

**Civil Registration in the Sultanate of Oman:
Its development and potential implications on vital statistics***

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Background

The Sultanate of Oman is located in the south eastern corner of the Arabian Peninsula (figure 1). It has an area of 309,500 square kilometers and is composed of varying topographic areas consisting of plains (3%), mountains (15%) and wadis (dry river beds) and desert (82%).

The first General Census of Population, Housing and Establishments was carried out in December 1993¹ and the second in December 2003². Before the first census, demographic information and population estimates and projections were based on survey results.

According to the second census², the population of Oman was estimated to be 2,340,815 of which 559,257 were expatriates representing 23.9% of the total population. The average annual population growth rate was about 1.5% for the total population (1.8% for Omani population and 0.4% for Expatriate population). The Omani population had a median age of 15.7 years (compared to 12.1 years in 1993) and about 41% of the population was below 15 years and only 0.7% above the age of 65 years.

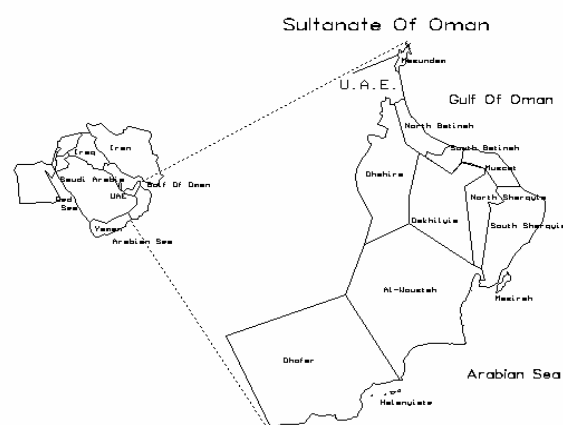


Figure 1: Oman in relation to other Gulf

Oman is an upper middle income country with a GDP per capita of US\$13,786 (RO 5321.5)³. The health system in Oman is characterized by its universal coverage for both citizens and governmental or public sector expatriates. The health system is financed mainly by the government. Governmental spending accounts for about 80% of the Total Health Expenditure (THE). Services purchases by private sector varies according to services; 2% for the most expensive services which are inpatients services, 59% for dental services, 51% for drugs and 19% for outpatient services⁴. Health care is directly provided in facilities owned and operated by the government. The government provides 93% of hospitals and about 98% of hospital beds. Public health services are run by 78% of the doctors, 92.5% of nurses and 85% of other paramedics³.

The Ministry of Health (MOH) is the main health care provider and is responsible for ensuring the availability of health policies and plans and monitoring their implementations. Other health care providers in the country include: Armed Forces Medical Services (AFMS), Royal Oman Police Medical Services (ROPMS), Sultan Qaboos Hospital (SQUH), Diwan Medical Services (Diwan MS), Petroleum Development Oman Medical Services (PDOMS) and the Private Sector. Table 1 shows health care facilities in the Sultanate of Oman³.

Table 1: Health care facilities in the Sultanate of Oman, December 2006

	Hospitals	Health Centers & Extended Health Centers	Clinics
Ministry of Health *	49	150	
Sultan Qaboos Hospital	1	1	
Armed Forces Medical Services	3		31
Royal Oman Police Medical Services	1		3
Diwan Medical Services			2
Petroleum Development Oman Medical Services			9
Private Sector	5		732
Total Health Care Facilities	58	151	777

* Hospitals that belong to MOH are classified into Regional hospitals (13) which act as tertiary and or secondary hospitals, wilayat hospitals (6) act as secondary hospitals and local hospitals (30) which provide primary health care with some inpatient services. Health centers are classified into health centers with beds, health centers without beds and extended health centers

The availability of reliable information on vital events, particularly births and deaths, is of extreme importance to project population growth, support health planning and set priorities for interventions. Ideally the ultimate source of such information would be an accurate and complete national vital registration system. As in some other developing countries, the Sultanate of Oman had no vital registration system in place.

Demographic indicators reflecting population growth and health status were estimated, as previously mentioned, through a number of demographic, social and health surveys. In spite the fact that these estimates were of extreme importance in guiding developments and health plans, the availability of a vital registration system would have additional and essential benefits. In addition to the legal aspect of any civil registration and its role in protecting rights of the population, it also provides useful information. The following paper describes the establishment of a vital registration system in The Sultanate of Oman and its role in assuring and providing additional essential information that can be properly and systematically assessed for completeness and accuracy.

Situation without Civil Registration and Vital Events Notifications

The Sultanate of Oman has started building a modern state only in 1970 and in fact Ministry of Health (MOH) was established in August 1970. During the years of early developments in the 70s and 80s there was no emphasis on registering vital events as births and deaths. Only events taking place in the few public health facilities available in the country, during that period, were recorded. Certificates for births and deaths were issued by MOH upon request and there existed no obligations for registering

such events. Small scale demographic and social surveys were conducted during the mid-70s and early 80s. These were the only sources for estimating mortality and fertility indicators during that period. These studies include; "Socio-Demographic Survey in 5 Towns, 1975"⁵, "Socio-Demographic Survey in 11 Towns 1977-1979"⁶, "Child Mortality Survey in The Sultanate of Oman 1986"⁷, and "the 1986 Clinic-Based Study of Childhood Mortality in The Sultanate of Oman, 1988"⁸. These surveys have different approaches to estimate childhood mortality. Estimates from these surveys could not be segregated using important factors especially gender. The coverage of such data was also questionable.

These studies were followed by a large scale survey with a national representative sample namely; "The Oman Child Health Survey (OCHS), 1992"⁹. The survey was executed during the period of November 1988 to February 1989 and has included 3,867 households, 24,321 individuals, 3617 ever-married women and 6886 children born in 1982 and after, this was followed by "The First General Census of Population, Housing and Establishments" in 1993¹. The first census has collected data that would allow estimated overall mortality and fertility as well as childhood mortality. "The Oman family Health survey 1995"¹⁰ was conducted to follow upon estimated made during the earlier surveys. The last two important sources of information were "The national Health Survey 2000"¹¹ and "The Second General Census of Population, Housing and Establishments" in 2003².

This series of surveys have provided a tool to monitor demographic indicators over the years. Meanwhile, the national health information system was increasingly developing and had the potential to be used for estimating mortality, morbidity and fertility. The MR2 register (Child Health care Register) is a register in which infants are registered in public health institutions on their first visit to their parent institution after birth and they are registered in the month of their birth irrespective when they show at the health institution. The register was originally design to follow up on immunization of infants during their first year of life. A child who does not show for any of the scheduled settings for immunization he is followed up by phone or home visit. So the status of any registered infant, whether alive or dead, can be verified during any of these scheduled timings or otherwise labeled as a defaulter. The register was examined during 1996 for the years 1993, 1994 and 1995¹². The MR2 survey allowed examining the probability of dying during the first year of life.

The graphs in figure 2 and 3 show the mortality and fertility estimates; respectively, made over the years using different demographic, social and health surveys as well as the national routine health information system. Although these estimates had produced trends of mortality in the country and its changes over time, there existed no appropriate systematic way to check for completeness and accuracy apart from ensuring survey methodology. On the other different survey and estimating methods took place over the years, making the estimates un-consistent over certain periods of time.

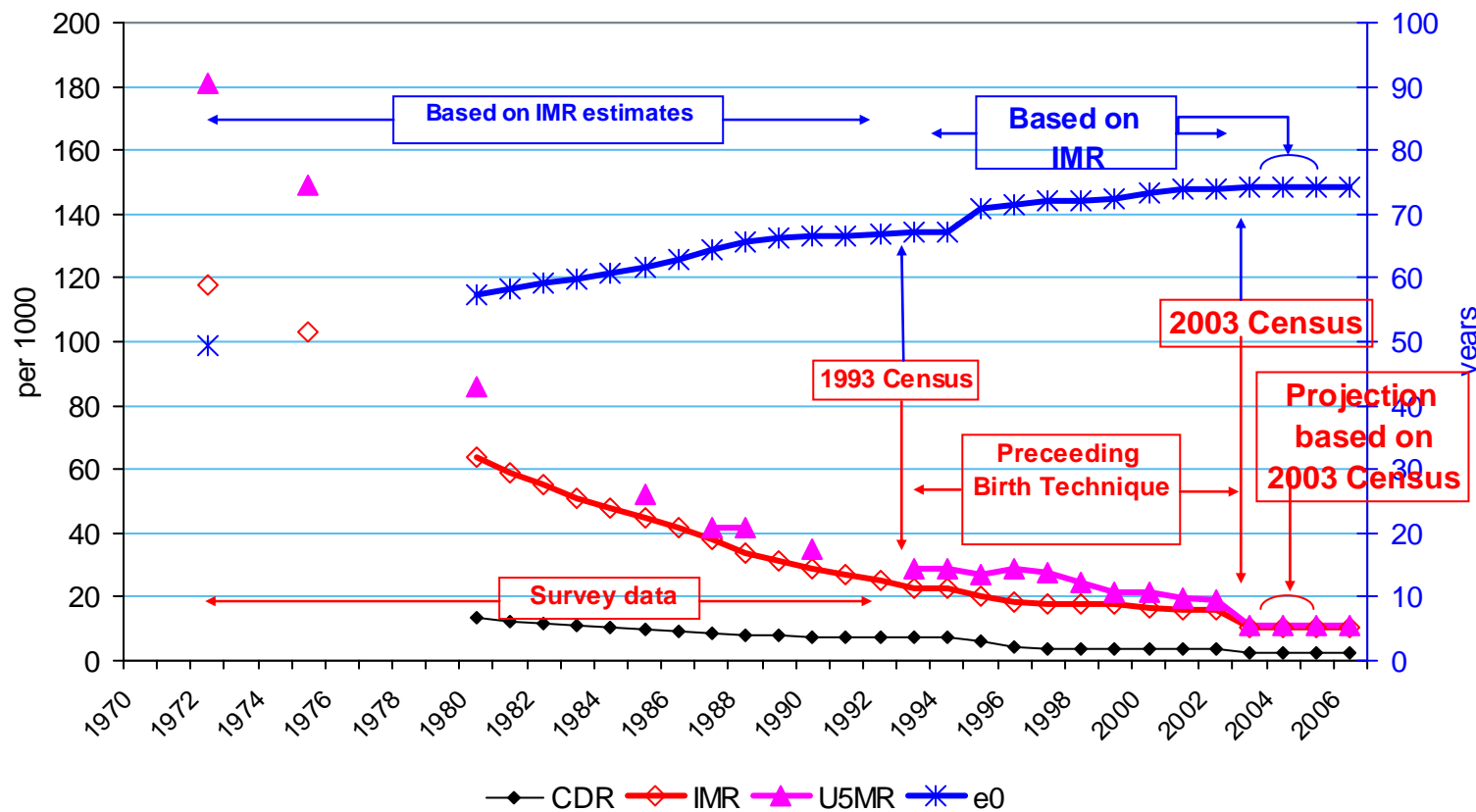


Figure 2: Mortality Estimates from Demographic, Social and Health Surveys

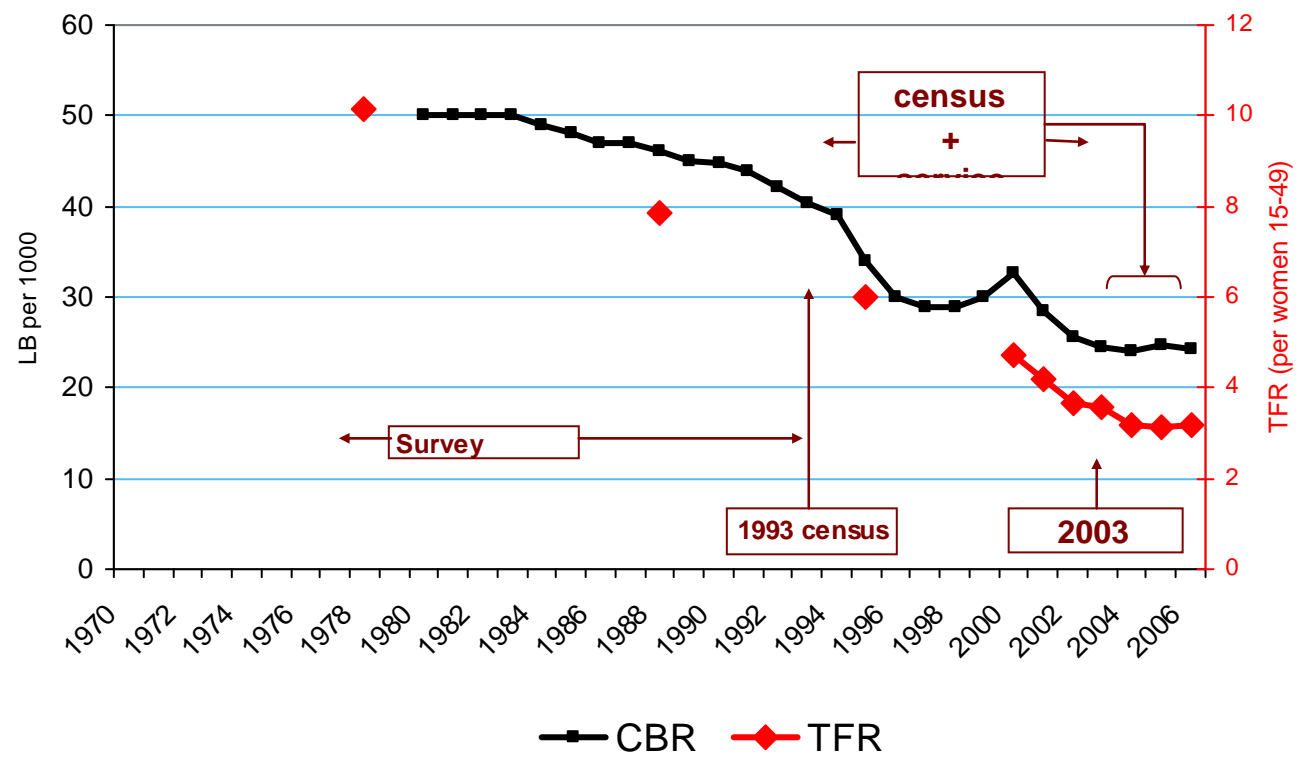


Figure 3: Fertility estimates from surveys CDR and Life expectancy at Birth

The establishment of Civil Registration and Notifications for Vital Events

The attempt to institute a compulsory vital registration was enforced by a Royal Decree (66/99) in 1999. However, obligatory civil registration including vital registration (VR) was actually enforced in May 2004. According to the Royal Decree the civil registration is the responsibility of Directorate General of Civil State at Royal Oman Police (DGCS, ROP). Its establishment required coordination among different sectors. The forms for notification of births and deaths were developed in coordination with MOH. DGCS was not interested in health related data as cause of death, cause of fetal death, information about the mother of the newly born and others. This has necessitated the development of a parallel database, within MOH, that records information on notifications. The DGCS has agreed to send copies of notifications from health care providers, community and Omani missions outside the country to MOH. Figure 2 shows the flow of notifications as were originally agreed upon. The notification database was initially used by MOH institutions to save notifications and help in their printing. Efforts have led to the implementation of this database in other public and private health care providers. This has allowed the electronic transfer of notifications from such care provider to MOH database (figure 4). The notification system is cared for by medical record technicians in each health care facility. The database was made available in electronic format in all hospitals where more than 80% of the events take place. Smaller health care facilities e.g. health centers complete the notification forms manually, a copy of which is then forwarded and recorded electronically at a central level (within each health region). Health care providers other than MOH have made the necessary arrangements and resources to care for the notification database. Training of medical record technicians to use the notification system is the responsibility of Directorate of Health information and Statistics within Ministry of Health.

Figure 2: Flow of notifications of vital events as originally designed – copies of notifications made by health care providers other than MOH are sent by DGCS to MOH

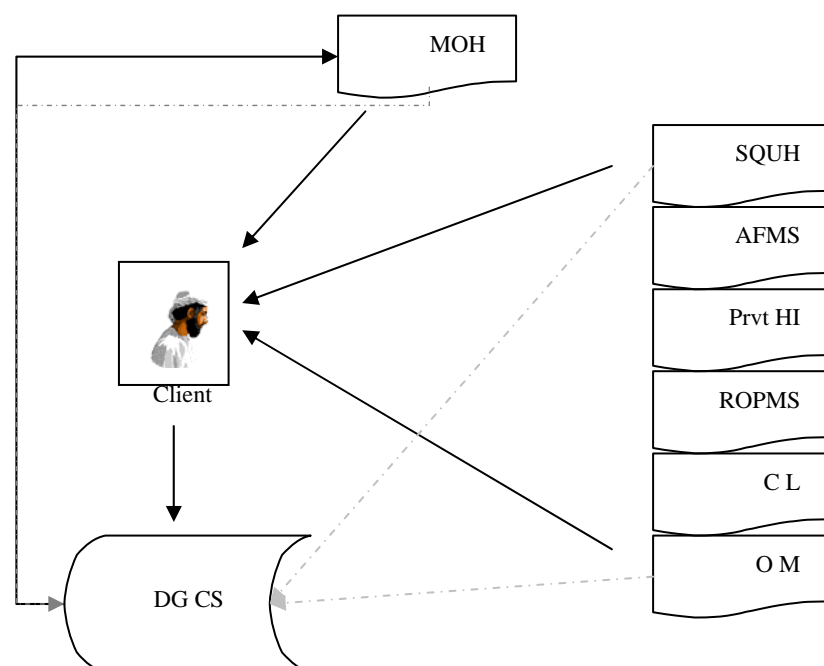
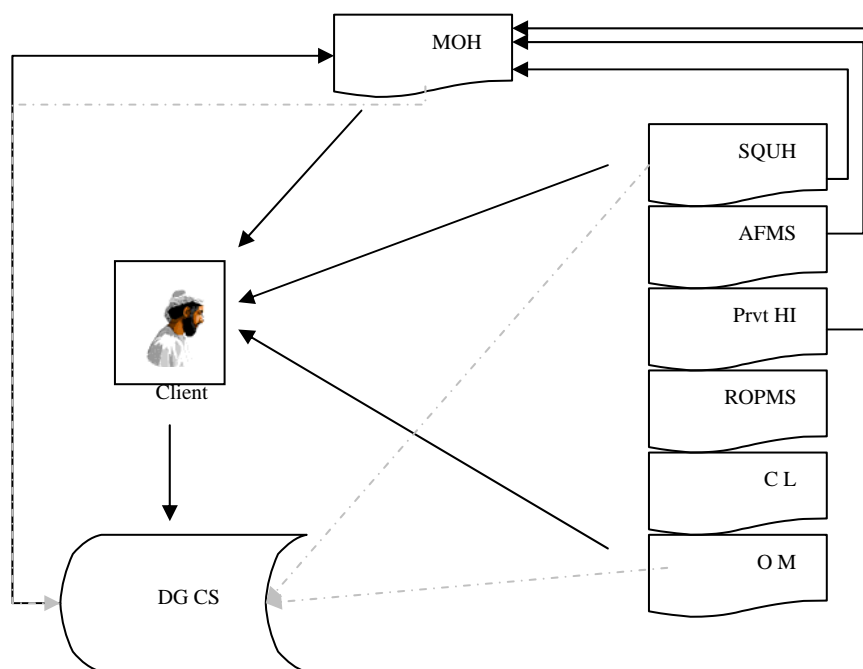


Figure 2: Flow of notifications of vital events as after some health care providers considered the electronic database for registering notifications – electronic copies of notifications made by health care providers other than MOH are sent directly to MOH



MOH: Ministry of Health; AFMS: Armed Forces Medical Services; Prvt HI: Private Health Institutions; ROPMS: Royal Oman Police Medical Services; CL: community leaders; OM: Omani Missions

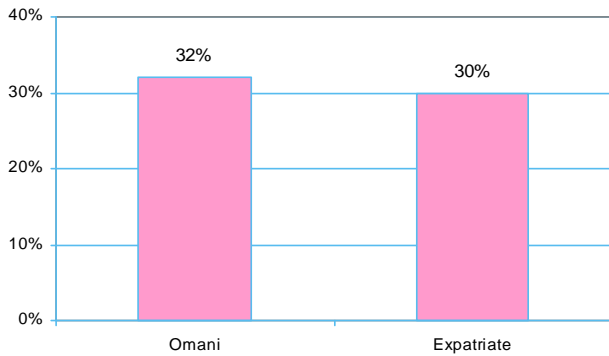
Assessment of 2006 data of vital events notification

Notifications of deaths during 2006 revealed a total of 5,412 Omani deaths (males 3,250 & females 2,162) in addition to 805 Expatriate deaths (647 males and 159 females). A total of 49,499 live births were registered (45,532 Omani live births).

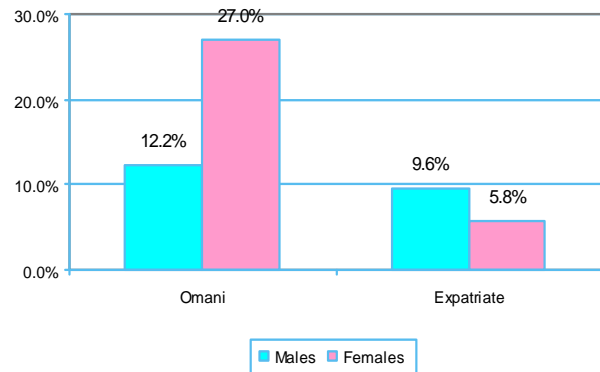
Data about births and deaths notified during 2006 were assessed for the availability of variables used for segregating the estimates namely age and sex in both the Omani and expatriate populations. Data showed that about one third of death events were not defined as whether they are males or females. Also 27% of Omani female deaths had their age missing. Missing age was reported in 12% of Omani males and less than 10% in Expatriate population (figure 6). Sex of newly born was missing in less than 1% while mothers' ages of live births were missing in about 14% among Omanis and 5% Expatriates (figure 7).

Plotting the natural log (ln) of the age specific death rates (figure 8) shows a usual pattern of high childhood deaths, low death rate among young adult which gradually rises with age. The pattern is clear in both males and females and is consistent with our knowledge of pattern of death with age.

Completeness of death notifications was then examined using Brass's growth balance method¹³. The data suggest that completeness of data is about 98% for males and 97% for females (figure 9). The same can be applied to non-Omani population).

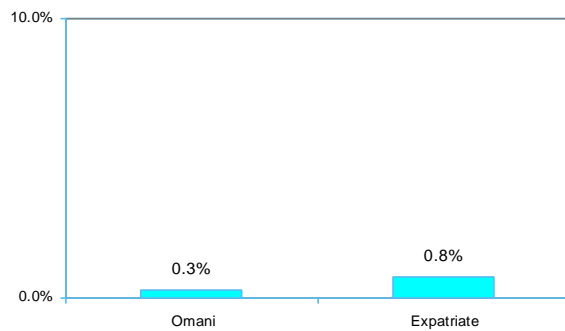


% Missing Gender Data

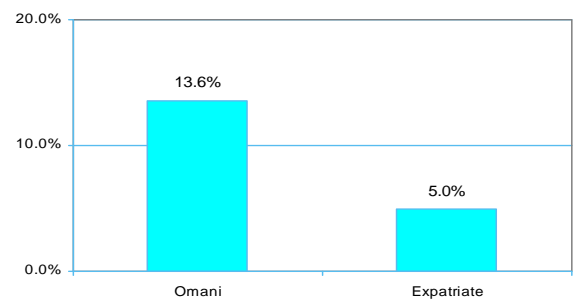


% Missing Age among Omani and Expatriates

Figure 6: Availability of Segregation Variables in 2006 Mortality Data



% Missing Gender Data of Newly Born



% Missing Mothers' Age among for Newly Born

Figure 7: Availability of Segregation Variables in 2006 Birth Data

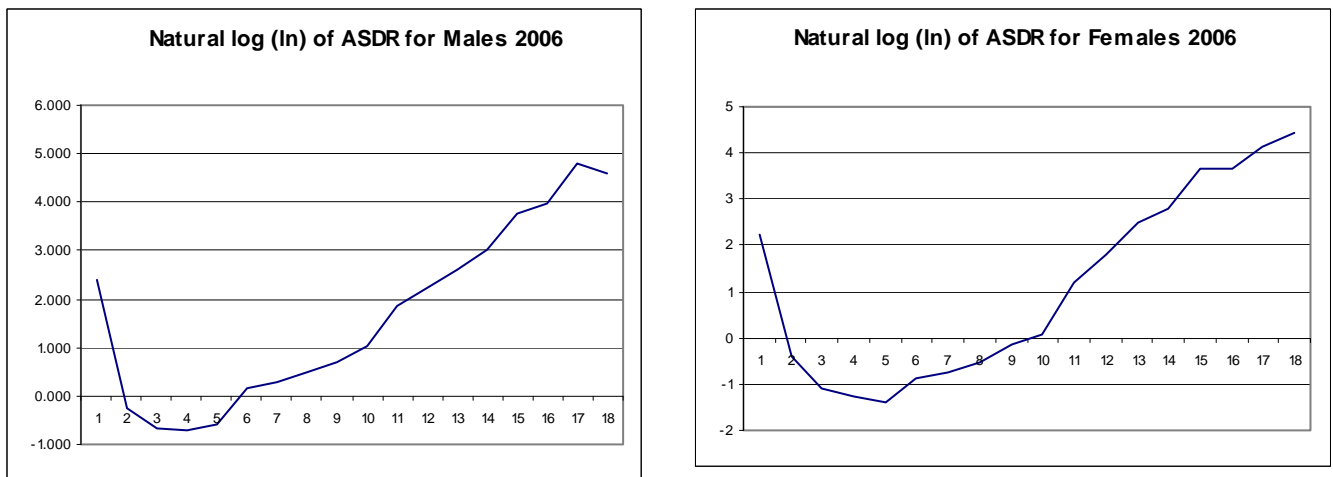
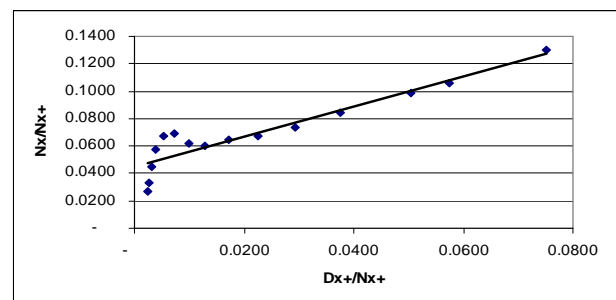
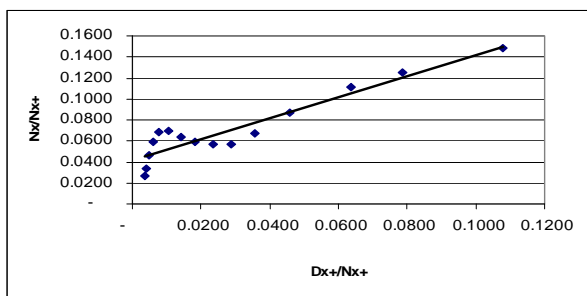


Figure 8: Plotting the natural log of ASDR to Assess Pattern of Deaths by Age



Female partial birth & partial death rates for Brass growth Balance

Male partial birth and partial death rates for Brass Growth Balance

Figure 9: Brass's Growth Balance Method to assess completeness of deaths registered in 2006

Tables 2 through 4 show the availability of example of mortality and fertility indicators segregated according to important parameters in the current system depending on survey estimates and projection in comparison to a system that is dependent on notification of vital events. It is clear that vital registration would provide plenty of information that were missing using the survey estimates.

Table 2: Availability of Mortality Indicators (Crude Death Rate – CDR and Life Expectancy at Birth (e_0) in the current estimating methods and Using the Notification System of Vital Events

	2006 Current estimate		2006 estimates using notifications of Vital events	
	Omani	Expat	Omani	Expat
CDR - Overall	2.48	Not available	2.9	1.2
CDR - Male	Not available	Not available	3.4	1.2
CDR- Females	Not available	Not available	2.3	1.1
e_0 - Overall	74.29	Not available	72.6	81.6
e_0 - Male	Not available	Not available	70.4	81.9
e_0 - Females	Not available	Not available	74.9	81.2
ASDR	Projected	Not available	available	available

Table 3: Availability of Mortality Indicators (Infant Mortality Rate – IMR and Under 5 Mortality Rate (U5MR) in the current estimating methods and Using the Notification System of Vital Events

	2006 Current estimate		2006 estimates using notifications of Vital events	
	Omani	Expat	Omani	Expat
IMR - Overall	10.25	Not available	10.1	8.1
IMR - Male	Not available	Not available	11	9
IMR- Females	Not available	Not available	9.2	7.1
U5MR - Overall	11.02	Not available	12.8	12.9
U5MR - Male	Not available	Not available	13.8	13.5
U5MR - Females	Not available	Not available	11.8	6

Table 4: Availability of Fertility Indicators (Crude Birth Rate – CBR, Total Fertility Rate - TFR and General Reproduction Rate – GRR) in the current estimating methods and Using the Notification System of Vital Events

	2006 Current estimate		2006 estimates using notifications of Vital events	
	Omani	Expat	Omani	Expat
CBR - Overall	24.17	Not available	24.2	5.7
CBR - Male	Not available	Not available	24.6	3.7
CBR- Females	Not available	Not available	23.7	13.4
TFR	3.19	Not available	3.19	1.03
Sex ratio birth	Not available	Not available	105.8	101.7
GRR (females)	Not available	Not available	1.55	0.51

Challenges

In spite the fact that civil registration is well established in the Sultanate of Oman only after 2 years from its established, there are still challenges that can affect its continuity. Notifications made by community leaders contain missing information. Although they are relatively few in number but still affect the completeness of the data. It is also not consistent across regions of the country and there bias in estimates would exist it attempts are made to have demographic indicators segregated by region. Reporting cause of death is one essential part of completing the notification form. This information is of utmost importance to examine epidemiological trends in the community. Reporting cause of death requires proper training of physicians and coders. Cases that are dead on arrival to institutions require special attention as they represent more than 40% of all deaths. Skills to do verbal autopsy is one important tool for health workers to identify cause of death in such cases.

The completeness of registering deaths requires that no burring take place without burial permit. However, for cultural reasons, burial permit is difficult to apply. It requires changes in cultural believes which requires sometime. Interventions to change attitude of the community towards registering vital events once it takes place should be considered.

Conclusion

The availability of notifications of deaths as part of the civil registration had allowed assessing completeness of data recorded in both genders separately and has assured high

coverage for both. It would allow estimating childhood and adulthood mortality as well as the construction of life tables for both males and females separately and for the Omani citizens as well as Expatriate population that represents almost one fourth of the total population. Data from registering vital events notifications would allow better estimate of fertility that would allow better projections for population growth and population health.

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