft and road traffic accidents in which nurses were involved resulting either to death or fatal injuries.

Results

Regional hospitals reported 64% of the cases, 12% Tertiary and Wilayat Hospitals and 10% from Health Centers. The top three reported incidents were errors in documentation 34%, errors in medication 20% and falls which accounted for 20% of the cases. Documentation errors ranged from writing wrong notes in wrong file to recording wrong information.

Fig 1:
Distribution of Incidents by Health Institutions



There was a statistically significant relation ($p < 0.05$) between duty time and documentation errors. Errors occurred mainly towards the end of a shift, possibly because the nurses were tired and were in a hurry to hand-over and leave for home hence using shortcuts.

On comparing errors and years of professional experience 22% (n=11) had less than 1 year experience and 20% (n=20) had 4 or more years of experience while 26% (n=13)

"Maintaining an error free practice environment is a challenge for all professions of health. No one is more on the front lines of safety than ***nurses & midwifes.****"*

had experience between 1 to 3 years ($p < 0.05$). Those trained in Oman constituted 28% (n=14) and those trained outside Oman constituted 56% (n=28). Some factors which enhance proficiency in practice are good basic nursing and midwifery education, experience in work, strong and systematic in-service programs and good systems of documenting care.

Table 1
Work Experience v/s Incidents

Years of Work Experience	n (%)
Less than 1 year	11 (22%)
One to two years	7 (14%)
Two to three years	6 (12%)
Four years and above	10 (20%)
Missing information	16 (32%)
Total	**50 (100)**

Actions Taken

The most serious cases received a written advise from the Undersecretary of Health Affairs (n=4). Other cases were dealt with at institutional level 37% (n=18)% had written advise. No nurse/midwife from MoH was terminated as a result of an error committed.

Table-2
Type of Actions taken

Type of Actions Taken	n (%)
Written Advice	18 (37%)
Verbal Advice	18 (37%)
No action	12 (24%)
Missing information	2 (4%)
Total	**50 (100)**

Discussion

This analysis has shed some light on the common errors. Although a reporting system for errors /adverse events exists in the Ministry of Health, data are made available to the decision-makers and not to the practitioners or the frontline managers. The analysis shows that fresh nursing graduates and those who have been in the service for more than 4 years contributed to 42% of the total reported errors. A probable reason being the lack of proper orientation program, and the lack of minimum requirements for maintaining competency in practice – an issue the *Oman Nursing and Midwifery Council* is currently addressing.

In Nursing and Midwifery no research work has been undertaken to understand reasons of the errors/adverse events that continue to occur. It is probable that not all errors/adverse events are reported to the Directorate of Nursing Affairs and generally there is a absence of the culture of self-reporting.

As professionals our duty is to change behaviors and make reporting of incidents be felt as an obligation. For thousands of years, healers have lived by the motto "primum non-nocere" - *first, do no harm.* Nurses, midwifes, doctors, and others on the patient care team in health facilities strive every day to deliver the safe, compassionate care that patients deserve.

Improving patient safety involves changing the traditional culture of health care. It requires us to create a culture that is open to discussing of errors when they occur - a culture that encourages providers to bring errors to the forefront - a culture that is non-punitive and "blameless"- a culture that encourages us to learn from our mistakes. Most importantly, improving patient safety is about creating a significant change. Improving patient safety involves problems and issues that require system solutions. Health care is a human experience - people caring for people. Individuals, by the very nature of being human, are vulnerable to committing errors. Although individuals are the focus of the error, er-

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Review of Refractive Services in Oman

Background

Defect in the vision that can be corrected by visual aid is known as refractive error. All at some stage of life, face this problem. Hence the health initiatives aiming to improve the quality of life should address this issue in an organized manner. The Ministry of Health in Oman has provided refractive services since the early eighties.

With the initiation of school health services and reorganization of the eye health care programme in 1991, the vision screening was conducted annually at three school levels with the help of trained school health staff and refractionists. The standard operating procedures (SOP) for common eye diseases was established in 1995 that included early detection of refractive errors. Health information system based on the ICD-10 was initiated at the same time and this generated reliable, accurate and comparable data on the refractive errors and their management.

In 1996-97, a community based national survey for the blindness and common eye diseases was conducted. Among 11,400 persons of all ages examined, 3.8% of them were using visual aids for distant vision at the time of survey.

The prevalence of refractive errors of Omani population is not available. However, the hospital based data and school student's screening data suggested that it is a public health problem that needs comprehensive approach. Therefore it was prioritized in the plan document of 'Vision 2020 – Oman'. Some of the recommendations from this document were also included in the 6th Five-Year Health plan.

Situation Analysis

Demographic profile (2001): The estimated population is 2.47 million of which 45% are aged less then 15 years and 14.3% are above 40 years. These are the likely groups with problems due to refractive errors. Male to female ratio is 51:49.

Resources: Ninety qualified Ophthalmologists in the country provide eye care of whom sixty eight are in MoH, ten in sister organizations and others in private clinics. Thirty five qualified optometrists assist ophthalmologists. Additional sixty five optometrists are in private sector and most of them are in the capital area.

There are twenty six ophthalmic clinics in the Ministry of Health, three in sister organizations and around ten in the private clinics. Ninety six private optical shops provide refractive services in Oman. The MoH issues license to the opticians after evaluation.

The diagnostic equipment in MoH includes retinoscope, auto-refractor, keratometer, phoropter, etc. The spectacles are dispensed by the optical shops. Many of them and few ophthalmic clinics dispense contact lenses also. Two eye hospitals in private sector provide refractive surgeries. Manufacturing unit for frames and glasses does not exist in Oman.

SOP: The guidelines are included in *Eye Health Care manual – 1st edition.* Routine procedures in the MoH include vision testing, retinoscopy, use of cycloplagics especially in children with hypermetropia/strabismus followed by subjective correction.

Health education material: To provide information and to improve compliance of spectacle wear. Booklet and posters in local language are used in eye clinics as well as in the schools.

Activities

Diagnostic: The Ophthalmologists or Refractionists perform eye checkup and prescribe spectacles.

Visual aids: The visual aids are provided to the needy by private optical shops. The cost of the spectacles range from US $ 20 to 300.

Contact lens prescribing and dispensing: The contact lens clinics have Ophthalmologists and/or experienced Opticians. The cost of lens ranges from US $60 to US $350.

Refractive surgery: Qualified ophthalmologists in two private eye hospitals undertake refractive surgery. The cost per eye is US $1500.

Vision screening and refraction for school children: The students of 1st primary, 4th primary, 1st preparatory and 1st secondary levels in all schools of *Ministry of Education* (MoE) undergo vision screening and refraction annually by the trained school health staff .

"The prevalence of refractive errors of Omani population is not available. However, the hospital based data & school student's screening data suggested that it is a public health problem that needs comprehensive approach. Therefore it was prioritized in the plan document of ***'Vision 2020 – Oman'****."*

Health education: The students in school of all level are given health education on nutrition, ocular and vision hygiene, etc.

Follow-up of students with refractive error: To improve the compliance of spectacle wear, the regional school refractionists communicates with parents to determine the barrier. Annual follow-up estimates compliance rate.

Provision of spectacles at reduced rate: The MoE and MoH have negotiated with private optical shops to provide spectacles at low cost of US $20. In some regions efforts have also been made to encourage private donors to provide free spectacles.

Health Information: Monthly data on refractive errors are compiled into annual health statistical report prepared and published by MoH.

Operational research: A number of operational research projects were conducted to determine extent of visual disability in 4th primary level students, compliance of visual aids, etc.

Capacity building for refractive services: A certificate course is being held at university and on an average annually two Ophthalmic Assistants are trained.

Intersectoral collaboration: A collaboration is established between MoH, MoE, Ministry of Information and Ministry of Social Affairs to improve the refractive services in Oman.

Data on Refractive error: Tables 1, 2 & 3 summaries compiled health information on refractive errors for the year 2001.

Refractive surgeries: A total of around 600

"The MoE & MoH have negotiated with private optical shops to provide spectacles at low cost (US$20). In some regions efforts have also been made to encourage private donors to provide free spectacles.".

Table-1
Profile of Refractive Errors among School Children

Class	% of students to population of same age	Screened (Coverage %)		Refractive error			
				Myopia (%)		Hypermetropia (%)	
		#	%	#	%	#	%
1st Primary (6-7 yrs old)	98.2	45,433	99.1	207	0.46	72	0.16
4th Primary (10-11 yrs old)	98.5	52,408	99.9	1,199	2.29	192	0.37
1st Preparatory (12-13 yrs old)	98.0	54,087	99.9	3,084	5.70	231	0.43
1st Secondary (16-17 yrs old)	77.7	44,543	99.9	4,403	9.88	202	0.45

Table-2
Refractive Error in School Children by Gender

Class	Myopia				Hypermetropia			
	Male		Female		Male		Female	
	#	%	#	%	#	%	#	%
1st Primary (6-7 yrs)	101	0.44	106	0.47	31	0.13	41	0.18
4th Primary (10-11 yrs old)	566	2.07	633	2.52	92	0.34	100	0.40
1st Preparatory (12-13 yrs)	1361	4.59	1723	7.04	110	0.37	121	0.49
1st Secondary (16-17 yrs)	1663	7.4	2740	12.4	98	0.44	104	0.47

Table-3
Compliance of Using Spectacles on Follow-up in Dakhliyah, Dhahira, & N. Sharqiyah Regions of Oman

Class	Students advised spectacles in	No of Student followed up	Students wearing visual aids in 2000-2001	
		#	#	%
1st Primary	45	37	25	**67.6**
1st Preparatory	351	271	148	**54.6**
1st Secondary	465	379	277	**73.1**

Table-4
Reported New Cases of Refractive Errors at Ophthalmic units: 2002

	Myopia (M- 52.1)	Hypermetropia (M- 52.0)	Astigmatism (M- 52.2)	Total
Adult Male (n= 70,560)	4,147	2,972	3,536	10,655
Adult Female (n= 74,139)	5,762	3,049	4,404	13,215
Male Child* (n= 25,888)	1,011	573	790	2,374
Female Child* (n=20,587)	1,179	554	937	2,670
Total (n= 191,174)	12,099	7,148	9,667	28,914

** A child is defined as <12 years of age.*

refractive surgeries were performed at two private hospitals in 2001.

Achievements

- Refractive error is prioritized health problem.
- Refractive service is an integral part of the general health care system and the comprehensive eye care, both at primary and secondary health care in the Sultanate.
- The high-risk groups like females, young age-group, remote areas, etc. are identified and the services are provided to these areas in all regions .
- Data from schools and eye department of the MoH hospitals are periodically reviewed and actions are taken to improve the services.
- Operational research related to refractive error and vision aids were conducted.
- Refractive services are provided at 24 MoH institutions with 68 qualified ophthalmologists and nearly 30 refractionists.
- Clinical refractive services support the refraction activities in schools.
- In the schools, around 0.15 million students are visually screened by the trained PHC staff and prescribed by qualified refractionists.
- The spectacles are provided to the needy at a concession rate of US $20.
- Local community is mobilized to support procurement and distribution of free visual aids.
- Refractive services at schools and MoH Institutions are monitored by the program.
- Private optical shops are licensed by MoH to ensure quality of refractive services.

Conclusions

Refractive error is a problem of public health importance in Oman and is probably on the rise. The problem is being addressed in an organized manner. Focus of the programme in coming years should be to make it sustainable. Community oriented activities especially for the care of presbyopics will further strengthen the activities.

"Refractive errors is a problem of public health importance in Oman & is probably on the rise. The problem is being addressed in an organized manner."

(Continued from page 4)

1. Mortality Group
2. Morbidity Group A: Communicable diseases, nutritional disorders, maternal conditions.
3. Morbidity Group B: Non-communicable diseases, genetic disorders, mental illnesses and accident & injuries.

Orientation and Training workshop was held in September 2001 for the MoH staff. Some of the officials participated in the WHO workshop in Indonesia, South Africa and Greece.

In March 2003 an inter-country meet (GCC countries) was held in Muscat, in which hands-down training was provided to the participants in the use of DISMOD II and DALY templates.

"The NBD 2000 project is underway in the Ministry of Health, Oman & it is projected that the exercise would be completed by mid 2004".

Steps for Conducting NBD Study

1. Prioritize diseases & their sequelae most relevant to Oman in terms of mortality and morbidity
2. Conduct literature review of all published and unpublished articles on the subject in Oman as well as neighbouring countries
3. Epidemiological estimates of diseases & their sequelae
4. Mortality estimates in the absence of vital registration system
5. Check for internal consistency in the epidemiological data using DISMOD II software
6. Discuss calculated estimates with the experts in the field
7. Re-estimate epidemiological variables
8. Calculate DALYs
9. Prepare report document with recommendations based on finding
10. Publication of the report

The NBD 2000 project is underway in the Ministry of Health, Oman and it is projected that the NBD exercise would be completed by the mid 2004.

Note:

1. *The theoretical background in this article has been reproduced from the NBD Manual version 2.0, published by WHO in October 2001. Interested readers are encouraged to refer to the original document on the URL- http://www3.who.int/whosis/burden/manual/nbdv2.zip*
2. *Additional information on technical papers or on NBD Study in Oman can be requested from the NBD Focal Point, e.g. Director of Health Information & Statistics, Directorate General of Planning, Ministry of Health HQ, Oman.*

(Continued from page 6)

rors also happen because of the system in which people work. More often than not, a single error has multiple sources. Reducing errors also will require us to design and implement more error-resistant systems.

In our efforts to improve the system we encourage nurses and midwifes to report incidents so that we can study the errors their causes and come-up with appropriate interventions.

References

1. *Benner, Patricia: From Novice to Expert, 1984*
2. *American Nurses Association (May 2000). "New ANA Study Provides Proof of Link between Staffing and Quality of Patient Care. http://www.nursingworld.org/pressl/2000/pr0502.htm*
3. *Morris MR. (199). Preventing Medication Errors, Registered Nurse, 62(9); 69-72*

Frequently Asked Questions (FAQ): Rabies

Q1: Is there a risk of Rabies in Oman?

Ans.: Yes. In Oman rabies is enzootic i.e. it is endemic in the wild animals (red foxes). The Sylvatic rabies occasionally transmits to peri-domestic to domestic animals and then to human. Hence there is a definite risk following bite of animal known to transmit rabies. Animals implicated for rabies so far in Oman are fox (4 cases), dog (1 case), cat (1 case).

Q2: Which animal bites should NOT receive anti-rabies vaccine?

Ans.: NO. Rats or any rodents or rabbits, hares, squirrels do NOT transmit rabies, hence their bites should NOT receive post-exposure treatment (PET) with anti-rabies vaccine.

Q3: What are the specific indications of HRIG?

Ans.: Wild (or unknown) animal bites, bites on head/neck area, class III bites, multiple deep bites on body, bite of rabid animal, biting animal either dead or lost and very young children should receive HRIG (Human Rabies Immuno-Globulin).

Q4: Why should we use discretion for use of HDCV & HRIG?

Ans.: HDCV (Human Diploid Cell Vaccine) & HRIG are both expensive vaccines especially the later. Hence the criteria and indications of post-exposure therapy should be strictly adhered to. If in doubt consult regional and/or national focal point.

Q5: What if the animal inflicting bite is unknown?

Ans.: Consider the animal to be wild and proceed with indicated post-exposure therapy.

Q6: Should HRIG be offered if the case reaches the health institution late?

Ans.: Yes. Until 8 days after the rabies prone animal bite. After 8 days HRIG (immune serum) has NO efficacy. However HDCV should be administered.

Q7: What should be done if vaccine is not available in the health facility?

Ans.: If the animal bite is prone for rabies and vaccination (HDCV or HRIG) is indicated then refer case to the nearest health facility where the stock is available. Involve Superintendent/Director of Health Affairs and/or Epidemiologist/Focal point of communicable disease to coordinate.

Q8: Where diagnostic tests for rabies are available?

Ans.: Human rabies is diagnosed on clinical grounds. In suspected sylvatic rabies kill the animal humanely. Cut off the head and send packed in ice to *Central Veterinary Laboratory (CVL), Rumais* for confirmation of diagnosis.

Q9: What is recommended if the biting animal can be observed for 10 days?

Ans.: Cessation of further treatment if the animal under observation is healthy after 10 days.

Q10: Is human-to-human transmission possible?

Ans.: No. Rabies is an end infection in humans hence not transmissible. However 6 cases are on record worldwide of transmission through infected corneal transplants.

Q11: Is there any contraindication for rabies vaccination?

Ans.: NO. There are no contraindications including pregnancy or infancy.

Q12: Is there risk of rabies if you drink the milk of a suspected rabid animal?

Ans.: NO, although theoretically the virus is present in all body fluids. It is unlikely to gain entry into tissues through GI tract. However due to the associated 100% mortality of Rabies PET should be offered.

"Human rabies incidence in Oman is extremely low due to the efficient animal-bite surveillance & an effective post-exposure prophylaxis with the best vaccines in the world viz. the HDC & HRIG."

Communicable Diseases Quarterly Report

First Quarter (January to March 2003)

ICD Code	Diseases	2003 First Quarter				2002			
		Jan	Feb	Mar	Total	Q1 Jan-Mar	Q2 Apr-Jun	Q3 Jul-Sep	Q4 Oct-Dec
GROUP 'A' DISEASES									
A00	Cholera	-	-	-	**0**	-	1(i)	1	-
A20	Plague	*Never Reported*							
A36	Diphtheria	*Last Case in 1992*							
A39	Meningococcal infection	-	-	1	**1**	3	2	1	-
A80	Poliomyelitis	*Last Case in 1993*							
	Acute Flaccid Paralysis	1	2	1	**4**	2	5	5	5
B05	Measles	1	-	-	**1**	3+1	-	-	1
B06	Rubella & [CRS]	-	-	-	**0**	2	1	-	-
A95	Yellow fever	*Never Reported*							
A82	Rabies	-	-	-	**0**	-	-	-	-
B20-24	HIV & [AIDS]	1 [3]	3 [1]	1 [1]	**5 [5]**	12 [8]	16 [11]	15 [11]	17 [3]
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**	-	-	-	-
GROUP 'B' DISEASES									
A03.0	Typhoid fever	2	4	3	**9**	19	16	25	10
A01.4	Paratyphoid fever	1	2	1	**4**	4	7	2	4
A02	Food poisoning	56	20	125	**201**	181	263	365	150
A22	Anthrax	*Never Reported*							
A23	Brucellosis	13	18	19	50	45	33	26	29
A37	Pertussis	8	9	13	30	21	43	17	15
A35	Tetanus (Excluding NNT)	-	-	-	0	1	1	-	2
A90	Dengue	-	-	-	0	-	-	-	1(i)
	Viral Hepatitis - Total	**146**	**155**	**115**	**416**	**531**	**834**	**393**	**322**
B15	Viral Hepatitis 'A'	45	56	20	121	84	234	167	75
B16	Viral Hepatitis 'B'	7	-	-	7	8	18	18	4
B17.1	Viral Hepatitis 'C'	-	-	-		-	6	5	2
B17.0	Viral Hepatitis 'D' among 'B'	-	-	-		-	-	-	1
B17.2	Viral Hepatitis 'E'	1	-	-	1	1	-	1	0
B19/B17.8	Viral Hepatitis (Unspecified)	93	99	95	287	438	615	202	240
B55	Visceral Leishmaniasis	-	-	-	0	1	-	-	0
B55.1	Cutaneous Leishmaniasis	3	3	3	9	6	2	-	4
B65	Schistosomiasis	1	4	10	15	1	-	-	1
B74	Filariasis	-	-	-	0	-	-	1 (i)	0
B72	Dracunculiasis	*Certified by WHO as Eradicated from Oman*							
G00.0	Haemophilus influenzae type b, Meningitis	-	-	1	1	9	10	4	3
G00.1-9	Bacterial meningitis other than Nm & Hib	1	5	5	11	27	23	23	10
A87	Viral meningitis	-	2	4	6	4	6	10	1
G03	Meningitis - Unspecified	7	2	2	11	-	7	5	4
A30	Leprosy	1	-	2	3	5	-	1	2
A15	Pulm. Tuberculosis Sputum Positive	6	1	9	16	33	39	24	24
A16	Pulm. Tuberculosis Sputum Negative	4	2	3	9	9	6	8	3
A17-19	Extra-Pulmonary Tuberculosis	7	8	6	21	20	23	38	16
B50-54	Malaria (All sources)	11	22	25	58	85	179	227	99
A50-53	Syphilis	17	6	8	31	33	33	25	32
A54	Gonococcal Infections	8	7	8	23	74	47	46	46
GROUP 'C' DISEASES									
A03	Shigellosis	55	89	94	**238**	296	242	203	417
A06	Amoebiasis	485	610	572	**1667**	1,385	1,257	1,178	1,624
A09	Acute Gastro-Enteritis & Diarrhoea	11,711	11,025	13,546	**36,282**	31,391	20,667	23,023	37,823
B01	Chicken Pox	1,495	1,643	2,338	**5,476**	3,895	4,810	2,296	4,409
B26	Mumps	141	95	140	**376**	578	933	415	571
A71	Trachoma	20	54	102	**176**	115	153	58	74
J10-J11	Influenza	274	116	78	**468**	777	216	651	1,202

Communicable Diseases Quarterly Report by Regions

First Quarter (January to March 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	**0**	-	-	-	-	-	-	-	-	-	-
A20	Plague	*Never Reported*										
A36	Diphtheria	*Last Case in 1992*										
A39	Meningococcal infection	**1**	1	-	-	-	-	-	-	-	-	-
A80	Poliomyelitis	*Last Case in 1993*										
	Acute Flaccid Paralysis	**4**	-	-	-	-	-	1	1	2	-	-
B05	Measles	**1**	-	-	-	-	-	1	-	1	-	-
B06	Rubella & [CRS]	**0**	-	-	-	-	-	-	-	-	-	-
A95	Yellow fever	*Never Reported*										
A82	Rabies	**0**	-	-	-	-	-	-	-	-	-	-
B20-24	HIV [AIDS]	**5 [5]**	2 [4]	-	-	-	1 [0]	1 [1]	-	1 [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**	-	-	-	-	-	-	-	-	-	-
GROUP 'B' DISEASES												
A03.0	Typhoid fever	**9**	3	-	2	-	-	2	1	-	-	1
A01.4	Paratyphoid fever	**4**	-	1	1	-	-	2	-	-	-	-
A02	Food poisoning	**201**	17	9	22	1	101	32	2	13	-	4
A22	Anthrax	*Never Reported*										
A23	Brucellosis	**50**	1	49	-	-	-	-	-	-	-	-
A37	Pertussis	**30**	8	-	4	-	-	11	1	6	-	-
A35	Tetanus (Non-NNT)	**0**	-	-	-	-	-	-	-	-	-	-
A90	Dengue	**0**	-	-	-	-	-	-	-	-	-	-
	Viral Hepatitis - Total	**416**	**24**	**14**	**86**	**157**	**37**	**41**	**26**	**6**	**2**	**43**
B15	Viral Hepatitis 'A'	**121**	10	1	48	1	1	-	21	-	-	39
B16	Viral Hepatitis 'B'	**7**	1	-	2	-	-	-	4	-	-	-
B17.1	Viral Hepatitis 'C'	**0**		-	-	-	-	-	-	-	-	-
B17.0	Viral Hepatitis 'D' among 'B positive'	**0**	-	-	-	-	-	-	-	-	-	-
B17.2	Viral Hepatitis 'E'	**1**	-	-	1	-	-	-	-	-	-	-
B19/17.8	Viral Hepatitis Unspecified	**287**	13	13	15	156	36	41	1	6	2	4
B55	Visceral Leishmaniasis	**0**	-	-	-	-	-	-	-	-	-	-
B55.1	Cutaneous Leishmaniasis	**9**	1	3	1	3	1	-	-	-	-	-
B65	Schistosomiasis	**15**	-	15	-	-	-	-	-	-	-	-
B74	Lymphatic Filariasis	**0**	-	-	-	-	-	-	-	-	-	-
B72	Dracunculiasis	*Certified by WHO as Eradicated from Oman*										
G00.0	Haemophilus influenzae type b, Meningitis	**1**	-	-	-	-	-	1	-	-	-	-
G00.1-9	Bacterial meningitis except Nm & Hib	**11**	3	1	1	1	-	2	3	-	-	-
A87	Viral meningitis	**6**	-	-	2	-	-	2	1	1	-	-
G03	Meningitis - Unspecified	**11**	1	-	1	2	-	6	-	1	-	-
A30	Leprosy	**3**	1	2	-	-	-	-	-	-	-	-
A15	Pulm. Tuberculosis Sputum Positive	**16**	6	1	1	-	3	2	3	-	-	
A16	Pulm. Tuberculosis Sputum Negative	**9**	2	2	-	-	1	1	2	1	-	-
A17-19	Extra-Pulmonary Tuberculosis	**21**	11	2	2	-	-	3	2	1	-	-
B50-B54	Malaria (All sources)	**58**	39	3	4	2	3	-	7	-	-	-
A50-A53	Syphilis	**31**	2	-	1	-	5	16	2	2	2	1
A54	Gonococcal Infections	**23**	5	-	2	-	2	4	1	6	1	2
GROUP 'C' DISEASES												
A03	Shigellosis	**238**	37	6	98	31	29	10	11	12	1	3
A06	Amoebiasis	**1667**	96	8	416	185	356	180	36	259	27	104
A09	Acute Gastro-Enteritis & Diarrhoea	**36282**	5196	2910	4638	3865	4307	6406	4952	2971	549	488
B01	Chicken Pox	**5476**	1309	557	513	382	327	1244	476	511	149	8
B26	Mumps	**376**	66	23	110	8	12	65	48	40	2	2
A71	Trachoma	**176**	9	2	44	19	-	-	41	61	-	-
J10-J11	Influenza	**498**	18	-	28	251	-	3	-	168	-	-

Selected Communicable Diseases by Wilayat

First Quarter (January to March 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				1	4					1
	Seeb				2	7	3		16	4		1			
	Muttrah					6	1		6	4					
	Bowsher				4	3	1		11	5					
	Al Amerat					3	1		5	1					
	Quriyat									6	1				
DHOFAR	Salalah					3			3	12	2				2
	Thumrait									1					
	Taqah					1				1					
	Mirbat					1	1								1
	Sudah														
	Rakhyut														
	Dhalqut														
	Muqshan														
	Shaleem														
NORTH BATINAH	Sohar	1			6	2	1			10			1		
	Shinas				1	1	1			2					
	Liwa		1			1				2					
	Saham				4					20					
	Khabura									3					
	Suwaiq					2				4					
SOUTH BATINAH	Rustaq	1				3			1	4					
	Nakhl														
	Wadi Maawil														
	Al Awabi														
	Musanah				1	2	2		1	13					
	Barka					2	1		5	9					
DAKHLIYAH	Nizwa					1			3	14					
	Bahla				2	1			1	32					
	Adam									3					
	Hamra									6					
	Manah									1					1
	Sumail				1					1					
	Izki				1					9					
	Bid Bid					1	1								
DHAHIRA	Ibri				1	1				2					
	Yanqul	1			3	1									
	Dhank				2										
	Buraimi	1								4					
	Mahda														
NORTH SHARQIYAH	Ibra								1	4					
	Mudhaibi									100					
	Bidiyah								1	2					2
	Al-Qabel									43					1
	Dima Al-Tayeen									3					
	Wadi Bani Khalid									5					
SOUTH SHARQIYAH	Sur					2	1			3					1
	Masirah					1	1								
	Al Kamil & Al Wafi								2	3					
	BBB Ali					1	1		1	23					
	BBB Hassan									8					
MUSANDUM	Khasab														
	Dibba														
	Bukha														
	Madha														
AL-WUSTAH	Haima														
	Duqum									41					
	Mahoot									2					
	Al-Jazer														
NATIONAL TOTAL		**4**	**1**	**0**	**30**	**46**	**16**	**0**	**58**	**416**	**3**	**1**	**1**	**0**	**9**

Age Distribution of Communicable Diseases

First Quarter (January to March 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	**0**	-	-	-	-	-	-	-	-	-
A20	Plague	*Never Reported*									
A36	Diphtheria	*Last Case in 1992*									
A39	Meningococcal infection	**1**	1	-	-	-	-	-	-	-	-
A80	Poliomyelitis	*Last Case in 1993*									
	Acute Flaccid Paralysis	**4**	-	3	1	-	-	-	-	-	-
B05	Measles	**1**		-	-	-	1	-	-	-	-
B06	Rubella & [CRS]	**0**			-	-	-	-	-	-	-
A95	Yellow fever	*Never Reported*									
A82	Rabies	**0**	-	-	-	-	-	-	-	-	-
B20-24	HIV [AIDS]	**5 [5]**	-	-	-	-	-	1 [0]	2 [4]	1 [0]	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**	-	-	-	-	-	-	-	-	-
GROUP 'B' DISEASES											
A03.0	Typhoid fever	**9**	-	1	-	3	-	1	2	1	1
A01.4	Paratyphoid fever	**4**	-	1	-	-	-	-	3	-	-
A02	Food poisoning	**201**	3	18	23	25	11	38	43	31	9
A22	Anthrax	*Never Reported*									
A23	Brucellosis	**50**	-	16	14	9	4	-	3	2	2
A37	Pertussis	**30**	19	2	4	5	-	-	-	-	-
A35	Tetanus (Non NNT)	**0**	-	-	-	-	-	-	-	-	-
A90	Dengue	**0**	-	-	-	-	-	-	-		-
	Viral Hepatitis - Total	**416**	-	**74**	**238**	**67**	**13**	**7**	**5**	**3**	**9**
B15	Viral Hepatitis 'A' (ELISA)	**121**	-	15	84	19	2	1	-	-	-
B16	Viral Hepatitis 'B' (ELISA)	**7**	-	-	1	-	-	3	-	1	2
B17.1	Viral Hepatitis 'C' (ELISA)	**0**	-	-	-	-	-	-	-	-	-
B17.0	Viral Hepatitis 'D' (ELISA) among 'B'	**0**	-	-	-	-	-	-	-	-	-
B17.2	Viral Hepatitis 'E' (ELISA)	**1**	-	-	-	-	-	-	-	-	1
B19/B17.8	Viral Hepatitis Unspecified	**287**	-	59	153	48	11	3	5	2	6
B55	Visceral Leishmaniasis	**0**	-	-		-	-	-	-	-	-
B55.1	Cutaneous Leishmaniasis	**9**	-	1	-	-	2	4	1	-	1
B65	Schistosomiasis	**15**	-	-	4	4	4	-	2	1	-
B74	Lymphatic Filariasis	**0**	-	-	-	-	-	-	-		-
B72	Dracunculiasis	*Certified by WHO as Eradicated from Oman*									
G00.0	Haemophilus Meningitis type b	**1**	1	-	-	-	-	-	-	-	-
G00.1-9	Bacterial meningitis other than Nm & Hib	**11**	4	2	1	1	-	-	-	-	3
A87	Viral meningitis	**6**	2	1	2	-	-	-	1	-	-
G03	Meningitis - Unspecified	**11**	4	1	4	-	2	-	-	-	-
A30	Leprosy	**3**	-	-	-	-	-	1	-	-	2
A15	Tuberculosis: Sputum Positive	**16**	-	-	-	-	-	4	3	3	6
A16	Tuberculosis: Sputum Negative	**9**	-	-	3	1	-	-	2	2	1
A17-19	TB Extra-Pulmonary	**21**	-	-	-	-	2	3	6	3	7

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 contact screening and/or population survey in Salalah Wilayat.*

Animal Bite Surveillance by Regions

First Quarter (January to March 2003)

Region	Estimated Population at Risk (2002)	Type of Animal					Total Animal Bites	Rate per 10,000 population	Annualized Rates of Animal Bites in Previous Quarters			
		Fox or Wild	Dog	Cat	Other Domestic	Others (unknown)			2002			
									Q1	Q2	Q3	Q4
Muscat	709,776	-	21	15	-	-	**36**	2.0	3.5	3.9	4.1	3.5
Dhofar	237,523	-	-	4	5	-	**9**	1.5	1.1	1.4	1.0	1.0
North Batinah	443,967	1	23	14	8	-	**46**	4.1	2.0	0.6	0.9	1.7
South Batinah	255,383	2	21	30	8	-	**61**	**9.6**	**4.6**	**6.5**	**10.1**	**7.5**
Dakhliyah	285,312	-	3	16	5	-	**24**	3.4	**5.3**	**5.9**	4.1	**4.8**
Dhahira	226,627	2	4	5	1	-	**12**	2.1	3.3	3.8	2.5	3.5
North Sharqiyah	147,377	1	1	31	5	-	**38**	**10.3**	**10.0**	**14.1**	**15.5**	**15.4**
South Sharqiyah	174,558	1	14	2	3	-	**20**	**4.6**	2.2	2.1	1.4	2.7
Musandam	35,941	1	2	-	-	-	**3**	3.3	2.4	2.3	**5.7**	2.9
Al-Wustah	21,278	1	1	3	3	-	**8**	**15.0**	**11.8**	**7.6**	**7.6**	**8.6**
Total	**2,537,742**	**9**	**90**	**120**	**38**	**0**	**257**	**4.1**	**3.6**	**4.1**	**4.3**	**4.2**

Note: Rodent bites are excluded

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"**SARS** is a worldwide threat and the world needs to work together to find its cause, cure the sick and stop its spread."

Dr. Gro Harlem Brundtland
Director General of World Health Organization, Geneva
March 12th, 2003

Your opinion matters to us:
Any suggestions to improve upon the contents & the design of this Newsletter will always be gratefully received.

Your contribution is valuable to us:
Please write to us concerning your ideas & experiences, both good & bad. sharing them with a wider audience could benefit others, leading to new ideas, techniques & policies & helping to avoid struggling with problems others have already solved.

Editorial Board

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