Sultanate of Oman
Ministry of Health

سلطنـــــة عُـــمـان
وزارة الصـــــحـــة

Health Vision 2050

THE MAIN DOCUMENT

الصحة في Health Vision 2050

Quality Care, Sustained Health

عناية راقية وصحة مستدامة

Health Vision 2050

The Main Document

Prepared by

Undersecretariat for Planning Affairs

Ministry of Health
Sultanate of Oman

First Edition

May 2014

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Preface

The Sultanate of Oman has made remarkable achievements in health development during the past 43 years represented by the percentage and speedy reduction in mortality, especially childhood mortality, and the control of communicable diseases. As highlighted by a number of international agencies, health developments in the country have been achieved efficiently.

Oman is currently described as a high income country. It is a large country with difficult terrain and an intricate topography, with high and rugged mountains and barren valleys. Its small population of 3.6 million, of which 42.2% are expatriates or non-nationals, is scattered over large areas of sparsely populated settlements. These factors, together with the population growth, present challenges to the provision of health services. Currently, non-communicable diseases pose a threat to the health of the Omani population. As life expectancy and the corresponding risks facing our elderly population increases, our health system should be able to evolve to respond to such needs. Our health system should also address the expectations of the people of Oman and acquire suitable technology for developing the health of the people.

Health systems in most countries aim to provide a comprehensive range of services to the entire population and to ensure that standards of quality, equity and responsiveness are maintained. Our aim is the same, although some of our approaches may vary. It was the responsibility of the Ministry of Health, with its capacity in health planning, to develop a framework for developing the health system in the Sultanate of Oman. Over the past 1.5 years, several scientific activities were implemented to develop a "vision" for the health system. A long-term vision for the next 40 years has been considered and is thus labeled "Health Vision 2050". The aim of "Health Vision 2050" is that the Omani people live healthy and productive lives through establishing a well-organized, equitable, efficient and responsive health system, grounded by societal values of equity and social justice and thus this document has the theme "Quality Care and Sustained Health".

I am happy to present this "Health Vision 2050" document in which we critically analyze the political, economic, social, technological, environmental and legal contexts in which the health system functions. We describe health achievements, health status and the expected epidemiological profile. We then critically review the six building blocks of the health system and lay down 28 visions.

I hope that "Health Vision 2050" document will be the basis for our next eight "Five-Year Health Development Plans". We expect that we will modify our visions as we develop and as new evidences for better approaches appear.

Dr Ahmed Mohamed AlSaidi
Minister of Health
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May 2014

Foreword

Health planning is of extreme importance for the operation and development of the increasingly complex health care systems. It is important to facilitate the decisions of health care providers, consumers and financing organizations and bring about changes in the structure and operation of the health care system to improve health care availability and accessibility. Health planning is thus a force for improving the health of the population.

To follow on the achievements made in health status in the Sultanate of Oman over the past 40 years, and with the aim of further health developments, Ministry of Health has developed a long-term vision for the development of the health system in Oman. It is trying to answer the question; how would we like our health system to be 40 years from now? Achieving such characteristics will depend on the availability of resources and technology at the time of developments and will be the responsibility of successive health development plans.

Our health visions were developed through a number of well-planned scientific activities. We extensively analyzed the environment in which our health system functions, namely the political, economic, social, technological, environmental and legal environments (PESTEL analysis). The current status of the Omani health system, the morbidity and mortality in the population, the challenges facing the health system, the expected future developments and the changes in the population including macro-social and macro-economic changes, were also analyzed. Working groups of national experts each developed a detailed strategic study in one of the domains of the health system, discussing challenges and their own future prospective. Ministries and organizations related to health, including the Parliament and State Council, were visited and working papers were developed and discussed. International experts in different fields of the health system and international organizations were invited to provide their views and prospects. Groups of the population were also consulted through meetings, media seminars and advocacy for health system reform and their feedback was taken into account during the development of the health visions.

Demographic analysis shows that the total population is expected to double and become slightly more than 7 million in 2050. The population is expected to age and the elderly population, aged 60 years and above, is expected to increase to about 13.1% of the Omani population, compared with 6.1% in 2012, and their absolute numbers will increase about five fold. The epidemiological profile is rapidly shifting to non-communicable diseases related to personal behaviors, together with inherited congenital anomalies and congenital blood disorders. Injuries from road traffic accidents and other injuries constitute a considerable burden because of premature deaths and permanent disabilities.

The current health care system in Oman is considered to be a national public health care model. Health services are predominantly financed and provided by the government sector. With such government commitment, the escalating costs of health care provision, expectations from the population, the required developments in human resources for health and health services, developments in medical products and technology, and sustainability of health care financing are of extreme importance and were extensively discussed as visions were developed.

The development of “Health Vision 2050” uses the “Everybody's Business: Strenghtening Health Systems to Improve Health Outcomes: WHO's Framework for Action" to describe the six building blocks of the health system: leadership or governance; financing; human resources for health; service delivery; information; and medical products, vaccines and technology. Each building block was extensively analyzed and visions were developed.

"Health Vision 2050" document has 11 chapters. The first four chapters analyze and describe the current health system and health status. Each of the six building blocks of the health system is analyzed and related visions are described in a chapter. The final chapter emphasized the importance of intersectoral collaboration in the future and how it will influence health improvements. It should be emphasized that the visions should be revisited as new evidence appears. I hope that health planners will consider “Health Vision 2050” as a framework for developing future health development plans.

Dr Ali Talib AlHinai
Undersecretary for Planning,
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May 2014

Abbreviations

AAQ	Ambient Air Quality
AFMS	Armed Forces Medical Services
ANC	Ante Natal Care
BMI	Body Mass Index
CBR	Crude Birth Rate
CCU	Coronary Care Units
CDR	Crude Death Rate
CQCL	Central Quality Control Laboratory
CSG	Community Support Group
DALYs	Disability-Adjusted Years Lost
DGMS	Directorate General of Medical Supplies
DGPA&DC	Directorate General of Pharmaceutical Affairs and Drug Control
DHIS	Directorate of Information and Statistics
DOMAS	Department of Mathematics and Statistics
DOTS	Treatment Under Direct Control
EHC	Extended Health Center
EPI	Expanded Program Of Immunization
GBD	Global Burden of Disease
GCC	Gulf Cooperative Countries
GDP	Gross Domestic Product
GEP	General Education Diploma
GII	General Inequality Index
GIS	Geographical Information System
GNP	Gross National Product
GYTS	Global Youth Tobacco Survey
HDI	Human Development Index
HEI	Higher Education Institution
HPI	Human Poverty Index
HRH	Human Recourses for Health
ICT	Information and Communication Technology
ICU	Intensive Care Unit
IF	Impact Factor
IHR	International Health Regulations
IMCI	Integrated Management of Childhood Illness
IMR	Infant Mortality Rate
ITA	Information Technology Authority
LDL	Low Density Lipoprotein
MDG	Millennium Development Goals
MENA	Middle East and North Africa
MMR	Maternal Mortality Rate
MOH	Ministry of Health
MPNHD	Managerial Process For National Health Development
MRMWR	Ministry of Regional Municipalities and Water Resources
MS	Medical Services
NEHS	National Elderly Health Survey
NGOs	Non-Governmental Organizations

NHA	National Health Account
NHSIS	National Health Statistics and Information System
NRI	Network Readiness Index
ODC	Oman Dental College
OECD	The Organization for Economic Co-operation and Development
OESHCO	The Oman Environment Services Holdings Company
OMC	Oman Medical College
OMSB	Oman Medical Specialty Board
OWHS	Oman World Health Survey
PAP smear	Papanicolaou test
PDOMS	Petroleum Development of Oman Medical Services
PEM	Protein Energy Malnutrition
PESTEL	Political, Economic, Social, Technological and Legal
PHC	Primary Health care
PLHIV	Person Living With HIV
PPP	Purchasing Power Parity
PPP	Public Private Partnership
RO	Rials Omani
ROPMS	Royal Oman Police Medical Services
RTA	Road Traffic Accident
SARS	Severe Acute Respiratory System
SCABU	Special Care Baby Unit
SHS	Second Hand Smoking
SMAM	Singulate Mean Age of First Marriage
SQU	Sultan Qaboos University
SQUH	Sultan Qaboos University Hospital
SWOT	Strengths, Weaknesses, Opportunities, Threats
TFR	Total Fertility Rate
THE	Total Health Expenditure
U.A.E	United Arab Emirates
U5MR	Under 5 Mortality Rate
UNDP	United Nation Development Program
UNICEF	United Nations Children's Fund
UON	University of Nizwa
WHO	World Health Organization
YLD	Years of Live Lost due to Disability
YLL	Years of Live Lost

Abstract

The health system in the Sultanate of Oman is characterized by its universal coverage for both citizens and expatriates. Total Health Expenditure (THE) accounts for 2.7% of Gross Domestic Products (GDP) in market prices. Health care is provided in facilities mainly owned and run by the Government. The Government covers about 81.1% of THE, providing 83.1% of hospitals, 92.5% of hospital beds, 62.2% of outpatient services and 94.5% of inpatient services. Out-of-pocket spending accounts for 11.6% of THE.

The Sultanate of Oman has made remarkable achievements in health development, particularly in the percentage and speedy reduction in mortality, especially childhood mortality, and the control of communicable diseases. These health developments have been achieved efficiently, as reported by the World Health Organization (WHO) in the "World Health Report 2000", and they have been praised by a number of other international organizations. However, over the past few years Oman has witnessed both a demographic and an epidemiological transition. The population of Oman is aging and the disease profile is showing a predominance of non-communicable diseases and injuries. Such a transition, together with worldwide advances in technology, has necessitated revising the health system.

"Health Vision 2050" is an attempt to visualize how we would like our health system to be in future until the year 2050. Predicting the future of health care delivery can be fraught with uncertainty and risk, especially with the number of determinants that affect health care: demographic, political, economic, social, technological, environmental and legal.

To visualize the health system development in the future, it is necessary to project population growth as well as the expected age structure. Population projections show that Oman is expected to have a total population of slightly more than 7 million in 2050. The elderly (60 years and above) are expected to represent 13.1% of the Omani population in 2050 compared with 6.1% in 2012. Details of the projected population growth are shown in Chapter 1. It is also necessary to extensively analyze different determinants of health and a political, economic, social, technological and legal (PESTEL) analysis is performed in Chapter 2. Chapter 3 defines what a health system is and briefly describes the health system in Oman. The current status of the Omani people in terms of morbidity and mortality as well as the expected challenges facing the health system, are presented in Chapter 4.

Chapters 5-10 present a background analysis of the health system blocks, together with the visions and proposed strategic actions. Chapter 11 discusses intersectoral partnership and collaborations, and related visions and actions. A total of 28 visions are presented and discussed with justifications and related strategic actions.

Introduction

Health Vision 2050 الصحة في

Quality Care, Sustained Health

عناية راقية وصحة مستدامة

Introduction

The Sultanate of Oman evolved to become a modern country with state-of-the-art services under the rule of Sultan Qaboos, which began in 1970. Oman is currently described as a high-income country (1) with a gross domestic product (GDP) at current prices of US$78,212.5[i] million (Rials Omani (RO) 30,033.6 million) in 2012 (2). GDP per capita was US$21,587.7[i] (RO 8,289.7) in 2012 (3). It is a large country with difficult terrain and an intricate topography with high and rugged mountains and barren valleys. Its small population of 3.6 million, of which 42.2% are expatriates or non-nationals, is scattered over large areas in sparsely populated settlements (3).

Oman's Basic Statute of the State (issued in November 1996 by decree 101/96) states in Article 12 "The State guarantees assistance for the citizen and his family in cases of emergency, sickness, disability and old age according to the scheme of the social security and shall work for the solidarity of the society in bearing the burdens resulting from national disasters and catastrophes." Also "The State cares for public health and the means of prevention and treatment of diseases and epidemics. It endeavors to provide health care for every citizen and encourages establishing private hospitals, polyclinics and medical institutions under its supervision and according to regulations determined by the Law. It also works for; the conservation of the environment, its protection and prevention of pollution" (4). The Government is committed to providing health services and care free of charge. The health care system in Oman is considered to be a national public health care model. Health services are predominantly financed and provided by the government sector. It is characterized by its universal coverage. All citizens and non-nationals working in the public sector have coverage with services financed and provided by the public sector. Private sector sponsors are responsible for paying medical care cost for their non-national employees (employer mandate).

In 42 years, the infant mortality rate has dropped to less than one-tenth of its value and the under-five mortality rate to one-sixteenth. Today, these rates are just 9.9 and 12 per 1,000 live births, down from 118 and 181, respectively. The average life span in Oman has also dramatically increased from only 49 years in 1970 to as high as 72.6 years today (see page 55). Oman's health indicators are approaching the Organization for Economic Cooperation and Development's (OECD) levels.

Geographical Characteristics of Oman

The Sultanate of Oman is located in the south eastern corner of the Arabian Peninsula (Figure 1). It has a coast line extending almost 3,165 km from the Strait of Hormuz in the north to the borders of the Republic of Yemen, overlooking three seas: the Arabian Gulf, Oman Sea and the Arabian Sea in the south. Oman borders Saudi Arabia and United Arab Emirates (U.A.E.) in the west, the Republic of Yemen in the south, the Strait of Hormuz in the north and the

[i] Exchange rate: US$ 1 = RO 0.384

Arabian Sea in the east. There are also a number of scattered Omani islands in the Arabian Sea, the most important of which are Masirah and Al-Halaniyat islands (5).

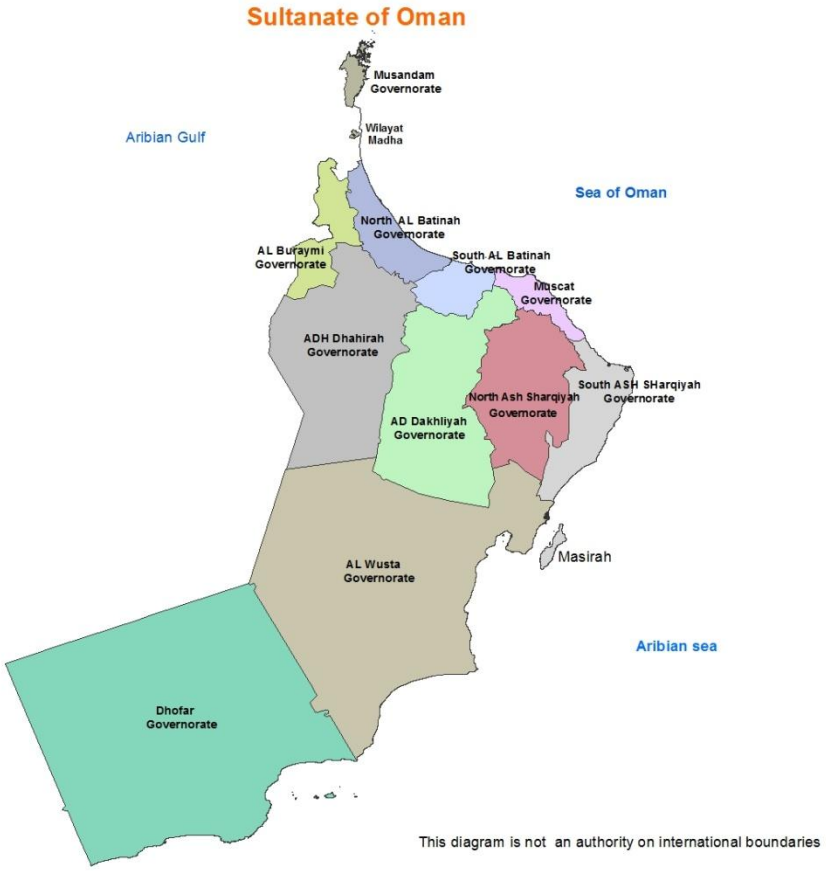


Figure 1: Diagrammatic Presentation of Sultanate of Oman
Source (6)

The total area of Oman is approximately 309,500 km^2. The country is composed of varying topographic areas, consisting of plains, wadis (dry river beds) and mountains. The most important area is the plain overlooking the Oman Sea and the Arabian Sea, which make up about 3% of the total area of Oman. Mountain ranges occupy almost 15% of the total aa of he country and are inhabited by about 5% of the population. The remaining areas are mainly wadis and desert (about 82% of the total area). The climate differs from one area to another: it is hot and humid in coastal areas in summer, and hot and dry in the interior with the exception of the higher mountains and the Dhofar Governorate, which enjoy a moderate climate throughout the year.

The Sultanate of Oman is administratively divided into 11 governorates with 61 wilayats (districts). Each governorates is considered a health region. These governorates are: Muscat, Dhofar, Musandam, AlBuraymi, AdDakhliyah, North AlBatinah, South AlBatinah, South AshSharqiyah, North AshSharqiyah, AdhDhahirah and Al Wusta (7).

The difficult topography of the country, together with the sparse distribution of the population, has made if difficult for the health system to provide accessible health services. The mountains form a belt between the coast and the desert from Musandam peninsula in the north to the city of Sur, creating a major barrier between the mostly inhabited coastal areas

and other parts of the country. A major part of the desert (AlRub AlKhali) is difficult to cross with modern desert transport and this also form a barrier between some areas of the country. Such topography makes it difficult to reach scattered pockets of population living in these areas. Mobile teams are utilized to provide basic health care in these areas; however, environmental conditions in these areas are difficult and the transfer of patients, especially critically ill patients, from their places to advanced levels of health care is difficult and costly.

Aim of Health Vision 2050

Health Vision 2050 describes the vision for health system development over the coming 40 years. It provides a review of the current health system in Oman as the basis for the development of a long-term health vision for 2050. The aim of Health Vision 2050 is for the Omani people to live healthy and productive lives, through the establishment of a well-organized, equitable, efficient and responsive health system, grounded by societal values of equity and social justice.

Health Vision 2050 tries to answer the question: how would we like our health system to be 40 years from now? Forty years is a long time and it is difficult to predict how developments in technology and other aspects in the rapidly evolving health field will take place. Whatever developments or changes occur over this time, what characteristics would we like to see in our health system at the end of this period? Achieving such characteristics will then depend on the availability of resources and technology at the time of the developments, and will be the responsibility of successive development plans. These future health system characteristics are our visions for the health system in 2050. Of course, there must be a balance between dreams and reality and we try to be realistic and develop "achievable visions".

Since it is difficult to predict what the world and medical technology will look like 40 years from now, how did we develop such visions? It was first necessary to analyze the current status of the Omani health system, the morbidity and mortality in the population, the challenges facing the health system and the expected future developments and changes in the population including macro-social and macro-economic changes. We formed 14 working groups of national experts; each group developed a detailed working paper in one domain of the health system in Oman, discussing the challenges and their own future prospective. A list of these working papers is found in the Appendix. Teams of national experts visited all the ministries and organizations related to health including the Parliament and State Council. Working papers from the ministries and organizations, describing their views on the current and probable future determinants of health outcomes, were presented and discussed with representatives from the health sector in a national preparatory workshop on 1-3 April, 2012.

International experts in different fields of the health system and international organizations were then invited to an international conference "Oman Health Vision 2050", sponsored by the Ministry of Health on 1-3 May, 2012. Key workers in the Omani health system made up the conference audience. International experts gave their views and prospects for different areas related to health systems and health system reforms. Experience of health system reforms from other countries such as New Zealand, Scotland and Singapore were described. Other aspects of the health system discussed include: international organizations' views on forthcoming challenges such as non-communicable diseases; equity in health; health system

research; health economics and health system financing; the burden of diseases; health system efficiency; patient-centered health services and hospital quality and future trends in allied health professions. Twelve concurrent discussion groups took place in the afternoons of the 3 days of the conference. Each discussion group was chaired by local and international experts and thoroughly discussed the national working papers. The results of these discussions were considered carefully during the development of the health system visions. Characteristics of other health systems in the world, especially developed health systems, were also reviewed and considered while developing the health system visions. Finally, the public was consulted through meetings with college students and through media seminars, in which advocacy for health system reform was discussed, and feedback from the public was taken into consideration.

A national steering committee headed by H.E. the Undersecretary of Planning Affairs and composed of national health system experts was formulated to lead the development of "Health Vision 2050". The committee decided that analysis of the health system should be based on "WHO Framework for Action on Health System" to describe the six main building blocks of the health system: leadership or governance; financing; human resources for health; service delivery; information; and medical products, vaccines and technology. The committee also commissioned multi-disciplinary groups of experts from the Ministry of Health at both national and governorate levels, related ministries, health institutes, universities and representatives from the private sector to produce strategic studies covering different aspects of health and the health system, namely primary health care; non-communicable diseases; elderly care; nutrition; maternal and child health; health facilities development; secondary and tertiary health care; the pharmaceutical sector; health and medical technology; health research; human resources for health and health professions education. Each study was reviewed by an independent review committee to ensure its quality, consistency and alignment with the guiding framework. While the strategic studies looked at strengths, weaknesses, opportunities and threats (SWOT method) to analyze the situation of the health area being studied, "Health Vision 2050" takes this a step further and analyze all the factors that affect the health system: political, economic, social, technological, environmental and legal factors (PESTEL analysis). Figure 2 illustrates the process of situation analysis.

As a side activity, additional working groups were formed to document health developments that have taken place since the start of the Renaissance in 1970. The documentation processes described Oman's experience in developing its health system and improving the health of the people. Eleven documentations were developed, covering various aspects of the health system.

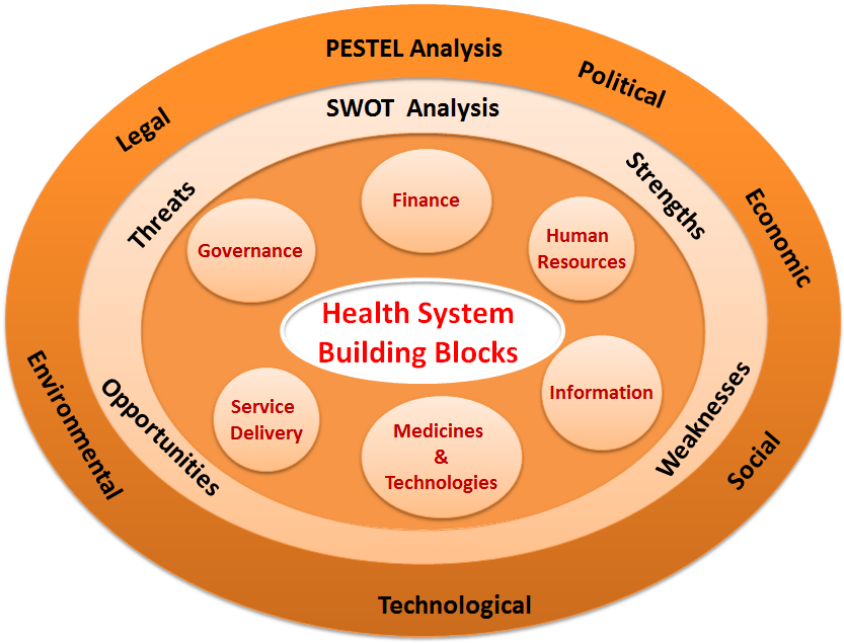


Figure 2: Illustrative diagram to summarize analysis of current health system and health status

Health Vision 2050 considers the strategies developed in these strategic studies, as well as the experience of health development in the documentation studies. The diagram in Figure 3 illustrates the evolution of Health Vision 2050.

Figure 3: Illustrative diagram showing the development of Health Vision 2050

A number of thoughts were raised during the process of reviewing the existing health system, national and international experts' views and the public concerns. These thoughts were taken into consideration in stating the vision for the health system in Oman in 2050. They can be summarized as follows:

- An unhealthy society results in considerable economic and social costs. A healthy society living a longer life is more productive and can deliver economic benefits. The objective of future developments in the **health care system is to enhance the health of Omani society** to the best reachable status.

- In light of the projected demographic changes in terms of population growth and aging, the change in disease pattern to non-communicable diseases, together with the increase in the cost of scientific progress and acquiring medical technologies; we have to make **financial and legislative arrangements** to face such changes.

- Health systems across the world, including ours, are facing the challenge of **escalating costs of health care**. The health system has to find ways to contain the remorseless rise in the cost of providing health care together with the paradigm to improve quality care.

- We also have to change how people live: Omanis have to have more awareness of the value of health and that prevention is better than cure. A healthy lifestyle will protect against painful, costly and long-term treatments. The **promotion of health** is of extreme importance for the healthy future of the Omani population.

- There must be a strong emphasis for a national policy that secures high quality standards of health care and knowledge support for clinical professionals as well as other health and social care professionals. Future policy should consider financial arrangements to **incentivize quality care and outcome-based budgeting** of health care facilities.

- In view of the rapidly increasing pressures from the non-communicable diseases; the increased financial requirements and the increased expectations of health care services to control such diseases, together with the fact that hospitals are one element in a wide health care delivery system; there is an increasing need to move the health care out of the hospitals and closer to the patients. Future health policies should consider providing more **specialist services** in community settings, developing primary care services to include diagnostics and services for people with long-term conditions, and developing community support for patients with chronic diseases. Primary care and community support should strongly address promoting positive health determinants. These later would reduce expensive hospital utilization. Integrating preventive and curative services is necessary for prevention strategies. Primary care and community support should be apexed by highly specialized curative care hospitals to ensure self-reliance and sustainability of the health system.

- The past decade has brought a number of discoveries and medical advances that have influenced medicine and opened up possibilities beyond what doctors thought was possible years ago. Human genome discoveries and understanding genetic causes and

links to disease, will change **disease prevention strategies**, and reduce the cost of medical care and the burden on hospitals.

- The health system in Oman was originally designed to address communicable diseases and has partially developed to address the increasing burden from non-communicable diseases that were managed essentially in hospitals. As the emerging non-communicable diseases need to be managed on an ongoing basis, the health system should be developed, along with the existing health care processes and models, to respond to the ongoing needs of such patients. There is a need for individual patients to be involved in their own management, as such an approach results in patients being more committed to adhering to their treatments and making behavior changes. Aspects of this "**patient-centered**" approach will promote greater patient responsibility, optimal use of services, improve health outcomes and cost efficiency.

- The health of the people requires that the health system is sensitive and responds to their needs, irrespective of their location, age, sex or socioeconomic status. Examples of peoples' needs include: service accessibility, short waiting times for referrals and treatment, extending targets to new types of care to reduce seeking medical care outside the country and patient safety. **Equity** should not only be in health care provision and accessibility but also should include sharing information that is secure, understandable and available to everybody, again, irrespective of their location, educational capabilities or socio-economic situation.

- A healthy population should be defined in broader terms than merely prevention of diseases. A protective environment and empowering families and members of the community to make decisions for their best health are essential for health. Inter-sectoral collaboration among health-related sectors is essential for healthy population. Future health care policy should accommodate and enhance patient choice for health care; as choice of location for receiving health care, choice of place of childbirth, choice of health care provider, and greater choice of treatment options to patients with long-term conditions. Peoples' choices are dependent on their knowledge about their health and the services available. **Transparency** of the health system should be incorporated in any future health policy.

- Health outcomes are mainly dependent on the **performance of health workers**. Health workers need to have the capacity to provide appropriate quality care. We realize that capacity relates to the degree that professionals possess task-relevant skills, abilities, knowledge and experience. The degree of desire and motivation of workers to exert efforts to attain particular levels of outcome are affected by a number of factors including low pay, stress, workload, working condition and poor image.

- **Collaboration among public health providers** is essential for running an efficient health system. Such collaboration avoids duplication of health services among different public health care providers and results in optimum use of services. Public and private partnerships and subcontracting should also be considered.

- The health system should focus on **outcomes as well as processes**.

- Health systems across the globe are facing a digital revolution that would turn the known and usual treatments to other new ones. Information technology and telemedicine have contributed to **changing the concepts of health managements** in the past few years and are expected to contribute to further changes. New medical knowledge will be developed and distributed faster than before. New medical fields will emerge and be accessible; genetic research is just an example. Tissue regeneration has potential for treating a variety of conditions, such as tissue-engineered heart valves replacing diseased ones, re-engineering blood vessels to replace damaged or blocked ones and to treat neurodegenerative diseases. Sustaining the health system in the future requires learning how to handle, keep up with and implement these information and communication technologies, the use of e-health, the many new coming developments and advances in research in the field of health and medicine.

- Technology in medicine ranges from simple devices to sophisticated ones such as pacemakers, heart-lung machines, dialysis machines, diagnostic equipments, imaging machines and even artificial organs and advanced prosthetics. These all were the result of advances in biomedical engineering that uses concepts of engineering in providing health care. The health system cannot be sustained if it is not updated with these technologies. Forefront **workers in the health system, i.e. physicians, nurses, laboratory technicians, radiographers and other paramedics, should be able to handle and keep up to date with such technologies**. The efficient use, maintenance and further developments of such technologies are essential for health system sustainability.

- The world has witnessed a revolution not only in communications, but also in travel facilities which is expected to advance further. There is a necessity that **health systems across the globe be able to work together** to insure health of the people when travelling and prevent global health threats.

- It has been seen that international hygiene reaches beyond the political boundaries and cooperation among health systems across the globe is essential to face the scourge of the communicable diseases. Today's interconnected world requires that **national legislation consider the global public** health. The health system should address globalization of the legislations or the international health regulations (IHR), to maintain and continuously strengthen its surveillance systems and be increasingly transparent to prevent and protect against global public health threats.

- Oman is a large country with a scattered population distribution. **Decentralization** in managing health services will allow identification of emerging needs of local communities. Decentralization in managing staff will allow periodic review of their social needs and requirements. However, decentralization of highly specialized care may affect the efficiency of the health system and this may require **centralization of certain identified specialty services**. A well-developed ambulance system would thus be needed after the centralization of certain specialties. This will also help to improve outcomes of non-communicable diseases and accidents.

- Last but not least, we realize that change takes time as advances in concepts and technology percolate slowly into health systems. Changes will, thus, need to go into phases. Sustain achievements, conceptual change and innovative ideas, and changes implantation are phases of the change.

The thoughts above are crystallized in the following core guiding values and principles, upon which our visions are developed:

Universal coverage: all people living in Oman will have access to quality health services that are equitably distributed, with freedom to choose health care provider.

Rights-based approach: health is a social right for every individual living in Oman and the health system will be responsive to the needs and rights of the individual.

Quality: clinical governance, a patient-centered approach and client satisfaction will be insured.

Integrated service delivery: the management and delivery of health services will ensure that clients receive a continuum of preventive and curative services, according to their needs over time and across different levels of the health system.

Efficiency: resources will be utilized efficiently to improve health system performance.

Innovation and creativity: the health care delivery system will be able to respond to dynamic changes associated with globalization, socioeconomic development and technology.

Evidence-based approach: all health policies, planning, decisions and interventions will be informed by evidence.

Ethics and professionalisms: high levels of professional values and ethics will be maintained.

Social accountability: current and future health needs and challenges will be responded to.

Effective partnership: all related sectors and partners will contribute to addressing the social determinants of health.

Solidarity: each stakeholder and beneficiary will contribute to the development of the health system based on their capacity.

Health Vision 2050 is expected to be re-visited regularly over defined periods of time to re-assess the validity of the vision with the emerging evidence and technology development. Figure 4 shows that the vision will be translated into actions to be implemented during the Five-Year Health Development Plans and will be regularly re-visited and assessed at given periods.

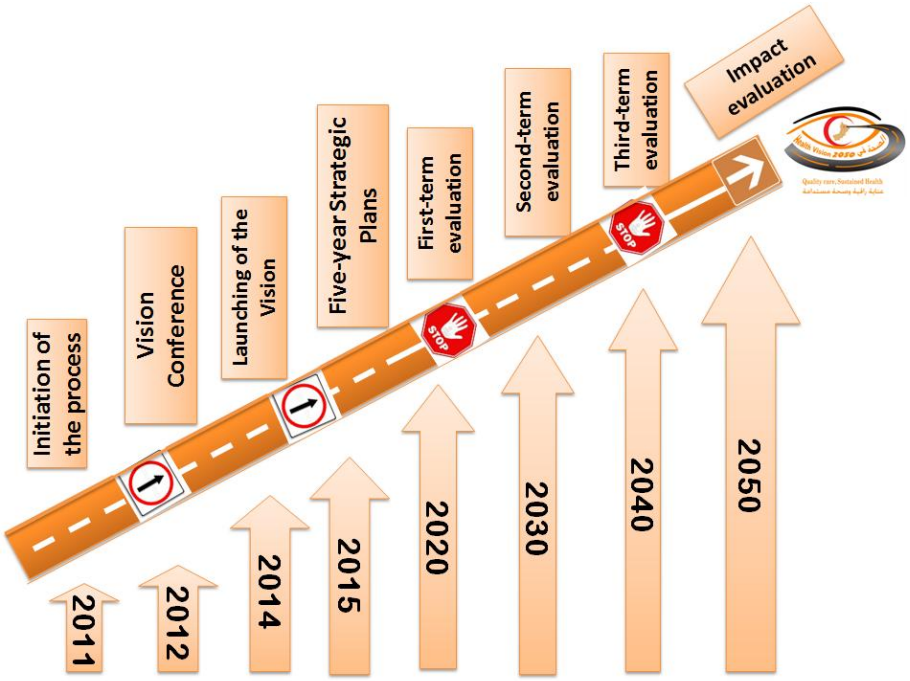


Figure 4: Health Vision 2050 milestones

Health Vision 2050 comes into 11 chapters. Chapter 1 describes in detail the current population of Oman: its size and characteristics and the expected changes in the future. The political, legal, socioeconomic, technological and environmental determinants that may affect how the health system in Oman will function and its outcomes are described in Chapter 2. Chapter 3 defines what a health system is, and briefly describes the health system in Oman. The health status of the Omani people is described in detail in Chapter 4. Chapters 5-10 describe the six building blocks of the health system in Oman: governance, finance, health services, human resources for health, medical equipments and products and information technology. Each chapter discusses the current status of the respective block, related challenges, and vision for development until 2050. Chapter 11 discusses how inter-sectoral collaboration in the future will influence health improvements.

Chapter 1
Demographic Characteristics of the Sultanate of Oman

Quality Care, Sustained Health

عناية راقية وصحة مستدامة

Chapter 1

Demographic Characteristics of the Sultanate of Oman

The Sultanate of Oman has had three censuses in 1993 (8), 2003 (9) and 2010 (10). The first "General Census of Population, Housing and Establishments" was carried out in the Sultanate of Oman in December 1993 and the second in December 2003. According to the first census in 1993, the total population of Oman was 2,018,074, of which 534,848 were non-nationals (expatriates) (about 26.5%). The second census in 2003 showed a total population of 2,340,815, of which 559,257 were non-nationals representing 23.9% of the total population. The 2003 census showed that 95% of the enumeration areas had population less than 1,000 individuals and were inhabited by only 17% of the population. According to the third census carried out in December 2010 the total population has grown to 2,773,479 with about 29.4% non-nationals. Before the first census, demographic information and population estimates and projections were based on survey results such as the "1986 Child Mortality Survey" (11) and the "Child Health Survey" conducted during 1988 (12).

The average annual population growth rate was reported to be 1.5% for the total population (1.8% for the Omani population and 0.4% for the non-national population) between the first two censuses (1993-2003). The 2010 census showed that the population has grown by 2.4% annually since 2003 (1.3% for the Omani population and 5.5% for the non-national population). The big growth of the non-national population can be explained by the enormous number of huge projects under progress in the country requiring additional workforce.

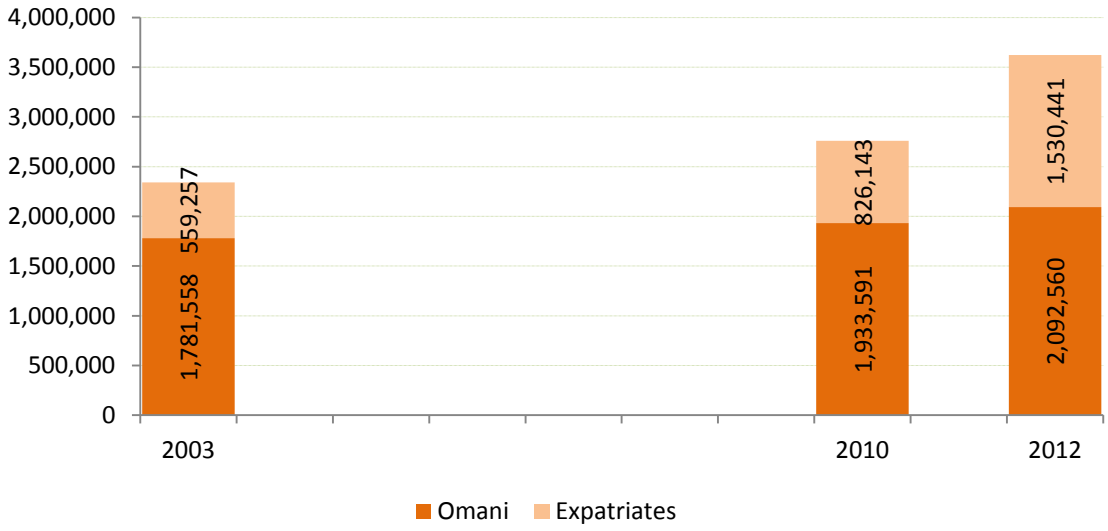


Figure 5: Population growth between the 2003 and 2010 censuses and the population in 2012
Sources: (9), (10), (13)

Mandatory registration of births and deaths was articulated by decree 66/99 issued in October 1999 (14) as part of civil registration. Civil Status Department in the Royal Omani Police was

nominated to be responsible for civil registration. The actual implementation of mandatory birth and death registration began in May 2004. The population size in 2012 was published as the size of the population registered by the Civil Status (13). The population size in 2012 was reported to be 3,623,001, of whom 42.2% were non-nationals. The data show that the total population had increased by about 31% since 2010 with an average annual growth rate of 14.3%; the Omani population had grown annually by 3.4% and the Expatriate population by 36.9% (

Figure 5). Under-enumeration in the 2010 census is a possible explanation for the large increase in population size in the past 2 years.

Age-Sex Structure of the Current Population

Although the Omani population is aging it is still a young population. Currently, it has a median age of 20.9 years compared with 12.1 years in 1993 and 15.8 years in 2003 (Table 1). Such data show that half of the population is below the age of 21 years. About 33.7% of the population is currently aged below 15 years and only 6.1% are aged 60 years or above (3).

Table 1: Selected demographic indicators

Demographic Indicator (for Omani Population)	2000	2005	2010	2012
Omani Population (000)	1,778	1,843	1,934	2,093
Median age (years)		15.8[a]	19.9	20.9
% Females	49.3%	49.5%	49.4%	49.2%
Females aged 15-49 years (% of Omani population)	23.5%	26.9%	28.9%	27.1%
Married Females (% of females 15-49 years) [c]	50.2%	50.2%	42.9%	42.9%
Age Dependency Ratio ((below 15+ 65 & above)/(15 to 65)	87.0%	70.0%	63.0%	61.4%
Age group (18-24 years) (% of Omani population)	24.9%	18.9%	18.2%	16.3%
% Below 15 years	43.2%	38.9%	35.3%	33.7%
% 60 years and above	4.8%	3.5%	5.2%	6.1%
Average Family Size	8.7	8.0[a]	7.8	8.1[b]

[a] Data for 2003
[b] Data for 2011, Source: (15)
[c] Source: (3)

The details of the age-sex structure for both Omnis and Expatriates are shown in Table 2 (13). Table 3 shows the cumulative distribution of the estimated population of 2012. The Omani population has a sex ratio of 103.2 males for every 100 females; in other words males constitute 50.8% of the Omani population. However, about 83% of the Expatriate population is male resulting in a sex ratio of 487.1 males for every 100 females. Population pyramids for Omani and Expatriate populations are shown in Figure 6. The severely skewed distribution of the Expatriate population is the result of expatriate male single workers in the country. This resulted in a skewed distribution of the total population clearly evident in Figure 7. Further analysis shows that the numbers of Expatriate males in the age group 20-59 years exceed the number of Omanis in the same age group; however, this is not the case in females (Figure 8). The nature of population skewness as presented before has both social and economic impacts that have to be considered in developing a health vision for 2050.

About 27% of the Omani population is female in the age group 15-49 years and currently married females represent about 42.9% of this group. Children aged less than 5 years

represent about 13.9% of the Omani population. The latter two groups; females aged 15- 49 years and children below 5 years of age, constitute about 41% of the Omani population and are potentially high risk groups, which, the health system currently has to care for.

Table 2: Population as registered in the Directorate General of Civil Status (mid-2012)

	Omani Population			Expatriate Population			Total Population		
	Males	Females	Total	Males	Females	Total	Males	Females	Total
0-4	148,368	143,073	291,441	16,038	15,362	31,400	164,406	158,435	322,841
5-9	114,540	110,523	225,063	17,929	16,712	34,641	132,469	127,235	259,704
10-14	96,711	91,941	188,652	14,576	13,360	27,936	111,287	105,301	216,588
15-19	118,754	111,452	230,206	9,557	8,423	17,980	128,311	119,875	248,186
20-24	126,158	121,668	247,826	136,043	25,817	161,860	262,201	147,485	409,686
25-29	115,848	112,934	228,782	322,785	47,838	370,623	438,633	160,772	599,405
30-34	90,210	89,228	179,438	244,894	42,013	286,907	335,104	131,241	466,345
35-39	61,793	59,876	121,669	172,550	36,436	208,986	234,343	96,312	330,655
40-44	42,124	39,785	81,909	135,047	23,516	158,563	177,171	63,301	240,472
45-49	32,906	33,021	65,927	89,668	14,220	103,888	122,574	47,241	169,815
50-54	28,884	30,846	59,730	61,033	8,756	69,789	89,917	39,602	129,519
55-59	20,744	24,068	44,812	35,704	4,312	40,016	56,448	28,380	84,828
60-64	17,732	18,666	36,398	10,606	1,963	12,569	28,338	20,629	48,967
65-69	14,804	14,653	29,457	2,395	908	3,303	17,199	15,561	32,760
70-74	13,342	11,951	25,293	583	488	1,071	13,925	12,439	26,364
75-79	9,238	7,085	16,323	237	288	525	9,475	7,373	16,848
80+	10,758	8,853	19,611	124	260	384	10,882	9,113	19,995
Unknown	4	19	23	0	0	0	4	19	23
Total	**1,062,918**	**1,029,642**	**2,092,560**	**1,269,769**	**260,672**	**1,530,441**	**2,332,687**	**1,290,314**	**3,623,001**

Source: (13)

Table 3: Ascending cumulative distribution of estimated population of 2012

	Omani Population			Expatriate Population			Total Population		
	Males	Females	Total	Males	Females	Total	Males	Females	Total
0-4	14.0%	13.9%	13.9%	1.3%	5.9%	2.1%	7.0%	12.3%	8.9%
5-9	24.7%	24.6%	24.7%	2.7%	12.3%	4.3%	12.7%	22.1%	16.1%
10-14	33.8%	33.6%	33.7%	3.8%	17.4%	6.1%	17.5%	30.3%	22.1%
15-19	45.0%	44.4%	44.7%	4.6%	20.7%	7.3%	23.0%	39.6%	28.9%
20-24	56.9%	56.2%	56.5%	15.3%	30.6%	17.9%	34.2%	51.0%	40.2%
25-29	67.8%	67.2%	67.5%	40.7%	48.9%	42.1%	53.0%	63.5%	56.8%
30-34	76.3%	75.8%	76.1%	60.0%	65.0%	60.9%	67.4%	73.7%	69.6%
35-39	82.1%	81.6%	81.9%	73.6%	79.0%	74.5%	77.5%	81.1%	78.8%
40-44	86.0%	85.5%	85.8%	84.2%	88.0%	84.9%	85.0%	86.0%	85.4%
45-49	89.1%	88.7%	88.9%	91.3%	93.5%	91.7%	90.3%	89.7%	90.1%
50-54	91.9%	91.7%	91.8%	96.1%	96.8%	96.2%	94.2%	92.8%	93.7%
55-59	93.8%	94.1%	93.9%	98.9%	98.5%	98.8%	96.6%	95.0%	96.0%
60-64	95.5%	95.9%	95.7%	99.7%	99.3%	99.7%	97.8%	96.6%	97.4%
65-69	96.9%	97.3%	97.1%	99.9%	99.6%	99.9%	98.5%	97.8%	98.3%
70-74	98.1%	98.5%	98.3%	100.0%	99.8%	99.9%	99.1%	98.7%	99.0%
75-79	99.0%	99.1%	99.1%	100.0%	99.9%	100.0%	99.5%	99.3%	99.4%
80+	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Unknown	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Total	**1,062,918**	**1,029,642**	**2,092,560**	**1,269,769**	**260,672**	**1,530,441**	**2,332,687**	**1,290,314**	**3,623,001**

Source: (13)

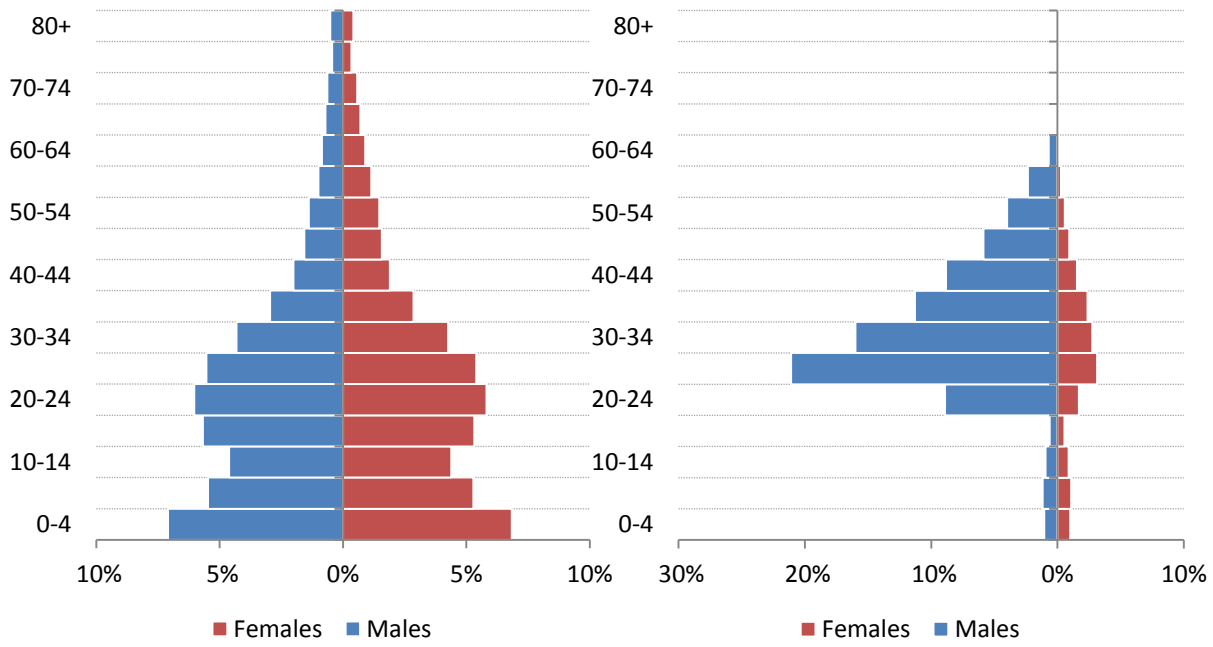


Figure 6: Population pyramid of mid-2012 population
Omani (left) and Expatriates (right)

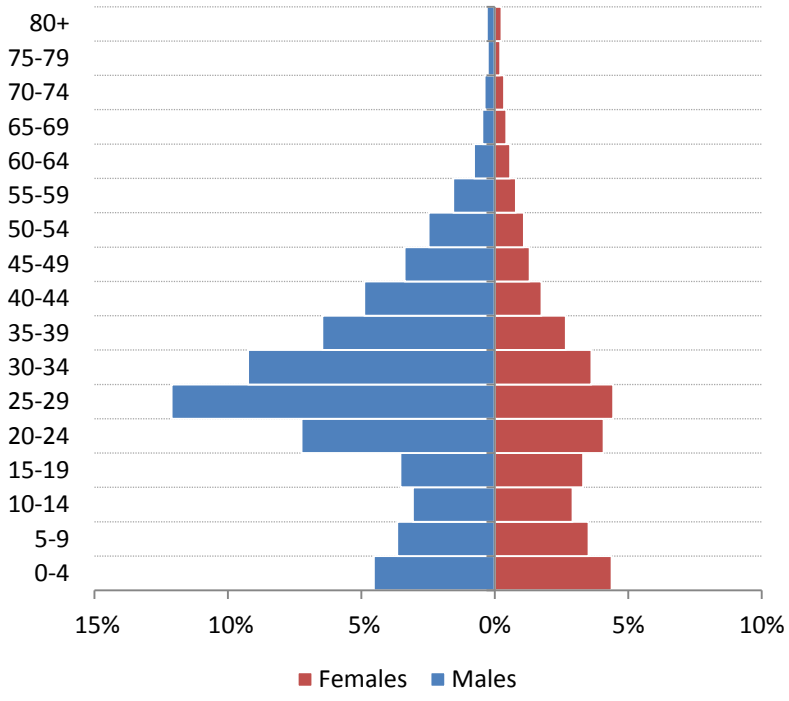


Figure 7: Population pyramid for mid-2012 total population (Omanis and Expatriates)

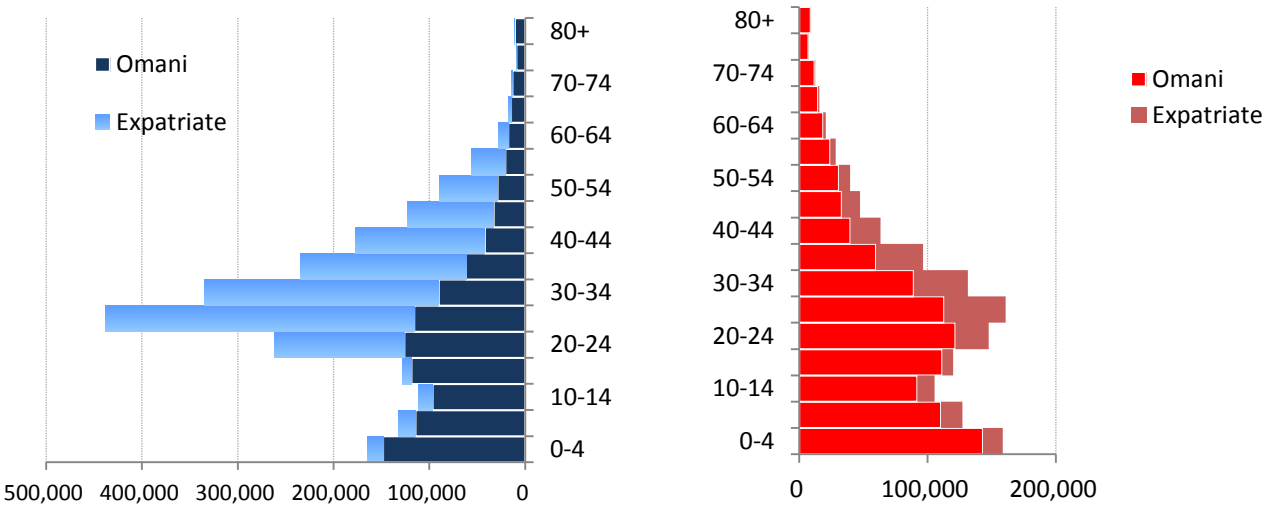


Figure 8: Total population distribution
(Omani in dark, Expatriate in light), Bars are stack e.g.in the age group 25-29, total males are about 439 thousands where Omanis are 116 thousands and expatriates are 323 thousands; total females are about 161 thousands where Omanis are 113 thousands and expatriates are 48 thousands)

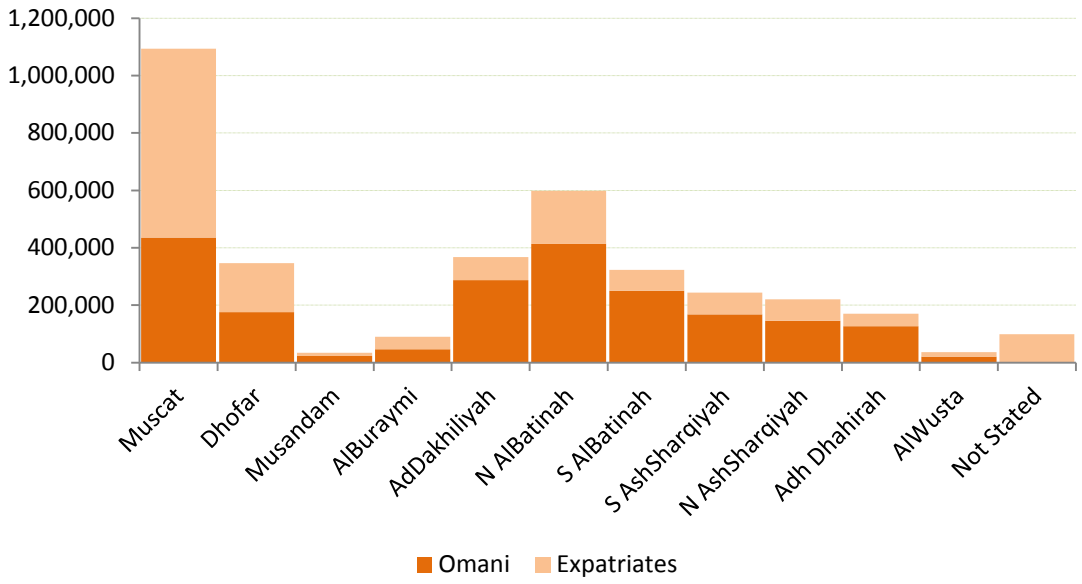


Figure 9: Omani and Expatriate populations' distribution in Governorates
Source: **(13)**

Population distribution among Governorates is shown in Figure 9. It shows that about 32% of the population lives in Muscat Governorate and of these about 62.3% are Expatriates. The population density in Muscat Governorate was estimated to be 296 persons per square kilometer in 2012. Data also show that 25.8% live along the coastal area in AlBatinah (North AlBatinah Governorate 16.8% and South AlBatinah Governorate 9%) and 10.3% in AdDakhiliyah Governorate (3). Those living in Muscat, North and South AlBatinah and AdDakhiliyah constitute about 68% of the total population of Oman of whom 41.8% are Expatriates. Population densities in the Governorates ranged from less than 1 person per square kilometer in AlWusta Governorate to 77 persons in North AlBatinah Governorate

compared to 296 in Muscat Governorate (3). The geographical distribution of the population clearly shows large areas with sparse population.

Expected Population Growth

The Omani population is a relatively young population where almost half the population is below the age of 21 years in 2012 (see median age of Omani population in Table 1). Population projections provide estimates of the expected population size and structure over the years till 2050. Population projections were performed using three scenarios; all scenarios assume the same mortality pattern where life expectancy at birth increase over the years in the same way it had increased over the previous years and a power model was used to fit life expectancy at birth and the "Coal-Demeny West" model life table was used (16). The three scenarios have different fertility rates. The first scenario assumes stationary fertility levels over the years, the second assumes intermediate fertility as total fertility rate (TFR) is expected to decline to 2.7 live births per woman aged 15-49 years in 2050 and the third scenario assumes low fertility such that TFR is expected to decline to reach replacement level (TFR 2.1) in 2050.

Assuming that fertility of the Omani population remains stationary at a TFR equal to 3.3 live births per women aged 15-49 years, the population is expected to grow to become 4.7 million in 2050 compared with 2.1 million in 2012. However, if fertility declines over the years, then the population will become 4.3 million in the intermediate fertility scenario and 3.95 million in the low fertility scenario (Figure 10).

It may be difficult to project the future numbers of Expatriates as a total and in different age groups, as their future numbers would depend on a number of uncontrollable factors mainly related to economic and social developments. Table 4 shows that the Expatriate population is currently 42.2% of the total population. If we assume that this proportion would decline over the years and reach about one-third of the total population (there are plans to keep Expatriate population about one-third of the total population; personal communication (17)); then the total population (given the stationary fertility scenario for the Omani population) is expected to be 7.05 million in 2050 compared with 3.6 in 2012 (Table 4). In other words, the population is expected to double during the next 38 years requiring considerable investments to increase the number of health care facilities to meet the increase in population size. The "Demographic Window Study" (18) published in 2009 by the "National Population Committee" had used data from 2003 census and had projected a slightly large population for 2050, namely 5.3 million for the Omani population; accordingly the total population would be expected to be 7.9 million. For planning purposes the current population projections laid down in Table 4 will be utilized as they had used more recent data and projected more detailed characteristics of the future population. Table 4 shows the expected population in 2050 (assuming stationary fertility) and its characteristics compared with current and previous years.

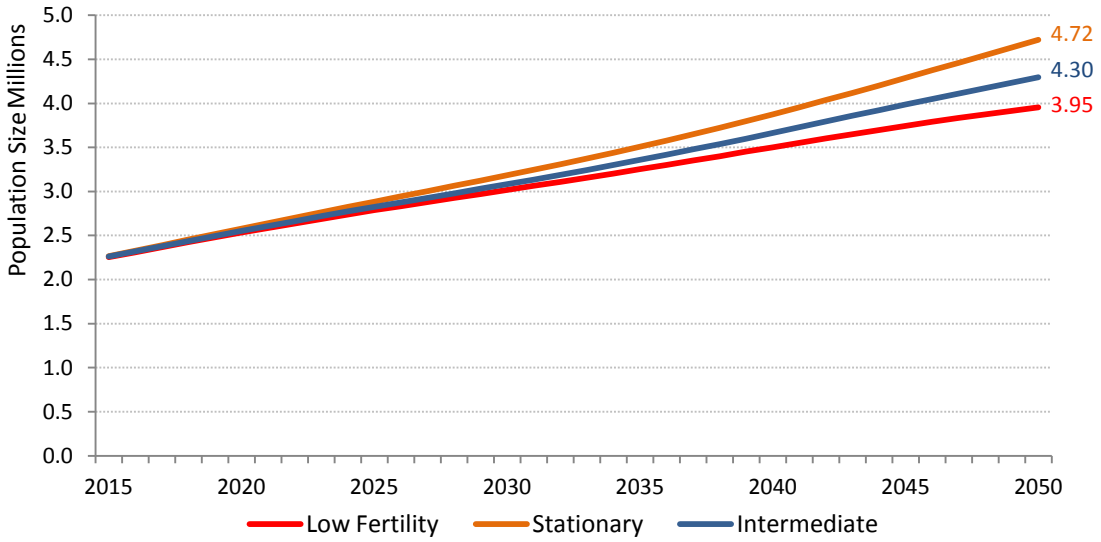


Figure 10: Population projections based on three scenarios
Stationary fertility, orange, intermediate fertility, blue, low fertility, red
Population projection performed using Spectrum (16)

Table 4: Population characteristics Over the Years and Expected Population in 2050 (Population Projection in 2050 based on Stationary Assumption)

	1993	2003	2010	2012	2050
Population					
Total	2,018,074	2,340,815	2,773,479	3,623,001	7,048,552
Omani	1,483,226	1,781,558	1,957,336	2,092,560	4,722,530
Expatriate	534,848	559,257	816,143	1,530,441	2,326,022
% Expatriates	26.5%	23.9%	29.4%	42.2%	33.3%
Omani Population					
% less than 5 years	17.2%	12.1%	12.7%	13.9%	11.4%
% less than 15 years	51.6%	40.6%	35.3%	33.7%	31.2%
% 15-64 Years	45.4%	56.2%	61.2%	62.0%	60.4%
% 60 years and above				6.1%	13.1%
% 65 years and above	3.0%	3.2%	3.5%	4.3%	8.4%
% females 15-49 years	19.4%	25.1%	28.9%	27.1%	23.0%
Median Age (Years)	12.1	15.8	19.9	20.9	27
Mean Age (Years)	20.4	22.4	23.9	25	30.5

Population projection performed using Spectrum (16)

The future growth rate of the Omani population is expected to differ according to the fertility scenario. In the stationary fertility scenario the growth rate is expected to decline to reach a plateau by 2060 after which it will continue to grow at an almost constant rate of 1.6%. While in the low fertility scenario the growth rate will decline to reach zero growth after which the size of the Omani population will start to decrease after reaching 4.5 million in 2085 (Figure 11).

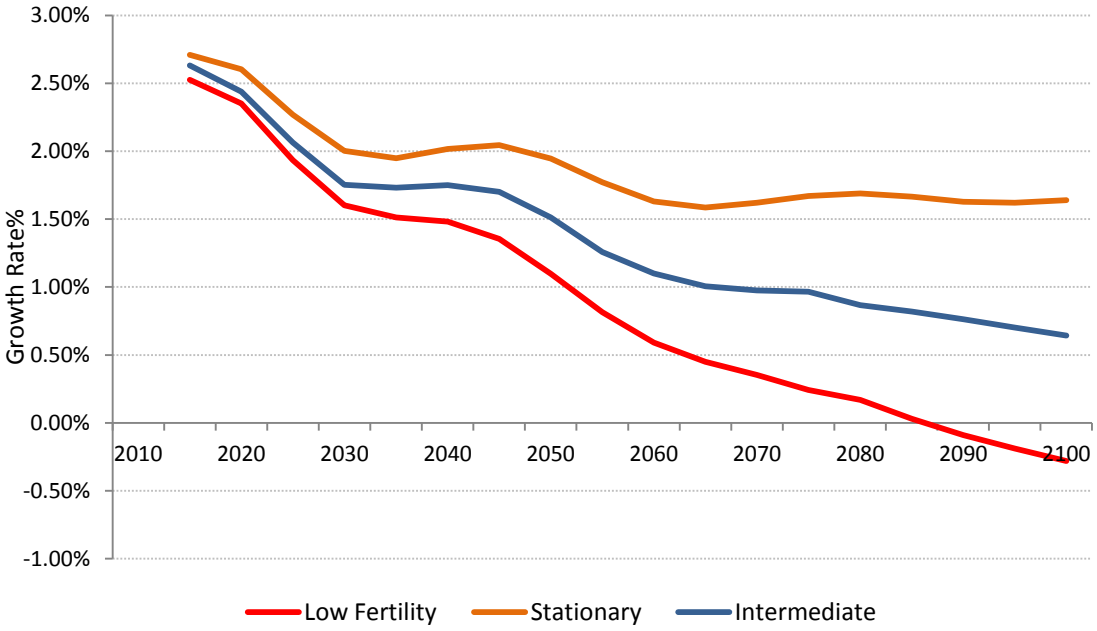


Figure 11: The expected average annual growth rate of the Omani population
Stationary fertility, orange; intermediate fertility, blue, low fertility, red

Population projections have also suggested changes in the age structure of the population (Figure 12) Aging of the population is one important change as the median age is expected to increase from 20.9 years in 2012 to 27 in 2050 and children below 15 years of age are expected to decline from 33.7% to 31.2% during the same period. It is also expected that elderly who would be at 60 years of age and above would constitute about 13.1% of the Omani population and those 65 years and older would be 8.4% compared to 6.1% and 4.3% in 2012; respectively (Table 4). The aging of the population will usually be accompanied by an increase in non-communicable diseases and diseases of the elderly and thus increasing the need for expensive health services. Maternity and children services should not receive increasing emphasis noticed during the previous periods, as the proportions of children below 5 years of age is expected to decrease to 11.4% in 2050 compared with 13.9% in 2012 and females in age group 15-49 to 23% compared with 27.1% in 2012.

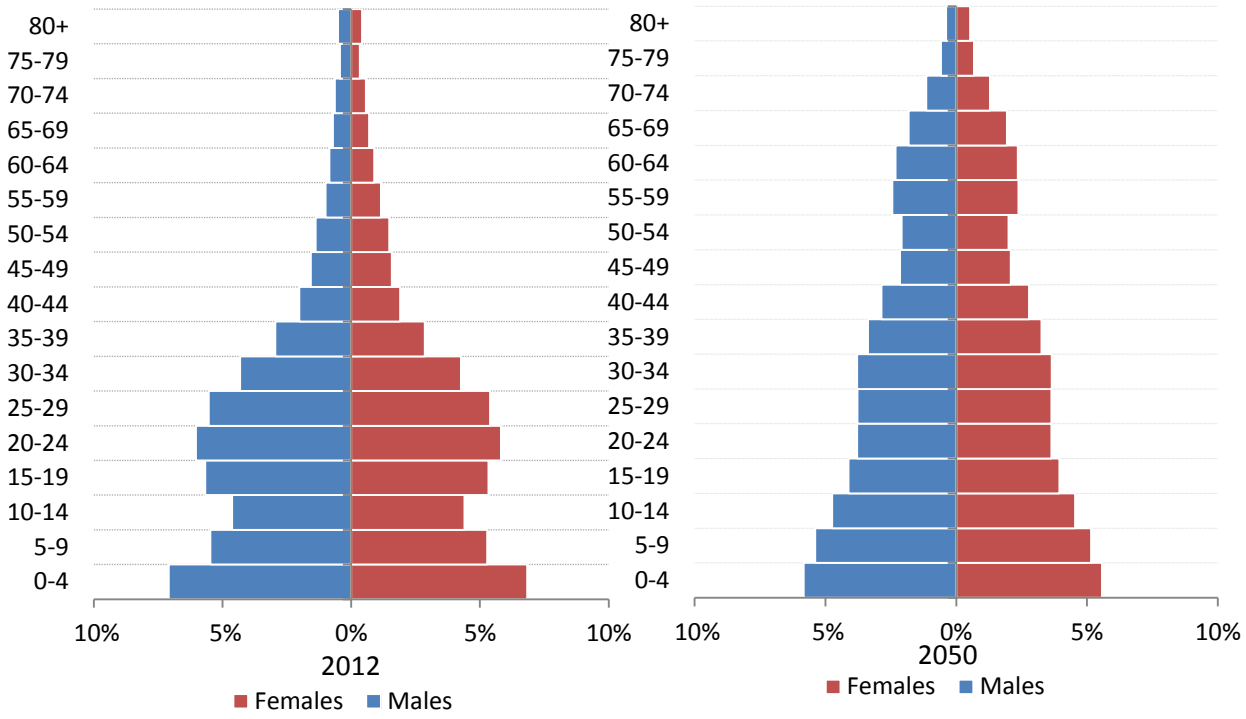


Figure 12: Expected age-sex structure of the Omani population in 2050 compared with 2012

Chapter 2
Political, Economic, Social, Technological, Environmental and Legal Determinants of Health (PESTEL Analysis) in the Sultanate of Oman

Quality Care, Sustained Health

عناية راقية وصحة مستدامة

Chapter 2

Political, Economic, Social, Technological, Environmental and Legal Determinants of Health (PESTEL Analysis) in the Sultanate of Oman

The social determinants of health are the circumstances in which people are born; grow up, live, work, and age, as well as the systems put in place to deal with illness. These circumstances are in turn shaped by a wider set of forces: economics, social policies, and politics. The performance of any health system is thus influenced by a number of determinants including political, economic, social, technological, environmental and legal determinants. Political stability is essential for all kinds of social developments including health. Geopolitical stability supports leadership and governance in health systems that will result in proper vision and guidance for health developments. Health is considered as input to and outcome of economic, social and cultural developments. The attainment of the health of the population thus requires more than just providing health services by the health sector. Sectors such as municipalities, environment, water, education, social development, agriculture, youth, media and electricity are examples of sectors supportive to health sector for health development.

To describe such determinants, this chapter presents a PESTAL analysis (Political, Economic, Social, Technological, Environmental, Legal analysis). It describes the political and the legal context, within which the health system functions. An understanding of the economic developments in the country will allow viewing potential support to the health system. This chapter also presents indicators related to a number of social determinants, namely: literacy and education; employment; social services; communication and transportation; media and tourism; and environmental. Community participation and empowerment and inter-sectoral collaboration were, and still are, considered as important pillars to achieve Health for All through Primary Health Care since Alma Ata Declaration ratified by the Sultanate of Oman.

Political and Legal Context

It is important to scan the political situation in Oman to show the geopolitical stability supporting different aspects of development including health. Oman was one of the least known countries and remained largely isolated from the rest of the world until 1970 when His Majesty Sultan Qaboos bin Said came to power. His Majesty's reign signaled the Renaissance or the beginning of a bright new era that renewed Oman's historic past and opened a new chapter of development, prosperity and social and economic progress.

Soon after his accession to power, Sultan Qaboos bin Said established a number of essential Ministries, namely; Ministry of Interior, Ministry of Justice, Ministry of Health, Ministry of Education, Ministry of Labor and Ministry of Economy in 1970. He began to meet his ministers formally and the ministers became known collectively as the Council of Ministers in

1971. This was followed in 1972 by the establishment of a number of key councils such as the "National Defense Council", the "Interim Council of Planning and "The Central Bank". Oman Commerce and Industry Chamber were established in 1973 and the year 1975 witnessed the development of the first "Five-Year Development Plan". The "Agriculture, Fisheries and Industry Council" was established in 1979 (19), (20).

In 1981, Sultan Qaboos ordered the establishment of the "Consultative Council", designed to provide Oman's citizens with a greater opportunity to participate in the efforts of the country's Government. The private sector was represented by the "Oman Chamber of Commerce and Industry" and the remainder by the Government (21). It started with 45 members (17 from Government, 11 Private and 17 from Wilayates) and evolved to have 55 members (adding two from the Government and eight from the Wilayates).

In December 1991, Sultan Qaboos set up the "Majlis A'Shura" (the Consultative Council) through a Royal Decree (No. 94/91) to replace the former Consultative Council. His Majesty specified the tasks entrusted to "Majlis A'Shura", stating that it was to be "…a forum for the combined efforts of the Government and people's constituencies wherein they may undertake to study the aims and goals of our development plan". This is translated as the "Majlis A'Shura" will review laws prior to instigation and provide recommendations on laws, policies, plans and general budget. The election process for electing members of "Majlis A'Ahura" passed into phases giving citizens more authority for choosing their own representatives and this had encouraged more citizens to share in the election process. Women were encouraged to run in elections for the "Majlis A'Shura" and two women had joined in 1994. The "Basic Law of the State (Basic Statute of the State)" was promulgated on November 6th, 1996 (by the Royal Decree No. 101/96). It had comprised 81 articles laying down a legal framework of reference governing the functions of the different authorities and separating their powers. It affords safeguards to guarantee the freedom, dignity and rights of the individuals. This historic document sets out Oman's system of government and the guiding principles behind the State's policies and also details public rights and duties. It contains specific principles covering the Head of State, the Council of Ministers and the judiciary (21).

In 1997 the Royal Decree (No. 86/97) was issued, establishing "Majlis A'Dawla" (The State Council). "Majlis A'Dawla" is a financially and administratively independent legal entity based in the Governorate of Muscat. It plays an important role in national development by acting as a link between the Government and the people. Its' Chairman and members are appointed by Royal Decree from Omani nationals of not less than 40 years of age with good social standing and reputation. Members have included former ministers, ambassadors and under-secretaries. The number of "Majlis A'Dawla" members must not exceed the number of "Majlis A'Shura" members and it is not permitted to combine membership of the "Majlis A'Dawla" with membership of "Majlis A'Shura" or public office, except under special conditions where a member might be requested for his or her expertise in a particular field. "Majlis A'Dawla" has an annual session with duration of not less than eight months. It reviews matters referred to it by the Sultan, drafts laws before promulgation and prepares studies on development-related issues including human resources. In 2006 the "Majlis A'Dawla" had 59 members of whom nine were women. Membership is for a four-year period and renewable.

"Majlis Oman" (The Council of Oman) was then formulated and is made up of members of "Majlis A'Dawla" and "Majlis A'Shura" as stipulated in Article 58 of the "Basic Law of the State". It assists the Government in drawing up the general policies of the State. The Council meets at the request of Sultan Qaboos to study and discuss matters raised by him, taking all its decisions on the basis of a majority vote. Sultan Qaboos addresses all the members of this Council on an annual basis (21). In 1999, the "Supreme Council of Justice" and the "Supreme Court" were established; the latter ensures implementation of the "Basic Law of the State".

In 2011, The Royal Decree (99/2011) updated the "Basic Law of the State" for the benefits of the citizens and the State. Figure 13 shows different phases of development of the political background of Oman.

Leadership and governance in the Omani health system has responsibly and wisely managed resources and revenues to the benefit of the health of the people of Oman and has responded to their needs during its different stages of development. Sound policies, strategies and development plans have been adopted. The Government of Oman, through Ministry of Health, has a health policy that is based upon several basic principles: Provision of comprehensive public and personal health services to its population through a health system with primary health care as its cornerstone; Equity in the distribution of health services and fairness of financial contribution among different population groups according to health needs; Community involvement in planning and implementation of its health care aimed at developing community self-reliance for sustainable health development, responsiveness to health and non-health needs of the community and Inter-sectoral co-operation with other health-related sectors to ensure positive impact on community health.

As a result, the country has witnessed a remarkable and speedy decline in childhood mortality. This decline is seen across all governorates and wilayates in the country ensuring equity of health care and human development. This was reported in the "Human Development Report" 1997 praising Oman as a global pace-setter for human development especially in areas of health and education (22). This reflects the political commitment of the Government to health and education. Oman was also ranked by WHO in its report "World Health Report 2000" as first among the 191 Member States in efficiency to improve health and eighth as regards overall efficiency of the health system (23). The "World Health Report 2008" (24) reported on Oman's sustained investment in health services, which have resulted in almost universal access to health care for Oman's population.

For organizing the national health system, the country is divided into eleven self-contained health regions and each comprises districts (Wilayats) (initiated in 1991 as ten health regions). Health regions correspond to governorates. The Ministry of Health has adopted a decentralization approach and has thus delegated necessary financial and administrative authorities and responsibilities to the health regions. Such approach has encouraged local initiatives, local planning, administration and budget control, which has collectively contributed to health status developments. Decentralization was also extended to Wilayat (district) level after the establishment of an integrated health system in each of the Wilayats in 1993. Further steps of decentralization were undertaken by adopting the "Hospital Autonomy Initiative" in 2001 and have been implemented in referral hospitals.

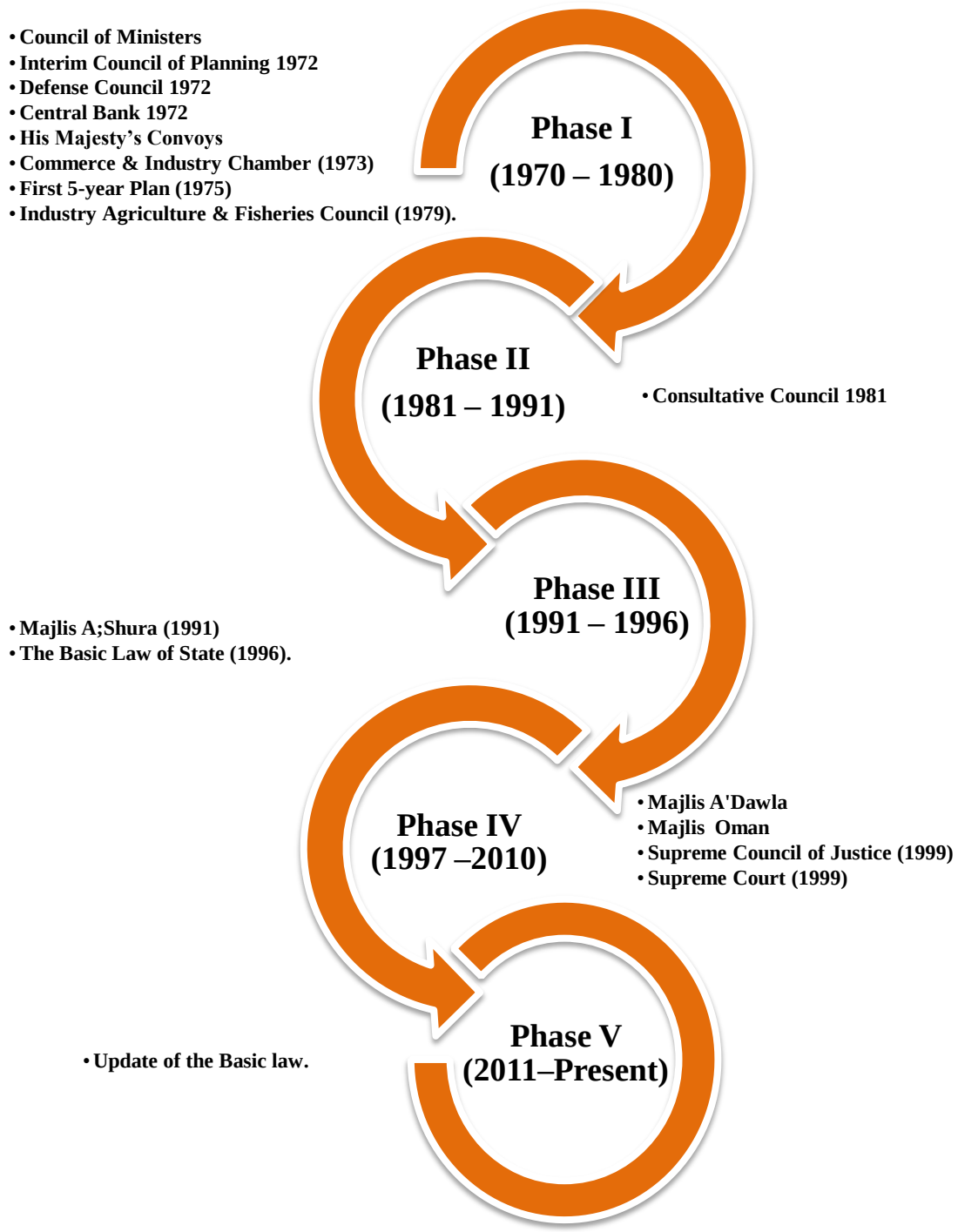


Figure 13: A diagram summarizing the phases of political developments

There are a number of international indices that reflect the impact of the political commitment of the Government to develop the country and encourage investments. Among these are the Global Peace Index (GPI) and the International Property Right Index (IPRI).

The GPI attempts to measure the position of nations' and regions' peacefulness. GPI 2012 considered Oman among the countries classified as most peaceful. Oman was ranked in the 59th position (out of 158 nations) with a GPI of 1.887 (GPI has a range of 1 to 5; with 1

strongly peaceful) by "The Institute for Economic and Peace" in its "Global Peace Index 2012" report (25). In spite the fact that Oman was ranked 59th it is still seen to be among the peaceful nations as the GPI is only 1.89 (closer to 1 than to 5). Table 5 shows that Oman ranks 5th as regards GPI among countries of Middle East and North Africa Region. Its GPI is significantly lower than the regional average of 2.25 (25).

Table 5: Global Peace Index (GPI) in Oman

State	GPI	Overall Global Rank	Regional Rank (Middle East & North Africa)
Oman	1.89	59	5

Source: (25)

The study of Gaurav Tiwai in 2012 (26) ranked Oman the 31st among 129 countries as measured by the "International Property Rights Index (IPRI)". This reflects the Government's support to the security of property rights, both physical and intellectual. Oman scored an IPRI of 6.6 out of 10. Oman's score was higher than the global median of 5.3. The maximum score at the global level (8.6) was reported for Finland. Oman comes among the second quintile of countries as regards global ranking. The IPRI has three components; Legal and political Environment (LP), Physical Property Rights (PPR) and Intellectual Property Rights (IPR). Oman scored 6.4, 7.7, and 5.7 for the three components, respectively. It shows that PPR is very strong in Oman and that IPR is the weakest although it has been increasing since 2010 (Figure 14).

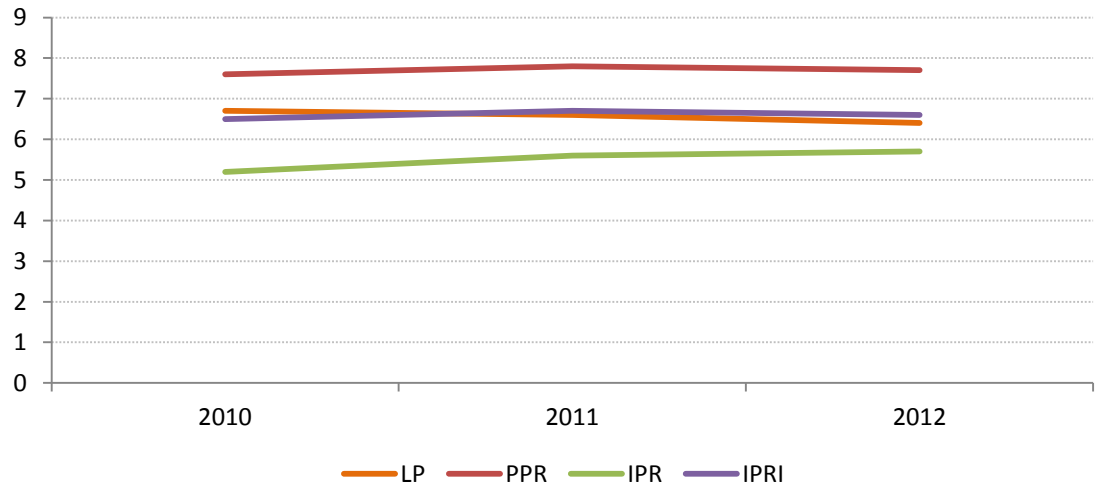


Figure 14: The International Property Rights Index (IPRI) for Oman and its three Components
Legal and Political Environment (LP), Physical Property Rights (PPR) and Intellectual Property Rights (IPR)
Source: **(26)**

In the legal context, the Sultanate of Oman has been committed since early days of the Renaissance to developing health and education. This was clear from the number of commitments made both nationally and internationally, as well as the laws issued over the years. Commitments and laws (examples and not inclusive) are listed chronologically as follows:

1970	Establishment of Ministry of Health and Ministry of Education
1971	Joined World Health Organization (December 27, 1971)
1972	H.M. Sultan Qaboos emphasized that "Health is the Right for Every Citizen"
1973	Legislation on Communicable Diseases (Law 8/1973)
1973	Medical Law (Law 9/1973)
1973	Pharmacy Law (Law 10/1973)
1975	Revision of the role of Ministry of Health (Rule 26/1975)
1977	Convention on Human Rights
1978	Alma Atta Declaration (for Primary Health Care)
1981	Health For All by 2000
1981	Convention to Eliminate all Forms of Discrimination against Women
1986	Sultan Qaboos University (SQU); in addition there are (Royal Decree 14/1999) (Royal Decree 96/1996 re-structuring SQU Council) and (Royal Decree 71/2006 SQU Law and Organizational Structure)
1989	Convention on the Right of The Child (November 1989)
1991	Majlis A'Shura (Royal Decree 94/1991)
1994	Ministry of Higher Education established (Royal Decree 2/1994)
1995	Copenhagen Summit 1995 for Social Determinants
1995	Vision 2020 (Approved by H.M. Sultan Qaboos on June 14th, 1995
1996	Basic Law (Article 12: Government responsible to provide preventive and curative care – Article 13: Government considers education essential for development) – Basic Law updated in 2011 (Royal Decree 99/2011)
1997	Majlis A'Dawla (Royal Decree 86/1997)
1999	Supreme Court
1999	Supreme Council of Justice
2000	United Nations Millennium Declaration (Millennium Development Goals)
2002	Education and Training Abroad (Royal Decree 83/2002)
2002	Re-defining the role of Ministry of Health (Royal Decree 38/2002)
2006	Oman Medical Specialty Board (OMSB) (Royal Decree 31/2006)
2007	National Committee for Family Affairs (Royal Decree 12/2007)
1995-2011	Bilateral agreement for training of health workers(Austria, Australia, Brunei, Dar AsSalam, Arab Board, Canada, China, Egypt, France, Germany, Holland, Jordan, Spain, Syria Arab Republic, United Kingdom, United State of America); bilateral agreement for projects (Cuba, Cyprus, European Union, Korea and United states of America)

Socioeconomic Determinants of Health

The Sultanate of Oman has witnessed remarkable social and economic developments during the past 40 years. Developments in education by providing schooling and reducing illiteracy, improvements in the environment, and the contribution of the media and communication in improving awareness of health, have all contributed to health developments and the overall development in the country.

The Oman World Health survey (OWHS) conducted in 2008 used the World Health Organization Quality of Life (WHOQoL) scoring to assess satisfaction of individuals with

their own health and different aspects of life; score has a maximum of 100 with zero indicating extremely poor quality of life (27). The results showed a mean score of 81.8 out of 100, indicating that individuals in Oman are satisfied with their overall quality of life. About 82% reported good quality of life and that they were happy and only 6% reported that they could not cope with important things or things that had to be done in their life (Table 6). About 87% reported that they feel safe from crime and violence and about three quarters freely walk safely, even after dark. However, only 24.2% reported that they are interested in politics and national affairs. Few reported being involved in social activities, for example meeting for local issues with community leaders, associations or organizations and cooperating with others possibly because of a lack of trust. This is reflected by a mean score for social cohesion of only 29.6 and for trust of 43.5 out of 100.

Table 6: Self-reporting on quality of life

Qulaity of Life Indicator	Values
% Rated Overall Quality of Life as Good	81.5%
% Reported there are Happy	82%
% Could Not Cope with Things that Had to be Done	5.8%
% Could Not Control Important Things in their Life	6.3%
% Safe from Crime and Violence	86.6%
% Safe Walking Alone after Dark	74.4%
% Interested in Politics and National Affairs	24.2%
Mean Social Cohesion	29.6
Mean Trust	43.5

Source: (27)

Table **7** lists a number of socioeconomic indicators that reflect developments over the years. The values of certain indicators were not available for 2012 at the time the report was written and 2011 values were used; these have been marked in the table.

Oman has witnessed a relatively high rate of economic growth during the last two decades. The per capita GDP and the Gross National Income (GNI) have shown an average annual increase rate of 8.3% and 8.4%, respectively 2000 to 2005 and this has increased in the subsequent five years (2006-2010) to 11.7% and 11.1%. There is an apparent slowdown of increase in GDP per capita during 2010-2012 (Figure 15 and Table **7**). This apparent slowdown may be explained by the significant increase in the estimated population size of 2012 compared to the population size reported in 2010 an explanation that is supported by the fact that GDP has shown an average annual growth of 15.2% and total government revenues have grown annually by an average of 30.5% during that period. The economic growth was accompanied by an increase in the general price index to 133.7% in 2010 and 143.2% in 2012 with base year 2000 compared to 100.2% in 2005 (28) (29). It should also be noted that economic growth is mainly because of oil and gas prices as their revenues constituted about 81% of total government revenues in 2010 and 84.7% in 2012, an increase from 78.4% in 2000.

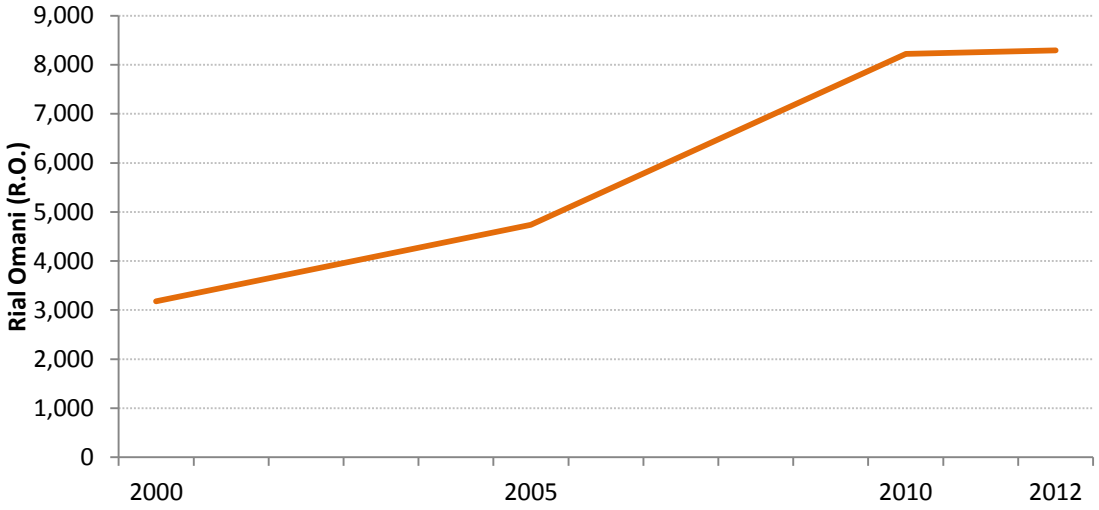


Figure 15: Trend of Gross Domestic Product per Capita, 2000-2012

Economic growth is also evidenced by the finding that domestic savings accounted for about 53% of GDP in 2011 compared with 43.3% in 2000 and the Gross National Disposal Income (GNDI) has increased around 3.4 folds from 2000 to 2011 (Figure 16) (30).

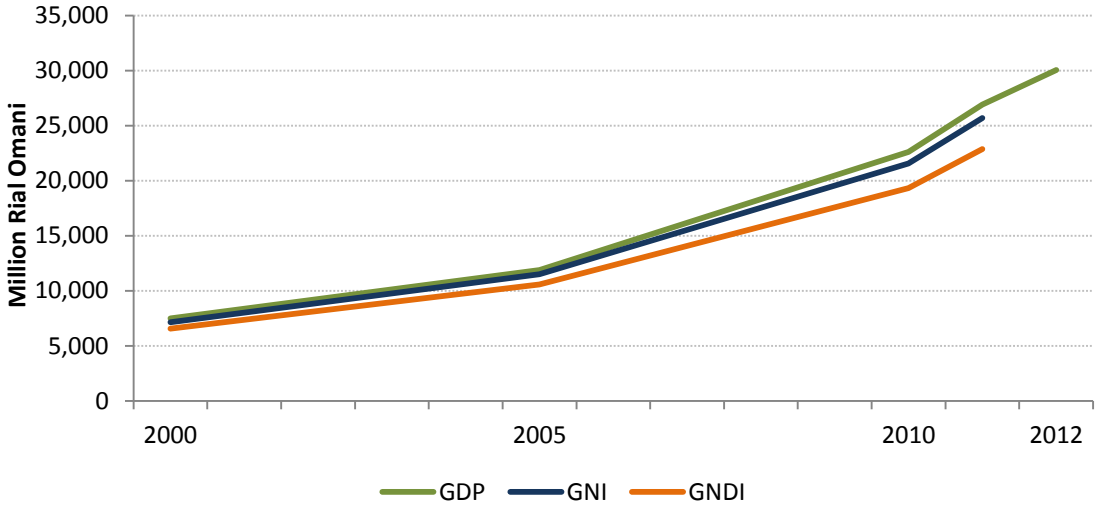


Figure 16: Gross Domestic Product at Current Prices (GDP), Gross National Income (GNI) and Gross National Disposable Income (GNDI), 2000-2012
Sources: **(30)**, **(31)**

Table 7: Socioeconomic indicators

Socioeconomic indicator	2000	2005	2010	2012
Economic				
GDP at Current prices (millions R.O.)	7,639.2	11,882.9	22,613.6	30,033.6
GDP per Capita (R.O.)	3,181	4,736.4	8,223.9	8,289.7
Average Annual Growth Rate of GDP per Capita		8.3%	11.7%	0.4%
Relative Share of Health in GPD	1.7%	1.6%	1.5%	1.4%[d]
GNI (millions R.O.)	7,358.2	11,509.9	21,552.6	25,674.2[d]
GNI per Capita (R.O.)	3,064	4,587.5	7,772	7792[d]
Average Annual Growth Rate of GNI per Capita		8.4%	11.1%	0.3%
Total Government Revenues (millions R.O.)	2,289.9	4,510.5	7,916.5	13,474.5
Average Annual Growth Rate of Total Government Revenue		14.5%	11.9%	30.5%
%Oil & Gas Revenues of Total Revenues	78.4	78.8%	80.8%	84.7%
Average Daily Production of Oil (000 BBL)	955	774	865	919
Total Government Expenditure (millions R.O.)	2,656.2	4,207.6	7,963.8	13,555.1
Surplus (+) or Deficit (-) (millions R.O.)	-361.8	-198.2	-48.8	-80.6
Gross National Disposable Income (GNDI) (millions R.O.)	6,570.5	10,574.9	19,312.6	22853.2[d]
General Price Index (base price =2000)	100	100.2	134.8	143.2
Price Index for food, beverage and tobacco	100	102.7	152.4	164.9
Price Index for Tobacco Products	100	90.9	104.3	128.1
Ministry of Health Recurrent Expenditure (millions R.O.)	137.2	185.5	327.2	448.1
MOH Recurrent Exp. (% of Total Gov. Recurrent Expenditure)	7.5%	5.8%	6.8%	7.2%
Social				
Age Dependency Ratio ((below 15+ 65 & above)/(15-65)	87%	70%	63%	61%
Omanis Married (15 years +)	50.4%	46.1%[c]	49.8%	n.a.
Omani Males Married (15 years +)	49.3%	44.8%[c]	49.0%	n.a.
Omani Females Married (15 years +)	51.6%	47.4%[c]	50.7	n.a.
Average Family Size	8.7	8.0[c]	7.8	n.a.
Social Services				
Cases of Beneficiaries of Government Grants	46,407	49,075	51,770	81,532
Cost of Beneficiaries of Government Grants (000 R.O.)	23,325	27,491	37,723	122,136
Social Welfare (Cases)	46,032	48,869	51,262	81,014
% Social Welfare of Government Beneficiaries	99.2%	99.6%	99.0%	99.4%
% Social Welfare of Omani Population 15 years+	4.6%	4.3%	4.1%	5.8%
Education				
Schools	1,158	1,240	1,466	1,529
Students(000)	602,986	624,767	632,326	644,515
Teachers (000)	29,421	41,284	52,430	61,754
Student –Teacher Ratio (Government Schools)	21.0	15.1	11.6	11.2
Student –Class Ratio (Government Schools)	32.4	28.9	27.1	26.9
% Females Students (Government Schools)	48.7%	48.5%	48.9%	49.7%
Illiteracy Rate (Omani population 15+ years)	26.4%	21.9%[c]	14.1%	n.a.
Illiteracy Rate (Omani Males 15+ years)	15.4%	14.5%[c]	8.9%	n.a.
Illiteracy Rate (Omani Females 15+ years)	34.1%	29.4%[c]	19.4%	n.a.
Gross Primary Enrollment Rate (grades 1-6)	100.3%	99.8%	102.5%	101.2%[d].
Net Primary Enrollment Rate (grades 1-6)	89.7%	98.6%	95.5%	98.1%[d]
Employment (Workers)[a]				
Total Workers	661,498	656,114	1,297,982	1,682,574
% of potential workers (aged 15-65 years)	44.0%	39.3%	67.5%	61.7%
% Omanis	20.8%	31.8%	24.5%	20.1%
Public Workers	110,498	132,114	163,982	194,326
Average Annual Growth of Public Workers[b]		3.6%	4.4%	8.9%
% Omanis	74%	82.8%	85.6%	85.8%

Average Annual Growth of % of Omanis in Public[b]		2.3%	0.7%	0.1%
% Women	27.7%	33.0%	36.4%	39.7%
Average Annual Growth of % of Women[b]		3.6%	2.0%	4.4%
Total Workers in Private Sector	551,000	524,000	1,134,000	1,488,248
Average Annual Growth of Private Workers[b]		-1.0%	16.7%	14.6%
% Omanis Working in Private Sector	10.2%	18.9%	15.7%	11.6%
Average Annual Growth of Omanis in Private[b]		13.1%	-3.6%	-14.0%
Place (governorate) of Work same as Residence	n.a.	n.a.	73%	n.a.
Communication & Transportation				
Internet Subscribers (000)	24	49	74	119
Fixed Telephone lines (000)	225	257	282	305
Mobile Phones (000)	162	1,980	4,606	5,278
Active Mobile Broadband Subscribers (000)				1,646
Asphalted Roads ((km)	8,477	15,943	28,903	31,365
Driving licenses Issued (000) (renewed and new)	58	75	122	129
Road traffic Accidents	13,040	9,247	7,571	8,209
% fatalities	3.0%	5.9%	9.1%	10.8%
Environment				
Water production (million gallon)	20,791	29,844	48,683	59,625
Water Distribution (million gallon)	20,692	29,590	44,638	n.a.
Number of Water Connections (000)	116	162	291	319
Households with Safe Water for Household Use (%)	65.3%	n.a.	77.0%	n.a.
Households with Safe Drinking Water (%)	69.5%	n.a.	87.6%	n.a.
Electricity Production (GW/h)	9,111	12,648	19,159	24,365
Electricity Distribution (GW/h)	8,682	12,023	15,626	20,958
Number of Electricity Connections (000)	428	530	678	790
Cultivated Area (000) feddan or acres	173	151	167	173
Agriculture Production (000) tons	1,213	989	1,525	1,248
Number of cows (000)	299	302	333	346
Number of Sheep (000)	344	351	389	404
Fish Landed (000) tons	120	158	164	191
Media and Tourism				
TV Broadcasting Hours (per year)	8,784	17,520	12,045	14,640
Radio Broadcasting Hours (per year)	14,274	19,710	28,470	36,600
Hotel Rooms (number)	5,312	7,248	11,183	12,180
Hotel Rooms (Occupancy Rate)	42%	47%	51%	47%

[a] Does not include National Security and Ministry of Defense
[b] In relation to previous cell
[c] Data for 2003
[d] Data for 2011
n.a.: not available
GDP: Gross domestic product
GNI: Gross national income
R.O.: Rials Omani
Sources: (9), (10), (28), (31), (32), (33), (34)

The data in the 2010 census showed a large Omani family size of about 7.8 persons. This was almost similar to the average family size reported by the "Household Expenditure and Income Survey" in 2010-2011, the Oman World Health Survey (OWHS) in 2008 and during the 2003 census of 8.1, 8.3 and 8 persons, respectively (9) (10) (15) (27). Data show that only 4% of adult Omanis are covered by social welfare. The OWHS 2008 (27) shows that the median monthly household income is RO 360; in other words about 50% of households have an income below RO 360 and 81.2% of households reported that their income source is wages

and salaries. The OWHS also shows that 10% of households have an income of less than RO 200. Households annually spend about RO 44.4 on health care and RO 54 on education. However, the Household Expenditure and Income Survey (2010-2011) (15) shows improvements in the median monthly income to RO 904 with average annual expenditure on health of RO 97.2 and on education of RO 224.4 (Table 8). In spite of the difference between these two surveys, they throw a light on the range of income and expenditure of Omani households.

Table 8: Omani household income and expenditure

Indicator for Omani Families only	2008 OWHS (27)	2010-2011 HH Expend & Income Survey (15)
Average Omani Family Size (No. of persons)	8.3	8.1
Economic Dependency Ratio (No. of persons)	n.a.	6.1
Median Monthly Income (RO)	360	904
Wages and salaries source of Income (% HH)	81.2%	76.0%
Average Monthly Expenditure on Health (RO)	3.7	8.1
Average Monthly Expenditure on Education (RO)	4.5	18.7

OWHS: Oman World Health Survey
HH: Household
Sources: (15) (27)

The Global Competitive Index (GCI), as defined by the World Economic Forum, is a comprehensive tool that measures the micro-economic and macro-economic foundation of national competiveness (35). Competitiveness is defined as the set of institutions, policies and factors that determine the level of productivity in the country which in turn sets the level of prosperity that can be earned by an economy. The Global Competiveness Report (GCR) 2012-2013 ranks Oman 32 among 144 countries with an overall GCI of 4.7 (score ranges 1-7) (35).

Table 9: Global Competitiveness Index (GCI) and its Components

Components of GCI	Rank (of 144)	Score (1-7)
Overall GCI 2012-2013	32	4.7
Basic Requirements (28.0%)	15	5.7
Pillar 1: Institutions	17	5.3
Pillar 2: Infrastructure	33	5.0
Pillar 3: Macroeconomic Environment	5	6.6
Pillar 4: Health and Primary Education	52	5.9
Efficiency Enhancers (50.0%)	45	4.4
Pillar 5: Higher Education and Training	61	4.3
Pillar 6: Goods Market Efficiency	25	4.9
Pillar 7: Labor Market Efficiency	36	4.7
Pillar 8: Financial Market Efficiency	26	4.7
Pillar 9: Technology Readiness	54	4.3
Pillar 10: Market Size	72	3.6
Innovation and Sophistication	44	3.9
Pillar 11: Business Sophistication	37	4.4
Pillar 12: Innovation	47	3.4

Source: (35)

The report identifies Oman as being in a transition stage of development between efficiency-driven and innovation-driven economy. Oman is best ranked for its macro-economic stability environment as this helps to increase productivity of the country. It is also ranked high for its legal and administrative framework, within which individuals and firms interact to generate wealth within the country or in other words for its institutions. Table 9 shows the GCI scores and ranks for Oman and all 12 pillars.

The Global Competitiveness Index uses statistical data for individual indicators within each of its 12 pillars. The indicators for the fourth pillar concerned with health and primary education are shown in Table 10. Values are either a statistical value, for example incidence rate for tuberculosis, or adjusted values of data from the "World Economic Forum's Annual Executive Opinion Survey" capturing concepts that require qualitative assessment as quality. Adjusted values are averages of 100 respondents from each country, weighted and adjusted in such a way to give scores 1 to 7, 7 being the most favorable (35). The rank shows that Oman has for improvement in its health indicators.

Table 10: Health and Primary Education Component of the Global Competitiveness Index (CGI) for Oman, 2012-2013

Health and Education Components of GCI	Rank (of 144)	Value*
Pillar 4: Health and Primary Education		
4.01 Business Impact of Malaria	1	Not applicable
4.02 Malaria Cases /100,000 pop*	1	0.0
4.03 Business Impact of Tuberculosis	66	5.4
4.04 Tuberculosis cases / 100,000 pop*	31	13.0
4.05 Business Impact of HIV/AIDS	71	5.2
4.06 HIV Prevalence, % Adult pop*	12	0.1
4.07 Infant Mortality, Deaths /1,000 live births*	47	7.8
4.08 Life Expectancy, years*	78	73.1
4.09 Quality of Primary Education	59	44.1
4.10 Primary Education Enrollment, net%	70	93.6

* Values are 1-7 scale unless annotated by (*)
Source (35)

Social Characteristics are important determinants for health status and worth major attention in health planning. Social characteristics important to health include educational level of the community for example illiteracy rate, status of education and of higher education, and employment.

Illiteracy rate has declined to about 14% among Omanis aged 15 years and above (Table **7**) and it is higher in females (19.4%) than in males (8.9%) (10) (36). In 2012/2013 there are 95 literacy centers with 908 classes teaching 9,899 students of whom 97% are women. There are also 53 adult education centers educating 2,033 students in 155 classes (37). Illiteracy rate is expected to further decline with such efforts combined with developments in education. Table **7** shows that during the academic year 2012/2013 there are a total of 1,529 schools, enrolling more than 644 thousands students. The Government runs more than 68% of these schools which accommodate 80% of students (37). The Ministry of Education initiated a reform of education in late 1990s and as a result Government schools are of two types: basic schools (85.4% of schools); representing the reform, and general schools. The private sector also shares the responsibility to promote education as private schools enroll more than 79

thousands students representing 12.3% of all students in Oman and more than 90% of their students are Omanis.

School enrollment has increased over time (38). It is estimated that the Gross Primary Enrollment (grades 1-6) is 101.2% and the Net Primary Enrollment is 98.1%. Government schools show a student to teacher ratio of 11.2 students and a student to class ratio of 27, having declined from 21.0 and 32.4, respectively, in 2000. The data show that 49.7% of students are female (37). Figure 17 shows the distribution of Government schools' students according to governorates. More students are seen in densely populated governorates: Muscat, AlBatinah and AdDakhiliyah governorates (37).

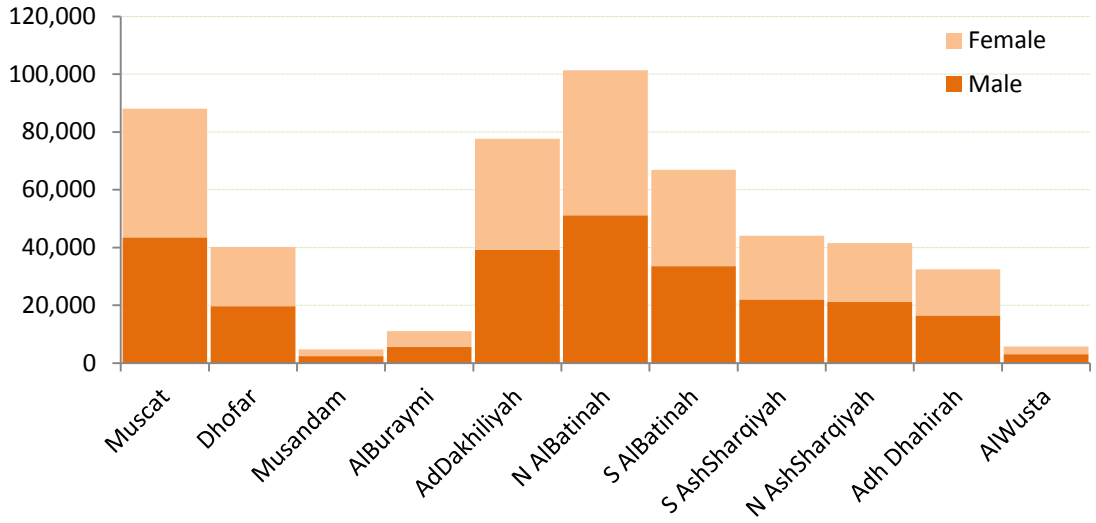


Figure 17: Government school students (general and basic) in Governorates by sex

There are also 6 vocational centers training 2,531 students in electricity, auto-mechanics, mechanics, carpentry, construction, air-conditioning, electronics, mechatronics, welding, agriculture, sales, interior design and health and beauty. In addition there are also 2 Fishctics Institutes training 358 students.

Higher education or education after secondary school education takes place in universities, colleges and special institutes. Students also study for bachelor degree in universities outside the country.

Table 11 shows that there are a total of 55 higher educational institutes (HEI); 28 are run by the Government and the remaining are private institutes (39). There is one government university (Sultan Qaboos University) and 7 private universities; these are Nizwa University, Sohar University, Dhofar University, AshSharqiyah University, AlByraimi University, German University of Technology in Oman and Open Arab University. The table also shows that about 30 thousands students are enrolled in 2011/2012 and there are a total of 95 thousands students registered for higher education in the same year (37). Ministry of Higher Education (40) reports that about 28 thousands were accepted for higher education for the academic year 2011/2012, representing 66% of students who passed exams of General

Education Diploma (GEP) (grade 12 exams) and showing an increase of 66% in numbers accepted compared with the year before (academic year 2010/2011). Data show that 4,744 students were studying specialties related to health at bachelor level (representing 4.6% of students studying at bachelor level) and 431 students are studying health-related subjects at postgraduate level (37).

Table 11: Higher education institutes and students in Oman, 2011/2012

Governorate	Number of Local Institutes	Registered Students (all grades)	Students Enrolled 2010/2011
University			
Sultan Qaboos University[a]	1	15,345	3,130
Students studying in Universities Abroad[b]		7,531	2,892
Private Universities	7	19,126	15,446[c]
Colleges			
Colleges of Applied Sciences	6	8,275	2,076
Technical Colleges	7	12,583	5,139
Private Colleges	20	29,590	[c]
Special Institutes			
Health Institutes[d]	13	1,840	628
Institute of Shariah Sciences	1	887	218
Total	**55**	**95,146**	**29,525**

[a] Sultan Qaboos University data include 1,380 postgraduate students

[b] Number studying abroad include 1,428 postgraduate students

[c] Both private universities and private colleges

[d] In Health Institutions there are additional 246 students registered for post-basic specialized diploma.

Source: (37)

Statistics show that there are a total of about 1.7 million workers in the country during 2012 of whom only 20.1% are Omanis (Table 7) (28) which highlight the need to increase training of Omanis to share in the workforce. Workers represent about 61.7% of potential workers in the country. Workers in the public sector represent only 11.5% of total workers and about 86% of them are Omanis. The 2010 census (10) showed that 73% of workers are employed within the same Governorate in which they live.

The **Human Development Index (HDI)** is a composite measure of developments (41). It takes into account advances in health, education and economy. It is estimated and published by the United Nations Development Program (UNDP) since 1990. In 2012, Oman was ranked in the 84th position out of 184 countries with an estimate of HDI of 0.731. The HDI in Oman has increased slightly over the years from 0.709 in 2008 (Figure 18). Oman is considered by UNDP among countries showing high human development (Figure 20). It has been clearly shown that the health component in HDI in Oman is the highest among the other two components of the index; health index was estimated to be 0.839 compared to 0.810 for income and 0.578 for education (Figure 19).

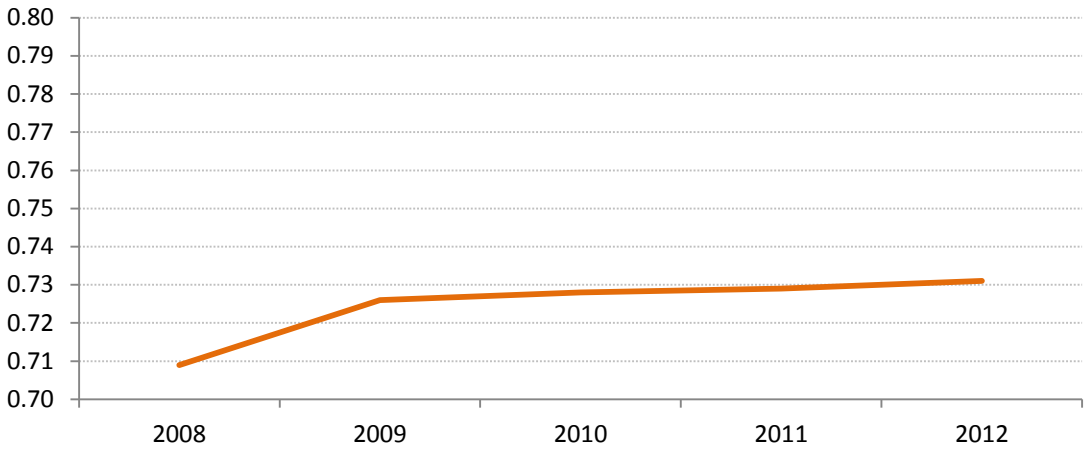


Figure 18: Trend of Human Development Index (HDI) for the Sultanate of Oman
Source: **(41)**

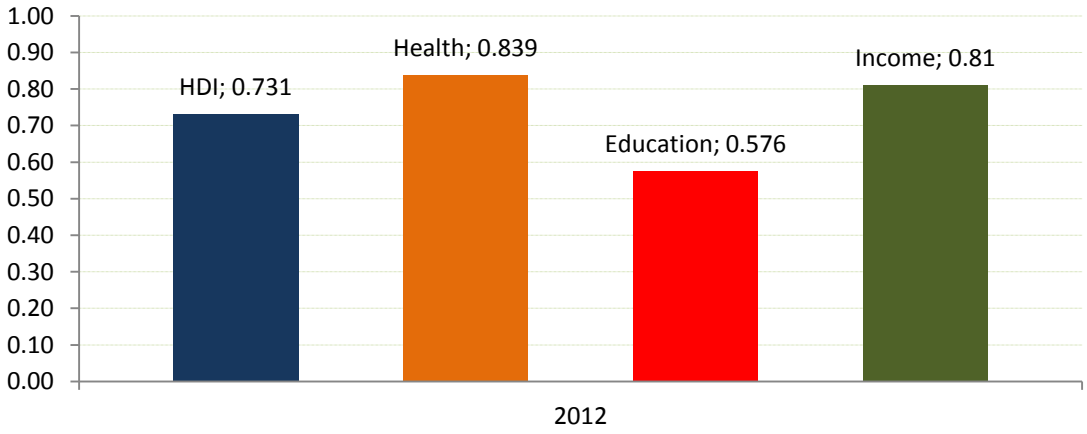


Figure 19: Components of the Human Development Index (HDI) for Oman, 2012
Source **(41)**

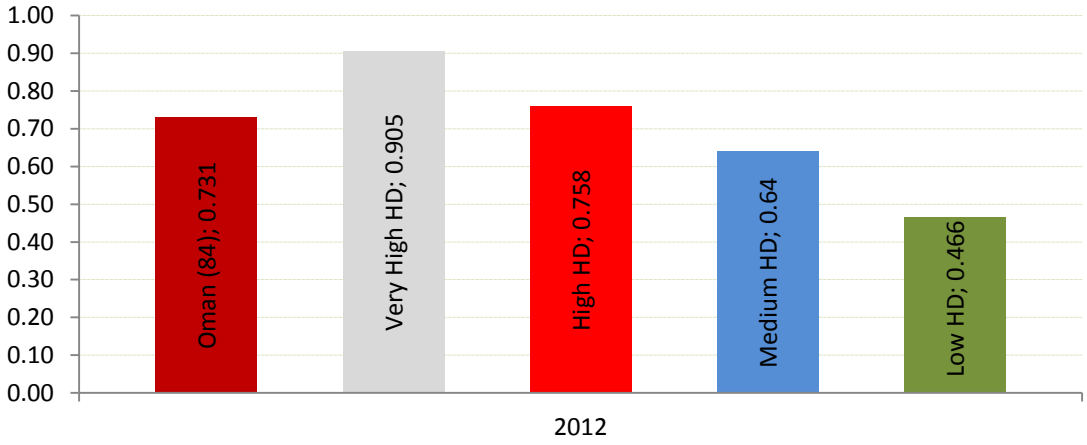


Figure 20: Human Development Index (HDI) in Oman and in Human Development (HD) Groups
Source: **(41)**

The "**Gender Inequality Index** (GII)" is interpreted as the percentage loss to potential human development due to shortfalls in the dimensions included in HDI because of gender inequality; the higher the values of GII the lower the achievement. Oman's GII was estimated to be 0.340 compared with a world average of 0.463 (better than the world average) and has been ranked in the 59th position. This is interpreted as 34% loss of the human development because of gender inequality (41).

Human poverty essentially measures deprivation of opportunities and choices most basic to human development. The **Human Poverty Index** (HPI) is therefore closely related to the "Human Development Index". Oman had HPI of 14.7% (minimum1.5% - maximum 59.8%; the lower the better) in the Human Development Report 2009 (42) and was ranked 64 among 135 countries.

Technology, Communication and Transportation

The Government of has always laid emphasis on adopting new technologies that would promote development. The "Information Technology Authority (ITA)" was established in May 2006 by the Royal Decree (No. 52/2006). It is responsible for implementing national information technology (IT) projects and supervises projects related to the implementation of the Digital Oman Strategy. It has the vision to transform Oman into a sustainable knowledge society (43). ITA in Oman has developed clear policies and through its initiatives, has developed e-government, e-business and a number of citizen-centric initiatives connecting the society with the Government. Table 7 shows that internet subscribers have increased more than four fold since 2000 (37) showing that the society is aware of and is using the latest technology for communication and acquiring knowledge (Figure 21). Mobile phone subscribers have increased by more than thirty-two fold since 2000 (37) (Figure 22).

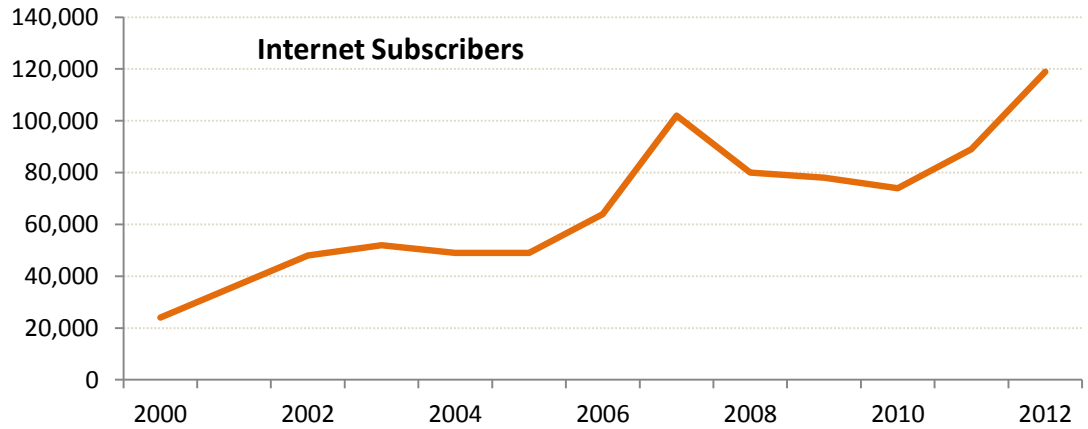


Figure 21: Number of internet subscribers since 2000

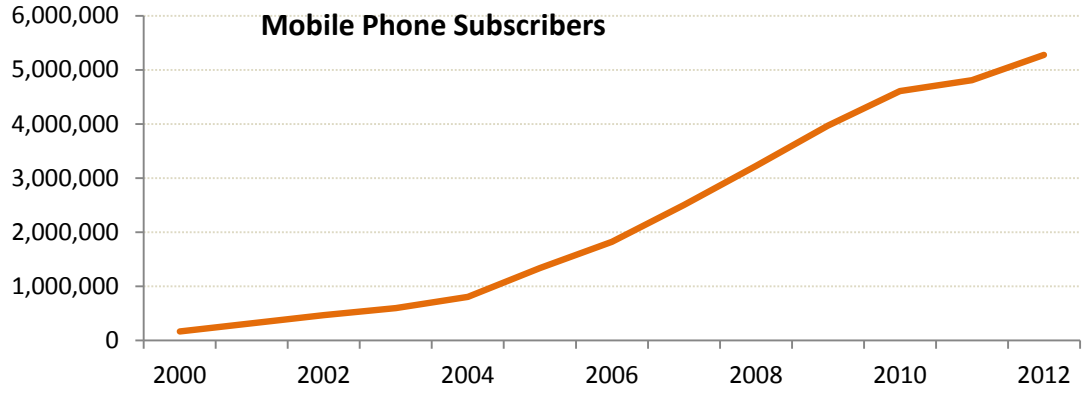


Figure 22: Mobile phone subscribers since 2000

The **Networked Readiness Index** (NRI) has four components: the environment of Information and Communication Technology (ICT), the readiness of the society to use it, actual usage and its impact on the economy and society. In its report "The Global Information Technology Report 2013", the "World Economic Forum" has ranked Oman in the 40th position among 144 Member States as regards the NRI (44). Oman scored 4.5 out of 7; highest score was 5.98 for Finland. The report ranked Oman 21st as regards Government usage of information and communication technology (ICT) but it had given a lower score (3.6) for business usage. It seems that society is ready to use ICT as it is affordable (5.9 out of 7) and individuals have the skills (4.8 out of 7).

The increase in the number and length of asphalted roads will improve transportation of people and goods and will contribute heavily to the development of the economy. It will also increase accessibility to health services. Asphalted roads have increased by about 3.5 fold since 2000 (Table **7**).

Environmental Characteristics

The Sultanate of Oman frequently passes through long periods of drought and as a result of population growth, social developments and changes in life-style, the demand for water is continuously growing in the country. Oman depends on groundwater and its limited rainfall. Several national activities have taken place for preserving water resources and rationalizing water use. Several legislations have been made to help enforce water resources conservation, for example; The Royal Decree (No. 82/1988), The Royal Decree (No. 29/2000) and The Royal Decree (No. 114/2001) for preserving national water resources and protecting them from pollution. (45). A National Conservation Plan has also been drawn up to rationalize and improve water consumption practices and explore for new groundwater reserves. Drilling new wells or deepening or replacing existing one must be licensed by the Ministry of Regional Municipalities and Water Resources (MRMWR).

Oman's "Falaj" (water channels) is one of the ancient ways for water management. It had been viewed as an Omani cultural behavior. It is considered as an effective method of water management. Water falls from mountain-tops and travels from one Falaj to another forming a

Falaj network that goes to populated areas. The water in Falaj is carried by the earth's gravity and the natural incline of the land over long distances without using pumps or any other mechanical means. There are 4,112 Falaj in the Sultanate of Oman, 3,017 of which are currently in operation (46).

Desalination plants are the source of drinking water in the country. Treated water is distributed through a 4,500 kilometers long piped network (46). Data show that about 77% of households use safe water[ii] in 2010 and more than 87% use safe drinking water[iii] (Table 12) (10). Table 12 compares sources of water in the 2003 and 2010 censuses (9) (10).

Table 12: Sources of Household and Drinking Water

Water Sources	Household Water		Drinking Water	
	2003	2010	2003	2010
Piped Water	52.5%	56.5%	43.1%	34.7%
Public Water Point	12.1%	20.4%	16.9%	20.6%
Private Well	14.3%	10.6%	4.3%	4.0%
Well Outside the House	18.4%	10.7%	16.7%	6.5%
Falaj		0.7%		1.0%
Bottled Water			15.4%	32.3%
Others	2.6%	1.1%	3.8%	0.9%
Total	100.0%	100.0%	100.0%	100.0%

Sources: (9), (10)

The "GLAAS 2012 Report: UN-Water Global Analysis and Assessment of Sanitation and Drinking Water" classifies Oman among countries having 76%-90% improved drinking water (47). Health data show a reduction in diarrheal diseases in children aged under 5 years from 497 cases per 1,000 children in 1995 to 263 in 2012; a reduction of 47.1% (48). The improvements in drinking water have possibly contributed to such a reduction. The report had classifies Oman among countries achieving the Millennium Development Goals on drinking water (49).

Data show that 99% of households in Oman have improved sanitation in 2010 and that sanitation has improved significantly over the years (Table 13) (46). The data show that Oman is among countries having more than 90% coverage with improved sanitation facilities. Development plans in the country have taken waste-water services into consideration. A number of government organizations were formed with a mandate to take over wastewater services for major cities by planning, designing and implementing a world class collection, treatment and disposal systems. "Haya Water" was established in January 2006 to implement and operate the wastewater collection, treatment and effluent distribution system in the Governorate of Muscat. Similarly, the "Salalah Sanitary Drainage Services Company" is responsible for wastewater systems in the City of Salalah and "Sohar Development Office" is responsible for Sohar City and adjoining areas (50). Apart from these 3 major cities the remaining of the country mainly rely on conventional septic tanks and effluent taken to conventional treatment plants using tanker services for treatment and disposal, managed by the Ministry of Regional Municipalities and Water Resources.

[ii] Safe water for household use includes piped water and public water point.

[iii] Safe drinking water includes piped water, public water point and bottled water

Table 13: Estimated coverage for sanitation in Oman

Year	Improved Sanitation	Unimproved Sanitation	Open defecation
1990	82%	6%	12%
1995	86%	4%	10%
2000	90%	0%	10%
2005	95%	5%	
2010	99%	1%	

Source (46)

The Government of Oman has developed policies with regard to the management and operation of solid and health care wastes. Through the Royal Decree (No. 46/2009), "The Oman Environmental Services Holding Company (OESHCO)" was established to be responsible for all areas of waste management, including waste collection, transportation, separation and processing, recycling, incineration, land-filling, handling of solid, industrial (hazardous and non-hazardous waste) and health care waste and remediation of environment loads (51). OESHCO organizes and privatizes the waste management and environmental protection activities across the country.

Natural phenomena as cyclones and earthquakes affect Oman, like other parts of the world. However, their effects were limited.

During the recent history, five known cyclones of varying intensities have hit Oman. The most severe of these cyclones was the Gonu cyclone in 2007 causing fatalities and severe damage to infrastructure in some parts of the country. Intense tropical cyclones like Gonu are extremely rare over the Arabian Sea, since most storms in this area tend to be small and dissipate quickly (52). The following is a list of the five cyclones; in chronological order, with a brief description of each to reflect the severity of such phenomenon in Oman;

1977 Oman Cyclone — The 1977 Oman cyclone was the second-strongest cyclone on record to hit the Arabian Peninsula, after Cyclone Gonu. The storm struck Masirah Island and later southern Oman on June 13, before dissipating the next day over Saudi Arabia. It killed at least 105 people and left 50,000 homeless.

2002 Oman cyclone — The 2002 Oman tropical cyclone struck the Dhofar Governorate in May 2002. It made landfall near Salalah; shortly thereafter it dissipated. The storm brought the heaviest rainfall to Dhofar in 30 years, causing flooding and creating rivers in wadis, or typically dry riverbeds. Several people drowned after their vehicles were swept away by the flooding.

2007 Gonu — Cyclone Gonu is the strongest tropical cyclone on record in the Arabian Sea. It developed in the eastern Arabian Sea on June 1, 2007 and made landfall on the eastern-most tip of Oman on June 6, 2007 becoming the strongest tropical cyclone to hit the Arabian Peninsula. The cyclone caused 50 deaths and damage of a few billion US$ to infrastructure. The cyclone was considered the nation's worst natural

	disaster. Gonu dropped heavy rainfall near the eastern coastline, reaching up to 610 mm (24 inches), which caused flooding and much damage.
2010 Phet	Cyclone Phet was a very severe cyclonic storm. Phet developed from a low pressure area in the Arabian Sea and organized into a tropical cyclone on May 31 and made landfall in the Oman on June 4, 2010. Damage from Phet in Oman was limited and did not cause losses in lives.
2011 Keila	Cyclonic Storm Keila developed from a low pressure area in the Arabian Sea and organized into a tropical depression on October 29. It struck the Oman coast to the south of Salalah. This resulted in widespread floods and 14 fatalities.

A massive earthquake of magnitude 7.8 had hit the Islamic Republic of Iran in April 2013 and was felt in Oman, especially the northern parts of the country. It did not result in any losses of lives or damage in Oman. However, during the past 12 years there were 40 mild to moderate earthquakes that have hit the surroundings of Oman. They were all of magnitude ranging from 3.8 to 5.2 and rarely felt by the people of Oman and did not result in any losses of lives nor did they cause any damage. Predictions show that no earthquakes are expected to hit Oman till the year 2042 (53). However, there are high seismic activities that may occur in the Islamic Republic of Iran during late April 2013 and may be felt in Oman but not expected to cause any damage (53).

Ministry of Environment and Climate Affairs is developing Omani standards for Ambient Air Quality (AAQ). Currently there are 3 monitoring stations installed in Rusail, Rasisout harbor and Sohar Industrial areas (46). Several activities are developed in other areas as chemical safety, food safety, occupational health and safety and injury prevention.

Tourism

Tourism has developed slowly in Oman. During the past decade a number of hotels and hotel rooms were established. Table **7** shows that hotel beds increased by more than two fold and its occupancy remained at an average of 50% (37). The World Economic Forum in its report, "The Travel & Tourism Competitiveness Report 2013" (54), had classified Oman among countries most welcoming to tourists.

Chapter 3
Health Systems and the Health System in the Sultanate of Oman

Quality Care, Sustained Health

عناية راقية وصحة مستدامة

Chapter 3
Health Systems and the Health System in the Sultanate of Oman

Health Systems

The key purpose of Health Vision 2050, as previously mentioned on page 4, is to review the Omani health system with the aim to develop a strategy to strengthen it. The common understanding of what a health system is? What constitutes a health system? And the understanding and the appreciation of the relationships among its different components are essential for developing effective and successful strategies for strengthening the health system.

The World Health Organization (WHO) definition of a health system is a system that "consists of all organizations, people and actions whose primary intent is to promote, restore or maintain health" (55). Better health is the primary and most important goal of any health system. A health system should also be concerned with non-health needs. It should ensure that people fairly share the burden of paying for health, such that no one is exposed to great financial risk because of seeking health. A health system should also attend to people's wishes and expectations on how they are treated by providers of care or non-personal services. The World Health Report 2000 has defined the goals of a health system as improving health and health equity in ways that are responsive to non-health needs, financially fair and make the best or most efficient use of available resources (23). The Health Vision 2050 uses the "WHO Framework for Action on Health System" (55) to describe the main six building blocks of the health system: leadership or governance, financing, human resources for health, service delivery, information, and medical products, vaccines and technology. The relationship among these main six building blocks is shown in Figure 23. The figure shows that social determinants of health, as described before, affect these blocks and their interaction.

The WHO Framework for Action (55) defines the working blocks as follows:

"**Leadership and governance** involves ensuring that strategic policy frameworks exist and are combined with effective oversight, coalition-building, regulation, attention to system design and accountability."

"**Health financing**; a health system should raise adequate funds for health in ways that ensure people can use needed services and are protected from financial catastrophe or impoverishment associated with having to pay for them."

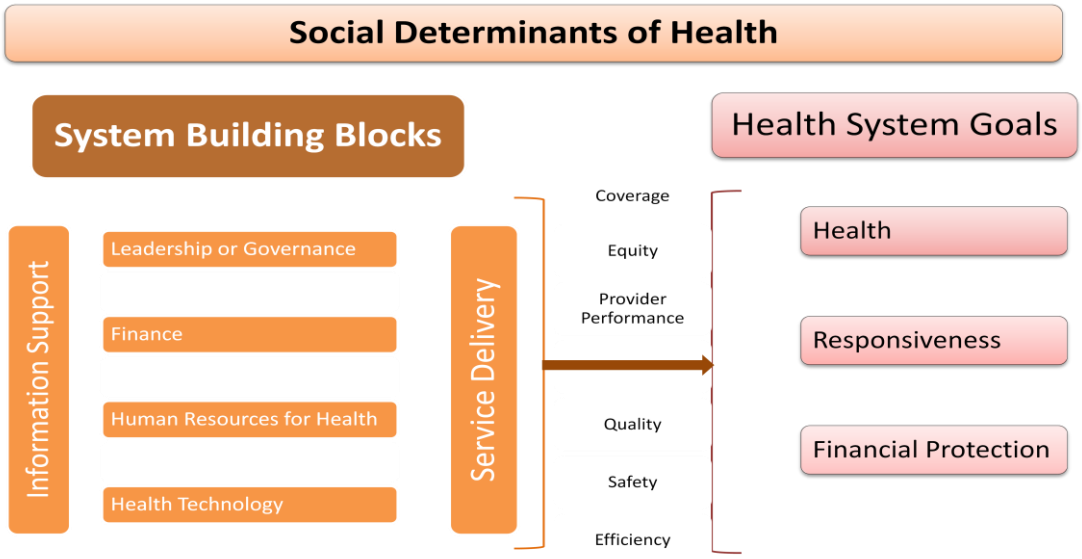


Figure 23: Health System Conceptual Framework
Source: **(55)**

"**Human Resources for Health** or Health Workforce works in ways that are responsive, fair and efficient to achieve best health outcomes possible, given available resources and circumstances (i.e. there are sufficient staff, fairly distributed; they are competent, responsive and productive)."

"Health services are those which deliver effective, safe, quality personal and non-personal interventions to those who need them, when and where needed, with minimum waste of resources."

"**Health Information System** ensuring the production, analysis, dissemination and use of reliable information on health determinants, health system performance and health status."

"**Medical products, vaccines and technologies** should be of assured quality, safe, efficacious and cost-effective, scientifically sound and used efficiently."

Health System in the Sultanate of Oman

Based on the definition of health system described above in page 48, the health system in Oman can be seen to consist of a health-care delivery system, other sectors related to health and community participation.

Health-Care Delivery System in Oman

The health system in Oman is characterized by its universal coverage for both citizens and non-nationals. The Total Health Expenditure (THE) accounts for about 2.7% of the Gross Domestic Products (GDP) and the annual per capita health expenditure is about Rials Omani (RO) 218.1 (equivalent to US$568 at exchange rates[iv] or 591 in Purchasing Power Parity

[iv] Exchange rate: RO 1= US$ 0.384

(PPP) -adjusted international dollars). The health system is financed mainly by the Government. The Government spends about 81.1% of THE. Out-of-pocket spending for direct purchase and cost sharing accounts for about 61.4% of private health expenditure (or 11.6% of THE) and the remaining (7.3% of THE) are covered by sponsoring and/or insurance companies (33). Services purchase by private sector varies according to services; 5.5% for the most expensive services which are inpatients services and 37.8% for outpatient services.

Health care is directly provided in facilities mainly owned and operated by the Government. The Government provides about 83.1% of hospitals and about 92.5% of hospital beds. Public health services are run by 77.5% of the doctors in the Sultanate, 85.7% of nurses and 77.4% of other paramedics. About 63.5% of dentists and 72.5% of pharmacists work in the private sector (3).

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 University Hospital (SQUH), Diwan Medical Services (Diwan MS), Petroleum Development Oman Medical Services (PDOMS) and the Private Sector. Table 14 shows the health care facilities in the Sultanate of Oman (3).

Table 14: Health Care facilities in the Sultanate of Oman, as on December 2012

	Hospitals	Hospital Beds	Health Centers & Extended Health Centers	Clinics
Ministry of Health [a]	49	4,659	192	
Sultan Qaboos University Hospital	1	473	1	
Armed Forces Medical Services	3	323		35
Royal Oman Police Medical Services	1	74		3
Diwan Medical Services				2
Petroleum Development Oman Medical Services				9
Private Sector[b]	11	448		975
Total Health Care Facilities	**65**	**5,977**	**193**	**859**

[a] Hospitals that belong to MOH are classified into Governorate (Regional) hospitals (14) which act as tertiary and or secondary hospitals, wilayat hospitals (5) 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

[b] There are in addition 476 private pharmacies

Other Sectors Related to Health

Health is considered as input to and outcome of economic, social and cultural developments. The attainment of the health of the population thus requires more than just providing health services by the health sector. Sectors such as municipalities, environment, water, education, social development, agriculture, youth, media and electricity are examples of sectors supportive to health sector for health development. Oman has witnessed remarkable economic and social developments during the past forty years. Developments in education by providing schooling and reducing illiteracy, improvements in environment, the contribution of the

media and communication in improving awareness of health have all contributed to health developments and the overall development in the country.

The Ministry of Health has initiated wilayat health committees to enhance interactions among different sectors. These committees are headed by wilayat leader (Wali) and have members from different health-related sectors. These are committees at the wilayat level, the smallest basic unit in the health system and being close to the population they are able to identify the main health problems in their own community and identify ways to combat such health issues. The committees also help to facilitate and coordinate between the health sector and other health-related sectors and non-governmental organizations. The wilayat health committees have tackled several health issues and had raised the awareness of the population towards health. The people have supported several health projects, both financially and physically, through these committees.

Community Participation

Ministry of Health has always considered community participation important in planning and providing health care. A network of volunteers; Community Support Group (CSG), was formed in 1992 to promote breast feeding and advocate for birth spacing. The initiative proved to be very successful. It was followed by the establishment of Wilayat Health Committees which allowed inter-sectoral collaboration together with community participation. Other community based initiatives include: Wadi Ma'awel Healthy Wilayat Project in 1994, Healthy Life Style Program in Nizwa in 1999, Healthy City in Sur in 2002, Healthy Village in Qalahat in 2002 and Healthy villages and neighborhoods programs in 4 wilayates of Muscat Governorate in 2004. Recently, the concept of Healthy City is being implemented in Sohar and Healthy Life Style Program in Salalah. These initiatives have in common the objectives of increasing the awareness of the respective communities to environmental and health problems, and creating physical, environmental, social, institutional and economic environments that support health actions. A central body for Community-Based Initiatives was established in the Ministry of Health to provide technical support for such initiatives.

Chapter 4
Health Status in the Sultanate of Oman

Quality Care, Sustained Health

عناية راقية وصحة مستدامة

Chapter 4

Health Status in the Sultanate of Oman

Health Status

The Sultanate o f Oman has made remarkable achievements in health developments over the past four decades. The health achievements have been praised by a number of international organizations. The United Nations Children's Fund (UNICEF) in its "Progress of Nations 1993" report (56) ranked Oman first in Middle East and North Africa Region (MENA) and second globally as regards the percentage of reduction of Under Five Mortality Rate (U5MR). Oman was able to manage a two-thirds reduction in U5MR in only 10 years, between 1981 and 1991.

The same report also ranked Oman first in MENA as regards measles immunization coverage. Oman was among the 12 developing countries that achieved the 2000 year target, set by the "World Summit for Children 1990' of at least 90% childhood immunization coverage, long before the target date. The Human Development Report 1997 of the United Nations Development stated that "Beginning in 1970, Oman undertook a comprehensive program of human development, achieving some of the most rapid advances ever recorded. Life expectancy has increased by 30 years; from 40 years in 1970 to 70 years in 1994. Infant mortality was reduced from more than 200 per 1,000 live births in 1960 to less than 30 in 1994" (22). This report considered Oman as a global pace-setter for human development especially in areas of health and education.

A study commissioned by the Government of Oman, the UNICEF and the World Health Organization (WHO) on health achievements in Oman reported that Oman's decline in childhood mortality is one of the fastest recorded in the world (57). In its "World Health Report 2000", WHO ranked the health system in Oman first among the 191 Member States in efficiency to improve health and 8th as regard overall efficiency of the health system (23). The "World Health Report 2008" (24) reported on Oman's sustained investment in health services that have resulted in almost universal access to health care for Oman's population and better health represented by increase in life expectancy at birth by 14 years and a 94% reduction in Under-Five Mortality Rate (U5MR) between late seventies and 2006. In an article published in UNDISPATCH on March 22nd, 2010, Mathew Cordell cited the comments of the WHR 2008 giving Oman's achievements as an example of success in health care development (58). Lately, the "Health Development Report 2010" (59) reported that Oman had the fastest progress in Human Development Index and such progress was attributed particularly to achievements in health and education. The health status in the Sultanate of Oman will be described in the following areas:

- Mortality Rates and Life Expectancy at birth
- Fertility Rates
- Maternal health
- Child health

- Communicable diseases
- Non-Communicable Diseases
- Geriatric Health

Mortality Rates and Life Expectancy

The Sultanate of Oman has witnessed a remarkable reduction in mortality indicators over the years (Table 15) (60). The Crude Death Rate (CDR) declined from 13.3 per 1000 population in 1980 to 3.2 in 2012. In 2012 the Infant Mortality Rate (IMR) is one-thirteenth its value in the early 1970s and the Under-Five Mortality Rate (U5MR) is one-sixteenth its value in the same period (Table 15). The reduction in mortality is accompanied by an increase in life expectancy at birth by slightly more than 1.5 fold during the same period to reach 76.2 years.

Table 15: Mortality Indicators for the Sultanate of Oman

Indicators	1970	1975	1980	1985	1990	1995	2000	2005	2012
Crude Death Rate (/1,000 population)			13.3	9.9	7.6	6.1	3.7	2.5	3.2
Infant Mortality Rate (/1,000 Live Births)	118[a]	103	64	45	29	20	16.7	10.3	9.5
Under 5 Mortality Rate (/1,000 Live Births)	181[a]	149	86	52	35	27	21.7	11.1	11.5
Fetal Death Rate (/1,000 births)			16.6	16.4	13.3	11.8	10.0	9.1	8.3
Maternal Mortality Rate (/100,000 Live Births)						22	16.1	15.4	17.8
Life Expectancy at Birth (years)	49.3	52.7	57.5	61.6	69	71.6	73.5	74.3	76.2

[a] for 1972
Blank cell: not available
Source: (3)

Mandatory registration of vital events (births and deaths) was only implemented in May 2004 (61) according to the "Civil Status Law" (62) following the Royal Decree (No. 66/99). The mortality indicators using direct estimates from death registration started in 2007 (61). Before 2007, mortality indictors were estimated using a data from socio-demographic surveys; socio-demographic survey for 5 towns in 1975 (63) and the socio-demographic survey of 11 towns in 1977 (64), the Child Health Survey in 1988/89 (12), the Oman Family Health Survey in 1995 (65), the 1993 General Census (8) and the 2003 General Census (9). The direct estimates from death registration that started in 2007 confirm the reduction in mortality described by the estimates from the demo-graphic surveys.

Data on infant deaths show that about 63% of deaths occur during the first week of life and that 79% take place during the first month of life (Figure 24). Table 16 shows that such deaths are mainly due to congenital anomalies and malformation and other causes related to slow fetal growth, fetal malnutrition and disorders related to short gestation and low birth weight (3). These causes are difficult to control using the usual public health measures. Figure 24

shows the continuous decline in the proportion of infant deaths above 28 days of age over the years, reflecting the success in implementing proper public health measures controlling mainly infectious disorders. Fetal death rate has also declined from 16.6 per 1,000 births in 1980 to 8.3 in 2012 (Table 15) and the causes of fetal deaths could be assumed to be the same as early neonatal deaths. About 13% of fetal deaths show congenital anomalies and about 49.8% showed maternal risk factors (positive consanguinity 24.6%, pregnancy induced hypertension 10.9% and diabetes mellitus 14.3%) (3).

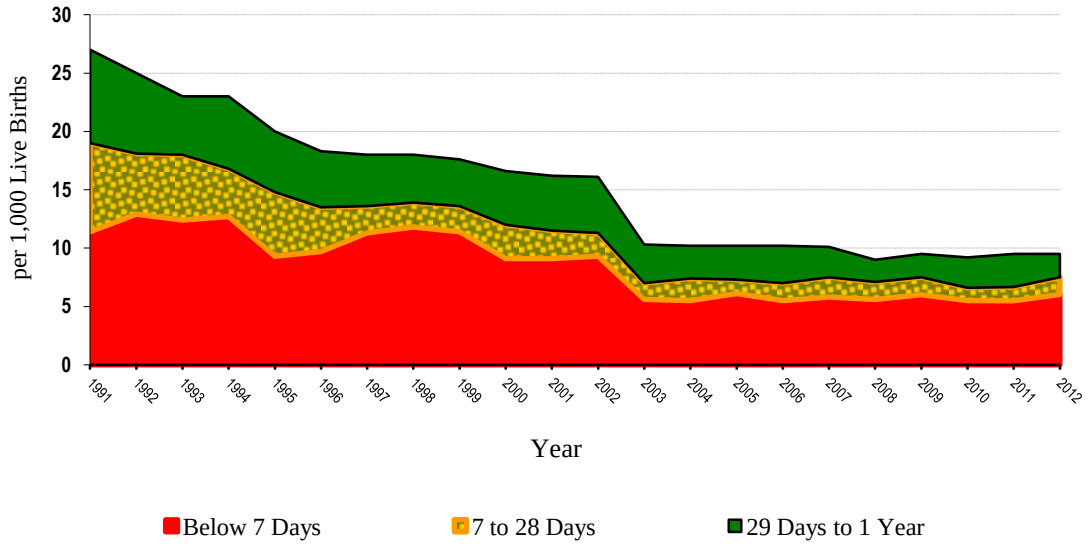


Figure 24: Infant Mortality Rate according to infant age, 1991 to 2012
Source: **(3)**

Table 16: Main causes of infant death in Ministry of Health hospitals

Indicators	Percent of total age group
Below 7 days	
Congenital anomalies and malformations	21.6%
Slow fetal growth, fetal malnutrition & disorders related to short gestation and low birth weight	21.6%
Respiratory distress of newborn	8.6%
Birth asphyxia	5.8%
7-28 Days	
Congenital anomalies and malformation	22.4%
Bacterial sepsis of newborn	15.3%
Slow fetal growth, fetal malnutrition & disorders related to short gestation and low birth weight	11.8%
Respiratory distress of newborn	11.8%
29 Days to 1 Year	
Congenital anomalies of heart and circulatory system	27.8%
Pneumonia	9.6%
Respiratory distress of newborn	5.2%
Slow fetal growth, fetal malnutrition & disorders related to short gestation and low birth weight	4.3%

Source: (3)

Maternal mortality rate has been fluctuating over the years; the lowest figure of Maternal Mortality Ratio (MMR) (per 100 thousands live births) reported in the last two decades was 13.2 in 2006 and the highest was 37.5 in 2002. Fluctuations can be explained by the low numbers of maternal deaths over the years, the relatively low numbers of live births in Oman and the calculation of MMR using 100 thousands live births in the denominator. The annual number of maternal deaths ranged from a minimum of 6 to 18 deaths. An example of such fluctuations was seen recently; the MMR in 2009 was reported to be 13.6 per 100 thousands live births and became 26.4 in 2010 and came back to 17.8 in 2012 (3).

Figure 25 and Figure 26 show life expectancy in years and infant mortality rate; respectively, in Oman compared with the average in the Eastern Mediterranean Region, High Income Countries and selected developed countries; as estimated by the World Health Organization for 2011 (33). Oman has a higher life expectancy than the average in the Eastern Mediterranean Region; however, it is significantly lower than its estimates in the high income countries and the selected developed countries in three continents. On the other hand Figure 26 shows that infant mortality in Oman is low and approximates the level in high income and developed countries reflecting Oman's achievements.

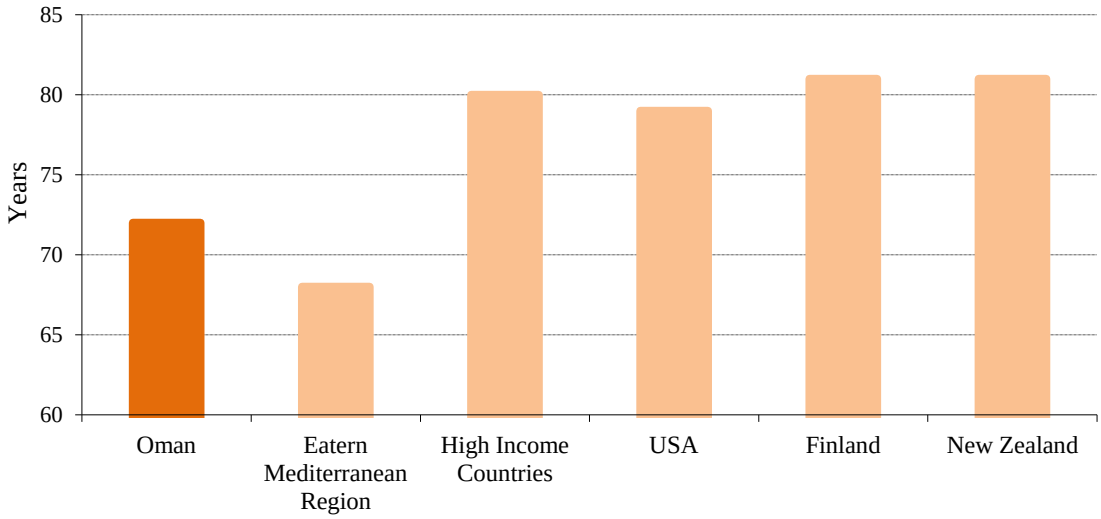


Figure 25 : Life expectancy at birth (in years) in Oman compared with other countries (2011)
Source: **(33)** (data from World Health Statistics 2013 for the years 2011 for comparability purposes)

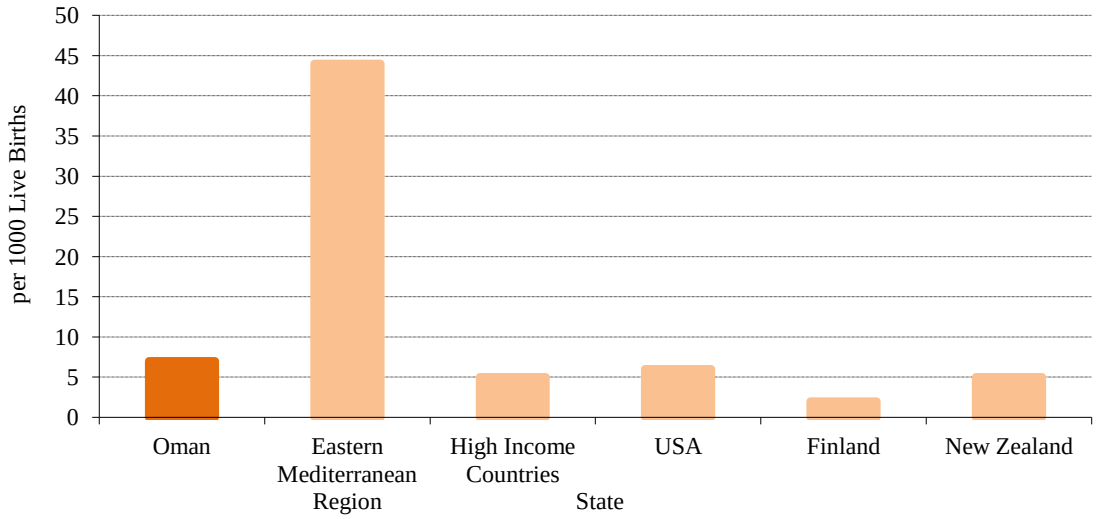


Figure 26: Infant Mortality Rate (/1,000 live births) in Oman compared with other countries (2011)
Source: **(33)** (data from World Health Statistics 2013 for the years 2011 for comparability purposes)

Fertility Rates

Data show a significant reduction in fertility indicators over the years. The Crude Birth Rate (CBR) declined from 50 live births per 1,000 population in 1980 to 32.1 in 2012 and the Total Fertility Rate (TFR) declined from 10.1 per women (15-49 years of age) to 3.7 during the same period (Table 17). The decline in fertility could be the result of several interacting socio-economic factors. The singulate mean age at first marriage (SMAM) has increase from 20.7 years in females and 24.7 in males in 1993 (8) to 26.8 and 29.1, respectively in 2008 (27). The "Birth Spacing Program" which started in 1994 (66), has contributed to such reduction in fertility through the educational campaigns it has sponsored and through making available modern methods for birth spacing; pills, injections and condoms.

Table 17: Fertility indicators for the Sultanate of Oman

Indicators	1980	1985	1990	1995	2000	2005	2010	2012
Crude Birth Rate (/1000 population)	50	48	44.7	34.0	32.6	24.8	29.2	32.1
Total Fertility Rate (/woman 15-49 years)	10.13	7.8[a]	n.a.	6.0	4.7	3.1	3.3	3.7

[a] TFR for 1988 (Child Health Survey 1992) (12)
n.a.: not available,
Source: (3)

The rapid decline in mortality during the 80s accompanied with high level of fertility had resulted in high natural growth rate (averaging 3.7%) during that period. The natural growth rate had declined following the decline in fertility to reach a minimum of 2.2% in 2006 (60). During the last few years; since 2007, there has been an increase in both mortality and fertility rates and fertility rates have out-proportioned mortality rates resulting in an increase in the natural growth rate during these years (Figure 27).

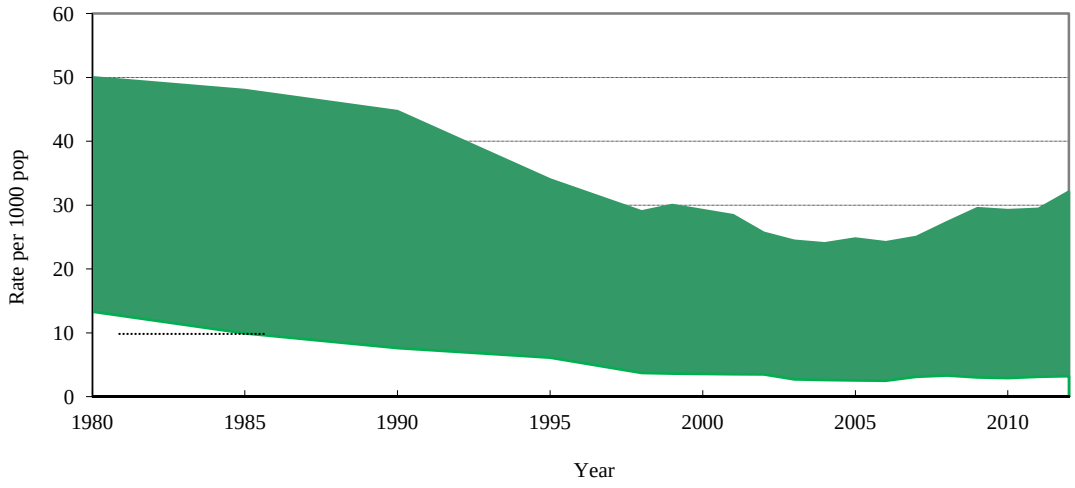


Figure 27: Natural Increase Rate
Area between Crude Birth Rate (above) and Crude Death Rate (below)

Maternal Health

Women in the reproductive age group (15-49 years) and children aged under 5 years collectively constitute about 41% of the total Omani population; 27.1% and 13.9% respectively (see Chapter 1). The health system in Oman had always considered such population groups a priority not only because of the proportion of the population they make up, but also because they are exposed to different risks. Maternal and Child Health services were uniformly implemented in Oman since August 1987 (66). The main objective was to provide comprehensive care to mothers and their children and to promote health and reduce morbidity and mortality in both groups.

There was a great concern to encourage pregnant women to register for antenatal care (ANC). Table 18 shows that only less than 1% of women who delivered in 2012 did not register for ANC, a pattern seen since 1996 (67). Early registration during the first trimester has increased steadily from 45.1% in 1996 (67) to 66.5% in 2012 (3). Data also show that there are increasing numbers of women who register for ANC over the years. Combining such findings together with the near complete coverage for ANC and the reductions in abortion rates can explain the increased number of live births and the escalation of the Total Fertility Rate (TFR) during the same period as seen in Table 17. This later is in spite o the fact that more than one third (34%) of women who delivered in 2012 have spaced children by three or more years and 42.5% by 2-3 years after their latest pregnancy. A pattern, if continues, is expected to have a positive effect on maternal morbidity and mortality. The apparent reduction in the mean number of visits per pregnancy can be explained by the change in policy for ANC services in 2008 which reduced the required number of visits during a single pregnancy from 13 visits to 6 visits, following World Health Organization recommendations. The mean number of ANC visits per pregnancy reached 6.0 in 2012 (Table 18) which is consistent with ANC services policy. This reflects the awareness of the population about the importance of utilizing ANC services especially for high-risk pregnancies. This increase in ANC care allows identification of high-risk pregnancies and their needs and this has been reflected in the decrease of emergency/elective caesarean section ratio from 6 in 1995 to 3.2 in 2012 (Table 18).

Anemia among pregnancy has declined from 54% in 1986 (68) and 39.3% in 1996 (67) to 26.7% in 2012 (3). Other forms of morbidity associated with pregnancy include diabetes (4.8%) and hypertension (1.1%).

Table 18: Maternal morbidity indicators (Ministry of Health Institutions)

Indicators	1980	1985	1990	1995	2000	2005	2010	2012
Number registered for ANC (No. 1st Visit)	8,175	25,002	51,365	52,692	49,309	52,037	67,480	78,034
Number of follow-up visits	26,410	87,061	242,758	314,355	339,969	392,877	352,921	388,884
Mean No. of visits per pregnancy	4.2	4.5	5.7	7.1	7.9	8.6	6.2	6.0
% Registered in 1st trimester					57.6%	65.5%	64.9%	66.5%
% Anemic					36.5%	33.1%	27.9%	26.7%
% Hypertensive					1.0%	0.9%	1.3%	1.1%
% Diabetic					1.2%	2.0%	6.5%	4.8%
% Visited ANC clinic 6 or more visits					75.7%	86.2%		
% Visited ANC clinic 4 or more visits							85.3%	80.4%
% Never visited ANC clinic					0.9%	0.6%	0.6%	0.6%
Number of Postnatal visits	3,403	4,434		63,235	65,300	68,216	67,452	68,445
Ratio postnatal visits to registered	0.42	0.12		1.2	1.3	1.3	1.0	0.9
% Birth Interval < 2 years					23.7%	20.7%	24.4%	23.3%
% Birth Interval > 3 years					32.7%	39.8%	35.2%	34.2%
% Delivered by Caesarian Section			5.1%	6.8%	9.7%	12.6%	16.4%	17.5%
Emergency/Elective CS Ratio				6.0	4.8	3.8	3.3	3.2
Low birth weight (/1,000 live births)	41.8	77.1	87.0	76.0	81.0	82.5	100.0	95.0
Abortion Ratio (/1,000 live births)			128	150	151	130	123	134
Abortion Rate (/1,000 women 15-49)			20.8	16.9	11.9	9.2	10.3	10.8
%Fetal deaths with congenital Anomalies					19.6%	14.5%	12.9%	12.8

ANC: Antenatal care
CS: Caesarian section
Source: (3)

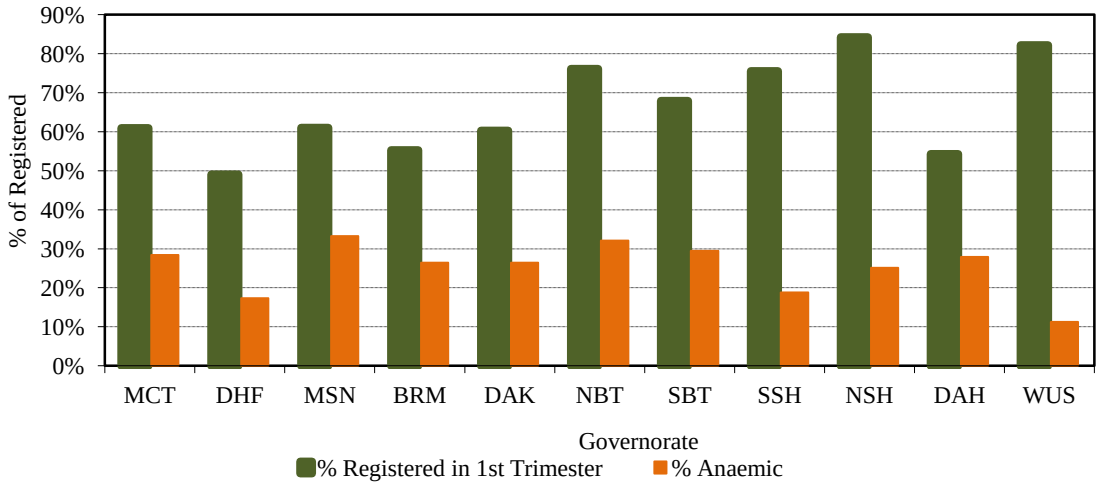


Figure 28: Variation among Governorates as regards early registration and level of anemia in pregnancy

MCT: Muscat, DHF: Dhofar, MSN Musandam, BRM: AlBuraymi, DAK: AdDakhiliyah, NBT: North AlBatinah, SBT: South AlBatinah, SSH: South AshSharqiyah, NSH: North AshSharqiyah, DAH: AdDhahira, WUS: AlWusta

There are variations among Governorates in maternal health indicators (Figure 28 and Figure 29). Data show low proportions of early registration in Dhofar, AdDhaira and AlBuraymi. Anemia in pregnancy was high in Musandam, North and South AlBatinah and Muscat. Diabetes was also high in North and South AlBatinah and in AdDakhiliyah.

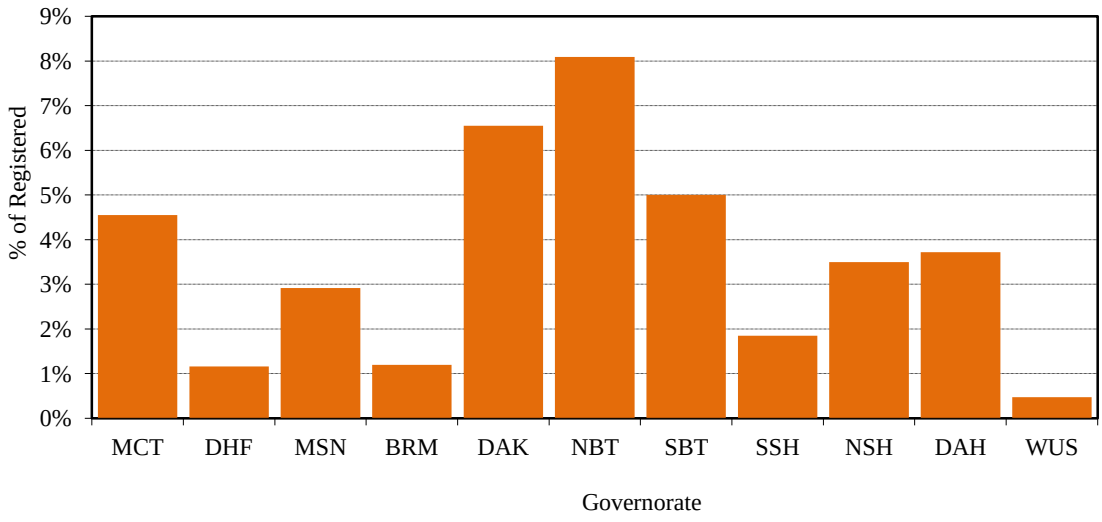


Figure 29: Variation among Governorates as regards Diabetes with Pregnancy
MCT: Muscat, DHF: Dhofar, MSN Musandam, BRM: AlBuraymi, DAK: AdDakhiliyah, NBT: North AlBatinah, SBT: South AlBatinah, SSH: South AshSharqiyah, NSH: North AshSharqiyah, DAH: AdDhahira, WUS: AlWusta

Child Health

Malnutrition among children aged less than 5 years was of great concern. The Oman Family Health Survey in 1995 showed that about one-fourth of children were underweight for their age, 13% suffered wasting and 22.9% were stunted (Table 20) (65). Such findings were alarming when compared to other countries with similar income levels and necessitated validation of such results. A "National Protein Energy Malnutrition Survey" was conducted in 1999 and had confirmed a high prevalence of malnutrition among children aged less than five years (Table 20) (69). It was clear from these surveys that severe forms of malnutrition were relatively uncommon (Table 20). A qualitative study carried out in 2002, to examine perceptions, attitudes and beliefs as well as causes of malnutrition in children in Oman (70) revealed that the most important causes of malnutrition in children were lack of awareness of protein energy malnutrition (PEM) among community caregivers as well as health workers, repeated pregnancies and short birth spacing periods and lack of safe sanitary water sources in some areas of the country causing repeated infections and affecting children's appetite. Data from routine examinations of school students revealed that 10.6% to 17% of students were underweight during the period between 2000 and 2012 and that 20% to 31% of underweight students were anemic (3) (67) (71).

Goiter was reported to be 10% in 1993 (72) and only 35% of households were reported to use iodized salts (73). Inadequate liver stores of vitamin A were reported to be 25.8% in infants aged 7 months, 13.6% in children aged 18 months and 7.9% in children aged 3 years in 1995 (74). About 38.9% of mothers had their breast milk deficient in retinol in 1997 (75).

Such levels of malnutrition among children and other important risk groups of the population were met by a number of procedures that included: promotion of breast feeding; breast feeding hospital initiative; establishment of PEM registers in primary health care facilities for early screening, follow up and management of malnourished children; implementation of community based initiatives for example triple A strategy; implementation of "Integrated Management of Childhood Illness (IMCI)" strategy; supplementation of micronutrients for example vitamin A (100,000 IU) for infants at 9 months of age and 200,000 IU at the age of 18 months. Vitamin A supplementations were also provided to mothers after delivery (200,000 IU). The high prevalence of anemia in pregnancy had necessitated iron supplementation program for all pregnant women in 1986. Health education campaigns to promote healthy foods. Fortifying food with micronutrients, for example fortifying flour with iron and folic acid in 1997 (76), (77) and oil with vitamin A (78). All nutritional guides and codes have been revised and there was an increase in coordination with other non-health sectors in such areas. Universal salt iodization was legislated in 1996.

Table 19: Cases of Protein Energy Malnutrition in children aged less than 5 years

Indicators	1995	2000	2005	2010	2012
Protein Energy Malnutrition Rate (/1000 children aged < 5 years)	128	15	22	6.9	4.6
% severe cases	3.0%	6.8%	7.1%	8.6%	10.1%
% hospital admitted of total cases					
For treatment of malnutrition	3.5%	4.8%	5.7%	3.7%	0.6%
For associated diseases		18.2%	10.3%	10.5%	2.8%
Deaths related to PEM (number)	10	0	3	0	1
PEM Cases improved to normal (% of total cases)			18.5%	29.3%	25.6%

PEM: Protein Energy Malnutrition
Source: (3)

These procedures have resulted in a remarkable improvement in nutritional status. The prevalence of underweight in children aged less than 5 years has declined in 2009 to about half its value in 1999 (8.9%), the wasting to 8.1% and stunting to 11.3% (Table 20). The proportions of children with PEM who improve to normal are on the rise (
Table **19**). About two-thirds (65.8%) of households consume iodized salt in 2004 (76). Coverage with vitamin A supplementation in infants, and mothers who have delivered has reached almost complete coverage (3). Anemia in pregnancy has declined to 26.7% (Table 18).

Table 20: Prevalence of Malnutrition in Children below 5 Years of Age

Indicators	1995	1999	2009
Underweight (Weight /Age)	23.6%	17.9%	8.9%
Severe Underweight (Weight /Age)	3.9%	1.5%	1%
Wasting (Weight /Height)	13%	7.0%	8.1%
Severe Wasting	1.6%	0.5%	0.6%
Stunting (Height /Age)	22.9%	10.6%	11.3%
Severe Stunting	8%	1.7%	1.4%
Overweight and Obesity (BMI / Age)			2.3%
Obese			0.4%
Anemia (<11 gm/dl)			60.2%
Severe anemia			0.6%

BMI: Body Mass Index
Sources: (65), (69), (79)

Communicable Diseases

The Ministry of Health, as the main stakeholder of the health system had adopted several strategies to control communicable diseases (80). These strategies were successful in controlling communicable diseases especially in children. The last case of poliomyelitis was reported in 1993. Since 1987 only two cases of diphtheria were reported in 1991 and 1992, respectively, and since 1991 only one case of tetanus neonatorum was reported in 1995 (66) (Table 21). Only three cases of measles were notified in 2012 compared with 3,675 in 1985 (3). This was the result of efforts to eradicate measles in Oman in the near future. Table 21 shows the declining trends in other communicable diseases.

Table 21: Communicable Diseases Notified to Ministry of Health

Disease	1985	1990	1995	2000	2005	2010	2012
Acute Poliomyelitis	33	0	0	0	0	0	0
Diphtheria	6	0	0	0	0	0	0
Tetanus neonatorum	11	0	1	0	0	0	0
Measles (all ages)	3,675	1,262	68	15	19	3	3
Rubella (all forms)	10	27	46	3	17	2	2
Whooping cough	765	49	814	190	36	34	130
Typhoid and paratyphoid	265	251	235	137	67	51	75
Food Poisoning (infectious origin)	319	174	596	953	447	764	323
Viral Hepatitis (all)	2,118	1,176	2,631	1,164	1,353	411	659
Meningococcal Infection	9	32	4	28	1	1	0
Haemophilus – meningitis			19	20	1	1	0
Bacterial and Viral Meningitis					23	21	29
Brucellosis	260	183	348	307	113	95	148
Leshmaniasis (cutaneous and visceral)	23	12	27	14	8	4	3
Schistosomiasis	5	29	6	3	2	2	1
Filariasis	20	1	0	2	0	0	0
Leprosy	32	13	38	12	9	6	7

Source: (3)

Among the strategies adopted by Ministry of Health was establishing a strong communicable diseases surveillance system in 1991. It had the objectives to register important communicable diseases, study sources of infection and take measures to prevent the spread of such diseases. The "Expanded Program of Immunization (EPI Program)" started in 1981 to immunize children against important childhood diseases (tuberculosis, poliomyelitis, diphtheria, pertussis, tetanus neonatorum, and measles). Coverage of children aged less than one year against these childhood diseases increased from 10% in 1981 to almost complete coverage in 1990 and has been maintained since then. Additional vaccines were introduced over the years to cover other serious diseases. Hepatitis B vaccine was introduced in 1990, the MMR (Measles, Mumps and Rubella) in October 1997 and haemophilus influenza vaccine in October 2001. As an upgrade of the immunizations services the Penta vaccine (Diphtheria, Pertusis, Tetanus, Hepatitis B and haemophilus Influenza B) was integrated in the services since July 2003. In addition, in 2003 the Ministry of Health started vaccinating all contacts of hepatitis B patients or carriers and all school children who did not receive hepatitis B vaccine before, and thus resulting in all the population born since 1985 to date being immunized

against hepatitis B. The pneumococcal vaccine was also introduced in 2008 to make the total number of targeted diseases eleven.
Efforts were also directed towards the control of other communicable diseases not included in the EPI program, for example brucellosis especially in Dhofar Governorate and leprosy which is no longer a public health problem. Filariasis is considered eradicated as there is no transmission within the country and the few cases reported in the past two decades were all imported cases; no single case of filariasis has been reported since 2004. The health system has set an effective epidemic preparedness plan to achieve the highest possible levels of early detection of communicable diseases and threats from global epidemics as has been seen with severe acute respiratory syndrome (SARS), Birds influenza (avian, H5N1) and Swine influenza (H1N1). Efforts were also directed to clean environments and plans for proper waste disposal, especially medical wastes (see page 44). Health education and increasing awareness of the people to the importance of communicable diseases preventions and the proper hygiene was among the most important strategies adopted by Ministry of Health.

Diarrheal diseases and acute respiratory infections in children aged less than 5 years have declined in 2012 to almost half their rates in 1995 (3) and the severe forms to about one-half and one-quarter, respectively (Table 22). There are no deaths related to either disease in the later years. Such infections have reached their endemic level and are not considered as public health problems in 2012; however, sustaining such achievements remains a challenge.

Table 22: Diarrheal diseases and acute respiratory infections in children aged less than 5 years

Disease	1995	2000	2005	2010	2012
Diarrheal Diseases (/1,000 children < 5 Years of Age)	497	322	263	239	254
Severe Dehydration (% of episodes)	0.4	0.3	0.2	0.1	0.2
Deaths related to Diarrheal Diseases (numbers)	2	0	0	0	0
Acute Respiratory Infections (/1,000 children aged < 5 years)	2,531	1,635	1,513	1,346	1,219
Severe Acute Respiratory Infections (% of episodes)	0.8	0.6	0.3	0.2	0.3
Deaths related to Acute Respiratory Infections (number)	6	0	2	0	0

Source: (3)

Table 23 shows that notified cases of pulmonary tuberculosis declined by 60% in 2010 compared with 1991, and that this reduction was evident in sputum negative cases. On the other hand, extra-pulmonary cases did not change over the years. A possible explanation of the later finding was the increase in the detection rate with advances in diagnostic abilities of the health system. However, 2012 witnessed about 35.5% increase in pulmonary tuberculosis compared with 2010. In spite of the fact that the prevalence of pulmonary tuberculosis has declined to about one-quarter its value in 1991; it has been almost stationary or slightly on the rise during the past decade (3). Case fatality rate dropped from 7.4% in 1991 to 5.3% in 2012 (3). The implementation of treatment under direct control (DOTS) has contributed significantly to the reduction of deaths from pulmonary tuberculosis. However, intensive control activities are needed to prevent the possibility of roll back TB in Oman.

Table 23: Development in Tuberculosis over the years

Disease	1991	1995	2000	2005	2010	2012
Total Number of pulmonary TB Cases	299 (216)	194 (145)	201 (145)	168 (129)	180 (103)	244 (130)
Sputum Positive Cases	150 (117)	135 (107)	164 (115)	131 (96)	152 (84)	205 (105)
Sputum Negative Cases	149 (99)	59 (56)	37 (30)	37 (33)	28 (19)	39 (25)
Extra-Pulmonary TB	106 (73)	82 (64)	112 (98)	89 (83)	124 (110)	131 (104)
Total Cases registered	405 (289)	276 (227)	313 (243)	257 (212)	304 (213)	375 (234)
Cases Cured	287	296	242	188	207	214
Cases Died	22	19	14	14	9	13
Cases Lost (Defaulters)	52	8	0	0	0	0
Cases on Treatment at Year end	426	155	121	133	147	151
Prevalence (100 thousands Omani population)	33.6	10	6.8	7.2	7.1	7.2

Data in brackets are Omani cases
TB: Tuberculosis
Source: (3)

The Sultanate of Oman has witnessed a success story in Malaria eradication. In 1975, almost every third individual in the population was infected with malaria (241,431 malaria cases were reported at that time) (81). In 1990, there were almost 33 thousands reported cases of malaria. Accordingly, in 1991 malaria eradication program was initiated and has resulted in a dramatic reduction in the number of cases to reach only 443 cases in 2006. However, since then detected cases are on the rise and 1,193 cases were reported in 2010 and 2,051 cases in 2012. The period 2004 to 2006 has witnessed no local transmission of malaria in Oman (60). Autochthonous cases are increasing lately; 59 cases were reported during the years 2010 to 2012. The annual parasite incidence had increased from 0 per 1,000 individuals in 2005 to 0.006 in 2012 (Table 24). Consolidation activities of malaria eradication, strengthening surveillance system and epidemic preparedness are essential to maintain achievements in malaria eradication and prevent the phenomenon of malaria rollback.

Table 24: Developments in Malaria over the Years

Disease	1990	1995	2000	2005	2010	2012
Total Malaria Cases	32,720	1,801	694	544	1,193	2,051
Autochthonous Cases		1,184	6	0	24	22
Annual Parasite Incidence (/ 1000 population)		0.566	0.002	0.000	0.007	0.006

Source: (3)

Table 25 shows that the incidence of sexually transmitted infections is on the rise. Whether this is a true phenomenon or it is because the increased awareness of the people towards the importance of treating such conditions promptly needs to be verified. However, such a rise in the incidence of these diseases is alarming and can be explained by the socio-demographic transition seen in the country. The youth and young adults (10-24 years of age) constitute slightly less than 40% of the Omani population. The increased travel of such high-risk groups to other countries and the global developments in the later years may be among the possible risk factors. A study performed in 2008 showed that only 3.9% of students of universities, colleges and higher educational institutes in Oman correctly identified ways of preventing the sexual transmission of HIV (82). In 2012 there are a total of 1,445 persons living with HIV (PLHIV) in Oman and about 53% of them are on anti-retroviral treatment (ART). It is worth mentioning that only 45% of PLHIV were assessed for laboratory parameters. A special clinic

was set up for managing AIDS patients and sufficient psychiatric councilors have been made available. In addition to such efforts, the Ministry of Health has provided health educational activities especially to high risk groups, peer education and had coordinated with media for such activities. Procedures to ensure blood safety have been introduced to eliminate blood transfusion as a source of HIV infection and other blood-borne infections. HIV ante-natal screening for pregnant mothers was also introduced during 2007 in an attempt to prevent vertical transmission from mother to fetus (80).

Table 25: Incidence of Sexually Transmitted Infections in Oman (/100 thousands population)

Disease	2000	2005	2010	2012
Sexually Transmitted Infections (100,000 Omanis)	40.1	51.8	88.5	126.6
Syphilis (100,000 Omanis)	5.7	2.2	1.8	0.9
Gonorrhea (100,000 Omanis)	13.7	3.4	3.9	3.2
AIDS (100,000 Omanis)	4.67	5.7	7.4	6.1
Ratio of Deaths to HIV Cases Registered	30.0%	22.9%	26.6%	26.0%

Source: (3)

Non-Communicable Diseases

During the past two decades the Sultanate of Oman has witnessed, as other parts of the world, an epidemiological transition to non-communicable diseases and other morbidity related to unhealthy life-style behaviors. Most communicable diseases have declined to endemic levels while the non-communicable diseases and other conditions related to changes in life-style behaviors are on the rise. This epidemiological transition could be attributed to several factors. Among such factors are the intense control activities directed towards communicable diseases (see page 63) by the health system. Demographic changes in the Omani population evident by the decrease in the proportion of the young below 15 years of age, increased proportions of the youth and the elderly and the increase in the life expectancy at birth (3); together with the other social and economic changes are among such factors.

Table 26 shows that communicable diseases seen in outpatient departments in MOH health centers and hospitals have declined by about 43% compared with 1996 to reach 6,745 morbidity episodes for every 1,000 individuals of the population, whereas; non-communicable diseases showed a 22% decline during the same period. Almost half (45.2%) of the morbidity episodes seen are related to non-communicable disease; a pattern seen over the years. On the other hand, communicable diseases represent only 33% of the episodes in later years compared with 43.2% in 1996.

Cardiovascular diseases and neoplasm are the two leading causes of hospital deaths in Oman, 32.5% and 9.9%, respectively (3) (infectious diseases in 2012 were responsible for 11.2% of hospital deaths). The Oman World Health Survey (OWHS) (27), conducted late 2007 and early 2008, revealed that 40.3% of adult Omanis are hypertensive; a rise from 33% in 2000 (83). It is worth mentioning that 75% of the hypertensive patients reported in 2008 were undiagnosed prior to the survey (27). Hypercholesterolemia and obesity were reported in 33.6% and 24.1% of adult Omanis, respectively (27). About 14.7% of adults are current tobacco smokers in 2008 (27). However, promising findings were reported in Global Youth Tobacco Survey (GYTS) in Oman in 2010 (84). Current tobacco use among youth aged 13-15 years has declined from 12.2% in 2003 to 6.8% in 2007 and then to 3.3% in 2010.

Table 26: Morbidity of patients attending at Outpatient Departments in Ministry of Health Institutions

Morbidity	1996		2000		2005		2012	
	% of OPD Morbidity	/ 1000 population	% of OPD Morbidity	/ 1000 population	% of OPD Morbidity	/ 1000 population	% of OPD Morbidity	/ 1000 population
Communicable Diseases	43.2%	11,901	34.2%	5,760	35.1%	6,064	33.5%	6,745
Non-Communicable Diseases	42.5%	11,714	53.2%	8,973	54.6%	9,442	45.2%	9,083
Injuries and Poisoning	11.8%	3,259	7.5%	1,262	5.9%	1,015	4.6%	917
Maternal Morbidity[a]	0.2%	299	0.5%	403	0.6%	351	1.0%	939
Peri-natal Morbidity[b]	0.1%	851	0.1%	1,480	0.2%	1,569	0.1%	1,730

[a] per 1000 women 15-49 years

[b] per 1000 live births in MOH institutions

Source: (3)

The prevalence of diabetes mellitus among adult Omanis increased from 8.4% in 1991 (85) (age adjusted prevalence 12.2% (86)) to 11.6% in 2000 (83) (age adjusted 16.1% (86)) to 13.2% in 2008 (27) (age adjusted prevalence was not calculated for 2008). Only 48% of diabetic patients diagnosed in the OWHS (27) knew that they have diabetes. An increase in the prevalence of diabetes mellitus is expected with advances in health care, as control programs reduce the risk of complications and death from diabetes. Such increase in prevalence is also expected to continue in the future especially that about 29.5% of adult Omanis are overweight and 24.1% are obese (27). The Ministry of Health established diabetic clinics and made necessary medicines available in all health care facilities. Diabetic foot clinics have also been established and staffed to provide high quality care and increase awareness of diabetics to such a serious complication. It is worth mentioning that the proportion of lower limb amputation as a complication of diabetes out of all amputations increased from 53.2% in 2001 (87) to 57.7% in 2012 (3). The ratio of diabetic retinopathy cases to total diabetic patients registered also increased from 4.3% in 2000 (67) to 5% in 2012 (3) and about 52.7% of cases had received laser therapy for diabetic retinopathy in 2012 which is lower than the 70% who received therapy in 2010 (60) .

Figure 31 shows that cancer incidence was almost constant over the years since 1997 (88). It was only in 2010 that the incidence declined by about 23% in males and 57% in females compared with the year before. Whether this is a true decline in incidence, unexpected fluctuation or under-reporting would require close follow-up of cancer reporting in the coming years. The most common cancer topographies (body sites) in Oman in 2010 were breast (13.9% of all cancer cases), non-hodgkin lymphoma (7.6%), leukemia (6.7%), stomach (5.7%) and skin (5.5%). Table 27 shows that cancers of the prostate and the urinary bladder are the most common cancers in males with age-specific incidence of 8.5 and 6.7 per 100 thousands, respectively. Similarly breast and cervix uteri cancers are the most common in females (9.7 and 3.4, respectively).

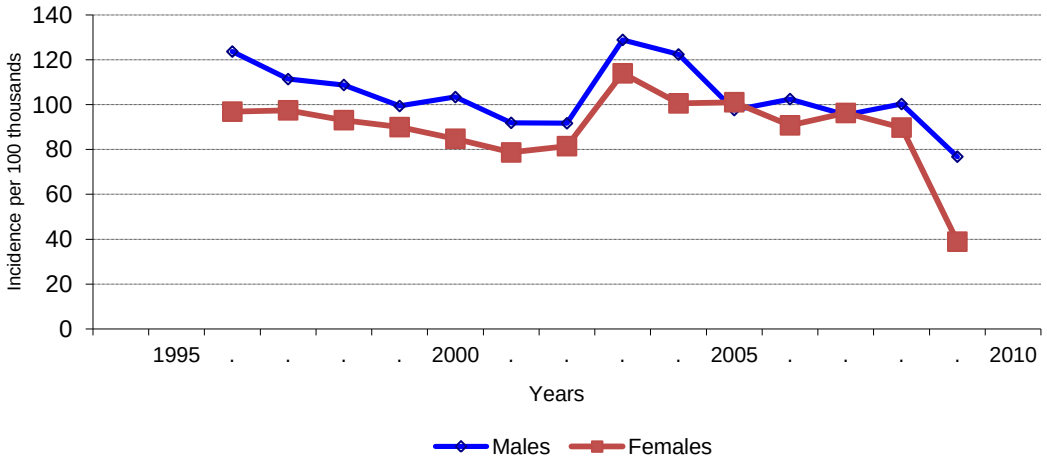


Figure 30: Age Standardized Incidence of Cancer per 100 thousands of Population

Table 27: Age-standardized incidence of common cancers in Omanis (per 100 thousands)

Males		Females	
Topography	**Incidence**	**Topography**	**Incidence**
Prostate	8.5	Breast	9.7
Bladder	6.7	Cervix Uteri	3.4
Non-hodgkin lymphoma	6.0	Non-hodgkin lymphoma	3.0
Stomach	5.4	Skin	2.4
Colon	5.2	Stomach	2.3

The highest incidence of cancer in 2010 was seen in Dhofar governorate (60.5 per 100 thousands population) and followed by Muscat (56 per 100 thousands) while the lowest incidence was seen in Musandam (23.1 per 100 thousands) (88) (Figure 31).

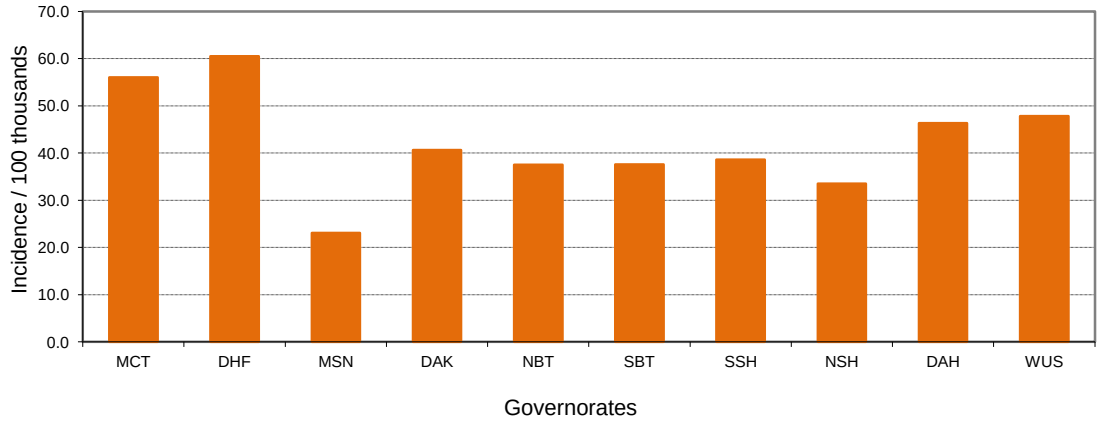


Figure 31: Incidence of Cancer in Governorates

MCT: Muscat, DHF: Dhofar, MSN Musandam, BRM: AlBuraymi, DAK: AdDakhiliyah, NBT: North AlBatinah, SBT: South AlBatinah, SSH: South AshSharqiyah, NSH: North AshSharqiyah, DAH: AdDhahira, WUS: AlWusta

Chronic renal diseases are among the most prevalent non-communicable diseases. By the end of 2012 there were 1,221 patients with renal failure receiving renal dialysis (3); representing 33.7 per 100 thousands of population compared with 618 patients in 2005 with a prevalence of 24.6 per 100 thousands (89).

Road traffic accidents (RTA) are a result of changes in life-style as well as demographic, economic and social changes. Oman has one of the highest RTA death rates worldwide. In 2010, a total of 1,127 deaths were reported with a rate of 31.1 per 100,000 of the population (90). The Omani rate was found to be higher than the world average in 2009, which was 21 (91) and increased from 24 per 100,000 in 1996, showing an average annual increase of 1.6%. About 12,071 individuals have lost their lives in RTA in the past 16 years. In spite of the fact that the number of accidents is coming down, the severity of the accidents has increased dramatically over the years. The ratio of number of injuries to accidents was 70% in 1996 and this has increased to 140.2% in 2012. During the same period the ratio of deaths to accidents has almost tripled from 5.4 to 14.4% (91) (90). The highest number of deaths has been reported in AlBatinah Governorate compared with other governorates in the Sultanate. Males are more affected by RTA; the sex ratio increased from 3.9 males for every single female in 2000 to 5.5 in 2012. Age groups between the ages 21 to 50 years are at higher risk of dying from RTA showing a cause-specific death rate ranging from 33.3 to 38.9 per 100,000 of the population in 2009 compared with the national average of 30 (91). Speed (52%) and reckless driving (23%) are responsible for most RTAs deaths (91). The situation is still worsening as 1,127 deaths from RTA were reported in 2012 compared with 1,044 deaths in 2011 and 820 in 2010; an 8% and 27.3% increase, respectively (92) (90). RTAs are a national crisis as they affect the most productive groups in the population (males aged 21-50 years), have economic impact on health services and a social impact on the population.

Geriatric Health

The reduction in mortality in the Sultanate of Oman was accompanied by an increase in the life expectancy to 76.2 years in 2012 compared with 49.3 in 1970 (see page 55). Today the elderly (60+ years) represented 6.1% of whom about half (48.2%) are females. The proportion of young elderly (60-64 years) represents 28.6% while the very-old (80 years and more) represents 15.4% (see chapter 1) The growth in the elderly population pose tremendous challenges in medical and social caring for this ageing population as age is a contributing factor for morbidity, disability and mortality for various diseases especially chronic and life-threatening diseases.

The first community-based survey for the elderly was carried out in Nizwa district (Wilayat) in AdDakhliyah Governorate, during 2006 (93). The results reflected poor nutritional knowledge and nutritional imbalance (94). The socio-economic profile, support and social cohesion, life-style, health status and difficulties, common health problems and utilization of health services by old age citizens were studied in a national household survey "National Elderly Health Survey (NEHS)" (95) along with the Oman World Health Survey (OWHS) in 2008 (27). The major health problems were hypertension (68.3%), high total cholesterol (53%), osteoarthritis (48.6%), overweight and obesity (46.1%), blindness and low vision (40.3%), anemia (35.2%) and diabetes mellitus (29.1%). The NEHS (95) also identified a number of social challenges and health difficulties. Widowhood was found to be 29.7%, much higher among females (54.1%) than males (7.4%). Furthermore, 6.8% were living alone, 80%

were illiterate and nearly 43% of the households with elderly belonged to the lowest income and lower middle classes. In total, 45.5% of the elderly were found to suffer five or more difficulties (ranged from moderate to severe/extreme) and that was mostly among females; such difficulties were found to increase with age. The integration of medical and social services is of great importance to address the challenges facing such a vulnerable group in a way that the elderly can remain healthy, independent and continue to play an active role in the society.

The eighth 5-year health development plan (2011-2015) (96) defines a specific domain for elderly care. The plan targets three categories of the elderly, namely those who can reach the health facilities, those who cannot and those who are bedridden. The main objectives are to provide promotive and curative health care, physiotherapy, rehabilitation for the elderly through primary health care; preparing the family members to meet the needs of the elderly; and to disseminate the public awareness in the society to promote community participation in care of the elderly.

Challenges Related to Health Problems

As mentioned on page 55, the Sultanate of Oman has witnessed remarkable reductions in mortality, especially childhood mortality, an increase in life expectancy as well as remarkable improvements in morbidity, in particular from communicable diseases. However, the health system is currently facing the burden of the epidemiologic transition to non-communicable diseases, as described on page 66. Non-communicable diseases are mostly related to life-style of the individuals making up the population, their control is difficult using the common public health measures, they are costly to diagnose, manage and treat and they are commonly life-long conditions. In addition to these non-communicable diseases there is also a second burden inherited from era of development, namely malnutrition and congenital anomalies, both of which are related to culture and behavior-driven factors. In addition to this double burden from diseases, there are global threats that threaten the sustainability of health developments from time to time, for example SARS, avian flu (H5N1) and swine Influenza (H1N1) epidemics.

Non-Communicable Diseases

The prevalence of non-communicable diseases is mostly related to the life-style of individuals making up the population. Smoking, insufficient physical activity and unhealthy diet are the three main risk factors for such diseases. The Oman World Health Survey (OWHS) in 2008 (27) showed that 14.3% of adult males smoke daily (any tobacco form) which had increased from 10.7% according to the National Health Survey in 2000 (83). In a study conducted and published in 2012 (97) to measure the concentration of suspended second hand smoking (SHS) particulate matter (PM_{25}) in indoor air, recreation venues including restaurants and entertainment places show high levels of PM_{25}, showing that exposure to SHS is a problem in some recreational venues. The Global Youth Tobacco Survey (GYTS) in Oman in 2010 (84) had showed that tobacco smoking declined among youth in the age group 13-15 years from 12.2% in 2003 to 3.3% in 2010 (see page 66) but, on the other hand, 9.5% of non-smoker youth are exposed to smoke from others at home. The survey also showed incorrect belief among the youth, as slightly more that 20% believed that smoking is not harmful to them. The

persistence of relatively high levels of smoking can be a driving force for the continued high prevalence of non-communicable diseases.

Scientific evidence shows that physically active people have higher levels of health-related fitness, a lower risk profile for developing a number of disabling medical conditions, and lower rates of various chronic non-communicable diseases than people who are inactive. The World Health Organization recommend that at least 150 minutes of moderate intensity physical activity through the week is sufficient to provide the protective effect against non-communicable diseases (98). The Oman World Health Survey (27) had showed that only 63% of the adult population attains such level of physical activity. Also a study on life-style (82) shows that students of colleges and universities in Oman spend an average of two hours watching TV or playing video games and thus would not have enough time for sufficient physical activity.

Inappropriate dietary habits have been reported. Only 26% have reported that they eat sufficient fruits and vegetables on a typical day (27), almost 40% of youth do not have breakfast on daily basis (82) and about 89% eat fast foods at least once a day (82). Such poor dietary practices resulted in unsatisfactory nutritional status; 22.4% (24.1% of Omanis) of adults are obese, 31.5% (29.5% of Omanis) are overweight, 5.7% are underweight, and 27.5% are anemic (27). The findings that youth lack essential nutritional knowledge may be a driving force for risky behavior (82); about 30% do not know that saturated fats are unhealthy and that 57% do not realize that unsaturated fats are healthier, about 22.4% do not realize that eating too much fast foods is unhealthy, and 26.4% do not know that healthy weight is a balance between calories intake and calories lost.

Not only the relatively high prevalence of risk factors is a challenge for progression of non-communicable diseases but the facts that 75% of hypertensive patients do not know that they have high blood pressure, about 67% of those who know that they are hypertensive patients do not have their blood pressure controlled and about 17% do not receive treatment, 52% of diabetics do not know that they have high blood sugar levels and that 64% of those who know they are diabetic do not have their blood sugar controlled (27). These later together with the findings that 35.2% are hypercholestrolemic, 32.0% have high low-density lipoproteins (LDL) (the bad cholesterol), 29.5% of Omanis are overweight and 24.1% of Omanis are obese (27) are real challenges in the course to control non-communicable diseases.

In spite of the fact that the breast is the most common cancer site in Oman (see Non-Communicable Diseases on page 66), only 8.8% of women 40 years and above have received mammography or breast examination during the three years preceding the 2008 OWHS (27). It is also worth mentioning that only about 21% of those who had pelvic examination in the same period had the Papanicolaou test (PAP smear) to screen for cervical cancer (27).

Road traffic accidents are a real threat (see discussion on page 69) not only because they affect the most productive age groups of the population with their economic impact but also because of the burden on health services to manage such difficult injuries and the number of disabilities they result in. It has been reported that about 3.3% of the population have been exposed to injuries because of road traffic accidents (27). This represents a huge number of patients presenting at the health services for management and if this percentage persists, the numbers will remarkably increase with the increase in population size if no effective control

measures are implemented. There is little information on disabilities; however, the 2010 census (10) reported that 4.5% of all disabilities are due to road traffic accidents, representing 1.5 disability cases in every 1,000 population and mostly among the highest reproductive age groups. The burden of road traffic accidents can be visualized if these disability figures are combined with figures of fatalities presented on page 69.

Based on projections of population growth described in chapter 1 page 40, the number of Omanis aged 60 years and over is expected to increase to 616,671 in 2050 and represent about 13.1% of the total population (Table 28) compared with 6.1% in 2012. Figure 32 shows the growth of the population aged 60+ years over time till 2050.

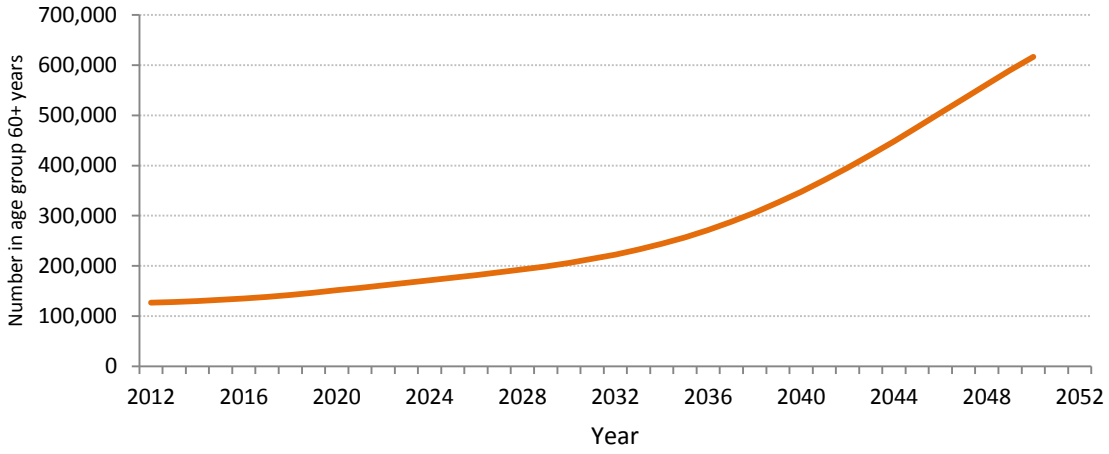


Figure 32: Expected Omani Population aged 60+ over the years

The expected age and sex distribution of the Omani population aged 60 years and above in 2050 is shown in Table 28. The data clearly shows that there will be about 43,463 individuals aged 80 years and over in 2050, representing 7% of the elderly (60 years and over) compared with 20 thousands in 2012 (Table 2). Such age distribution should be carefully considered in long-term planning for health system development.

Table 28: Age and sex distribution of the expected population aged 60+ years in 2050

Age group	Males		Females		Total		
	No.	% of total pop	No.	% of total pop	No.	% of total pop	% of pop 60+
60-64	109,374	4.6%	111,315	4.8%	220,689	4.7%	35.8%
65-69	86,034	3.6%	91,584	3.9%	177,618	3.8%	28.8%
70-74	54,128	2.3%	60,789	2.6%	114,917	2.4%	18.6%
75-79	27,751	1.2%	32,234	1.4%	59,984	1.3%	9.7%
80+	18,171	0.8%	25,292	1.1%	43,463	0.9%	7.0%
Total 60+ at 2050	295,458	12.4%	321,214	13.8%	616,671	13.1%	100.0%

Pop: Population

Congenital anomalies

The 2010 census (10) showed that congenital anomalies cause 31.4% of all disabilities in the country. Congenital anomalies are the leading cause of death for infants below the age of one year (see Table 16 on page 56). A total of 7,055 congenital anomaly cases were notified during the years 2007-2011 by Ministry of Health Institutions among children born after the year 2000 showing an average annual incidence of 25 per 1,000 live births (99). The most common congenital anomalies reported are the hereditary blood disorders; about 66% of all congenital anomalies notified, and they contribute to the high level of anemia in the country. Congenital anomalies in the country are believed to be driven by cultural factors for example closed tribes leading to a high proportion of consanguineous marriages; about 50% of marriages are consanguineous of which almost half are first degree consanguinity (100). The challenge is that 58% of the national sample interviewed in the National Reproductive Health Survey as part of OWHS, 2008 believe that consanguineous marriage is good (100) and another 17% believe that it does not affect the family in spite of the fact that about 74% are aware that it is a major cause for congenital anomalies. Another challenge is that about 36% do not believe in precautions to prevent genetic disorders (100).

Communicable Diseases

As mentioned on page 63, there have been remarkable achievements in the control of communicable diseases and this has resulted in reduction of mortality, especially childhood mortality. However, during the past few years the health system, like other health systems in world, has been threatened by global threats (e.g. SARS, Bird and Swine Influenza) and the challenge is how to keep the health system prepared for such threats and for new unknown ones. In recent years, malaria and pulmonary tuberculosis cases have both shown a slight increase (pages 64 and 65, respectively). Consolidation measures are required to sustain achievements. The Oman World Health Survey (27) showed that only 14% of individuals having symptoms suggestive of pulmonary tuberculosis have received screening to exclude the diseases. Sexually transmitted infections have also shown a slight rise (see Table 25). Whether such rise is due to increased reporting or a true increase needs considerable attention, especially because of the increased travel across the world and the future need to increase tourism in the country.

Disabilities

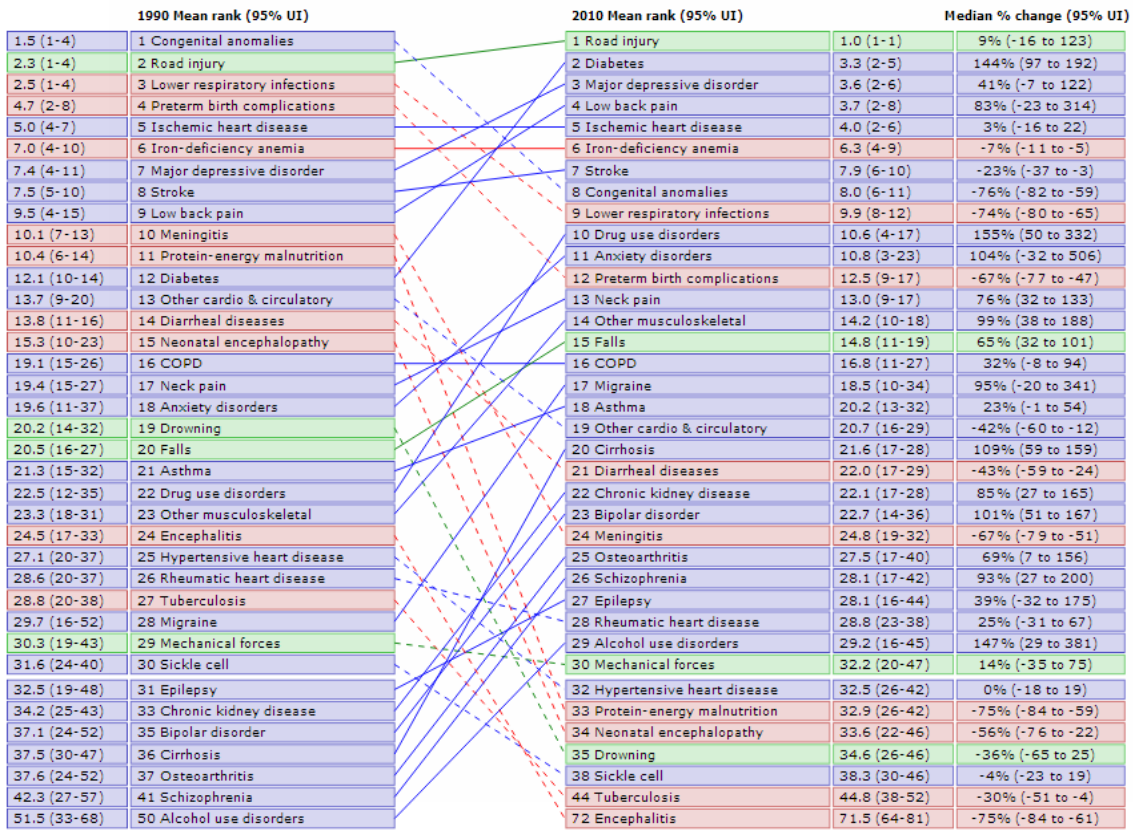
There is scarce information about disabilities in the country. However, the 2010 census (10) showed that about 32 out every 1,000 Omanis suffer some sort of disability and of these 35.4% suffer a severe form of disability and 10.9% are completely disabled. The most common form of disability was poor vision followed by difficulties in mobility and self-care. Similar figures were reported in the Oman World Health Survey (27); about 3.2% of individuals are blind, 5.9% have low vision, 0.6% cannot see across the road (20 meters), 0.4% suffer extreme difficulties in moving around and 0.3% cannot care for them-selves. With advances in health care, disabled individuals will require life-long care, both health care and social care. The challenge to meet such requirements should be cautiously considered.

The "Global Burden of Disease Study 2010 (GBD 2010)" quantifies the magnitude of health loss using a systematic and scientific approach. Its aim is to provide decision makers, health-sector leaders, researchers, and informed citizens with the big picture on diseases and conditions leading to health loss (101). The DALYs stands for Disability Adjusted Years Lost and is made of two components; years of life lost due to premature death (YLL) and years of life lost due to disability (YLD).

Figure 33: Disability Adjusted Life Years Lost (DALYs) for Oman
Lower diagram shows DALYs in 1990 and upper diagram for 2010, illustrating the contribution of Non-Communicable Diseases (blue), Communicable Diseases, maternal and nutritional disorders (red) and Injuries and poisoning (green) in DALYs
Source: **(102)**

Figure 33 shows the diseases and conditions and their proportional contribution to health loss as measured by DALYs in Oman (102). The figure clearly shows the reduction in the proportion made by communicable diseases (in red) from 1990 to 2010 and the increase in the proportion made by non-communicable diseases (in blue) and injuries (in green) in 2010 compared with 1990. Such changes show clearly the kind of epidemiological transition to non-communicable diseases and injuries. Figure 34 shows the first 30 leading disease conditions for health loss in 2010 and how their rank changed from 1990 to 2010. The figure

shows that road injuries are the first leading conditions leading to health loss in terms of DALYs followed by diabetes. Diabetes moved from the 12th rank in 1990 to the second in 2010 while road injuries moved from the second rank in 1990 to the first in 2010. An interesting finding is that "Major Depressive Disorder" moved from the 7th position in 1990 to the third in 2010.



1990 Mean rank (95% UI)		2010 Mean rank (95% UI)		Median % change (95% UI)
1.5 (1-4)	1 Congenital anomalies	1 Road injury	1.0 (1-1)	9% (-16 to 123)
2.3 (1-4)	2 Road injury	2 Diabetes	3.3 (2-5)	144% (97 to 192)
2.5 (1-4)	3 Lower respiratory infections	3 Major depressive disorder	3.6 (2-6)	41% (-7 to 122)
4.7 (2-8)	4 Preterm birth complications	4 Low back pain	3.7 (2-8)	83% (-23 to 314)
5.0 (4-7)	5 Ischemic heart disease	5 Ischemic heart disease	4.0 (2-6)	3% (-16 to 22)
7.0 (4-10)	6 Iron-deficiency anemia	6 Iron-deficiency anemia	6.3 (4-9)	-7% (-11 to -5)
7.4 (4-11)	7 Major depressive disorder	7 Stroke	7.9 (6-10)	-23% (-37 to -3)
7.5 (5-10)	8 Stroke	8 Congenital anomalies	8.0 (6-11)	-76% (-82 to -59)
9.5 (4-15)	9 Low back pain	9 Lower respiratory infections	9.9 (8-12)	-74% (-80 to -65)
10.1 (7-13)	10 Meningitis	10 Drug use disorders	10.6 (4-17)	155% (50 to 332)
10.4 (6-14)	11 Protein-energy malnutrition	11 Anxiety disorders	10.8 (3-23)	104% (-32 to 506)
12.1 (10-14)	12 Diabetes	12 Preterm birth complications	12.5 (9-17)	-67% (-77 to -47)
13.7 (9-20)	13 Other cardio & circulatory	13 Neck pain	13.0 (9-17)	76% (32 to 133)
13.8 (11-16)	14 Diarrheal diseases	14 Other musculoskeletal	14.2 (10-18)	99% (38 to 188)
15.3 (10-23)	15 Neonatal encephalopathy	15 Falls	14.8 (11-19)	65% (32 to 101)
19.1 (15-26)	16 COPD	16 COPD	16.8 (11-27)	32% (-8 to 94)
19.4 (15-27)	17 Neck pain	17 Migraine	18.5 (10-34)	95% (-20 to 341)
19.6 (11-37)	18 Anxiety disorders	18 Asthma	20.2 (13-32)	23% (-1 to 54)
20.2 (14-32)	19 Drowning	19 Other cardio & circulatory	20.7 (16-29)	-42% (-60 to -12)
20.5 (16-27)	20 Falls	20 Cirrhosis	21.6 (17-28)	109% (59 to 159)
21.3 (15-32)	21 Asthma	21 Diarrheal diseases	22.0 (17-29)	-43% (-59 to -24)
22.5 (12-35)	22 Drug use disorders	22 Chronic kidney disease	22.1 (17-28)	85% (27 to 165)
23.3 (18-31)	23 Other musculoskeletal	23 Bipolar disorder	22.7 (14-36)	101% (51 to 167)
24.5 (17-33)	24 Encephalitis	24 Meningitis	24.8 (19-32)	-67% (-79 to -51)
27.1 (20-37)	25 Hypertensive heart disease	25 Osteoarthritis	27.5 (17-40)	69% (7 to 156)
28.6 (20-37)	26 Rheumatic heart disease	26 Schizophrenia	28.1 (17-42)	93% (27 to 200)
28.8 (20-38)	27 Tuberculosis	27 Epilepsy	28.1 (16-44)	39% (-32 to 175)
29.7 (16-52)	28 Migraine	28 Rheumatic heart disease	28.8 (23-38)	25% (-31 to 67)
30.3 (19-43)	29 Mechanical forces	29 Alcohol use disorders	29.2 (16-45)	147% (29 to 381)
31.6 (24-40)	30 Sickle cell	30 Mechanical forces	32.2 (20-47)	14% (-35 to 75)
32.5 (19-48)	31 Epilepsy	32 Hypertensive heart disease	32.5 (26-42)	0% (-18 to 19)
34.2 (25-43)	33 Chronic kidney disease	33 Protein-energy malnutrition	32.9 (26-42)	-75% (-84 to -59)
37.1 (24-52)	35 Bipolar disorder	34 Neonatal encephalopathy	33.6 (22-46)	-56% (-76 to -22)
37.5 (30-47)	36 Cirrhosis	35 Drowning	34.6 (26-46)	-36% (-65 to 25)
37.6 (24-52)	37 Osteoarthritis	38 Sickle cell	38.3 (30-46)	-4% (-23 to 19)
42.3 (27-57)	41 Schizophrenia	44 Tuberculosis	44.8 (38-52)	-30% (-51 to -4)
51.5 (33-68)	50 Alcohol use disorders	72 Encephalitis	71.5 (64-81)	-75% (-84 to -61)

Figure 34: DALYs presented by change in rank of individual disease condition
From 1990 (left) to 2010 (right)
UI: uncertainty interval
COPD: Chronic obstructive pulmonary diseases
Source: **(103)**

The health system in Oman faces a persistent challenge from some diseases inherited from stages of development especially nutritional problems and congenital disorders. Congenital anomalies are among the leading conditions causing health loss. In spite of the fact that such conditions declined from the first position in 1990 to the 8th position in 2010, they are cause 4% of the DALYs in 2010 (102). Congenital anomalies are the main causes of infant deaths (about 21.3%); and about 12.3% of fetal deaths were attributed to such congenital anomalies (48). High level of positive consanguinity is considered a driving force of congenital anomalies. The latest National Reproductive Health Survey as part of OWHS, 2008 (100) shows that 47.8% of marriages take place between relatives and that 35.9% are first degree consanguinity. Hereditary blood disorders are relatively common in Oman. The prevalence of sickle cell diseases was reported as 2 per 1,000 children aged less than five years, β-thalassaemia homozygous as 7 per 10,000, sickle cell trait as 6%, β-thalassaemia trait as 2% and Glucose-6-phosphate dehydrogenase (G6PD) deficiency as 16% in a survey conducted in 1995 (104). There is no evidence that such conditions have regressed. The routine monthly

data collected from Ministry of Health hospitals show that 20 per 10,000 of the population were admitted and managed for non-nutritional anemia's in 2011(48).

Malnutrition is another persistent disease burden. Iron deficiency anemia cause 3.71% of health loss and has remained in the 6th position since 1990 till 2010 in spite the intensive efforts have been made during the last decade to control malnutrition especially in children (103). Underweight (weight for age) in children aged less than 5 years declined from 23% in 1995 (65), to 17.9% in 1999 (69) to 8.6% in 2009 (79). In a national health survey conducted in 2000 (83) about 43% of pregnant women and 30.0% of females aged 20–49 years were found to suffer from anemia. About 20% of adult males and 32.2% of adult non-pregnant females in 2008 (27) and 27.6% of pregnant women in 2011 (48) were anemic. Such conditions are believed to be related to behavioral aspects of the population that will take some time to modify.

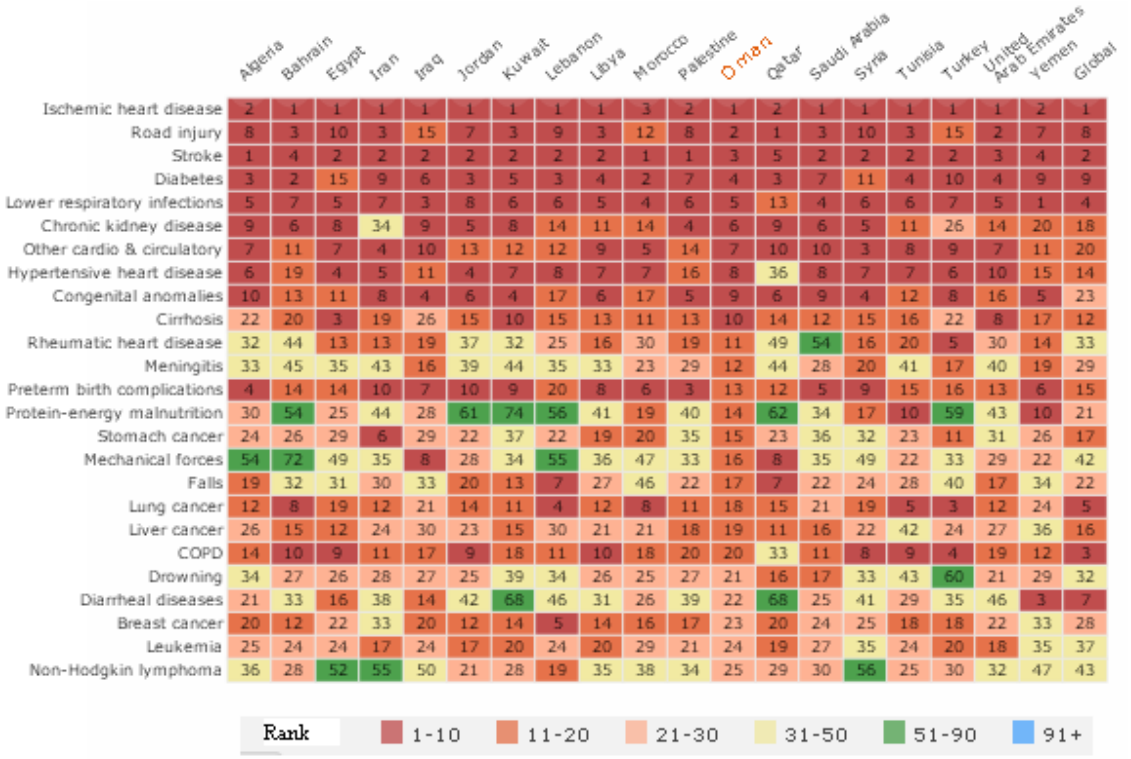


Figure 35: The first 25 leading causes of death in Oman
Compared to other Countries in the Middle East and North Africa Region and the Globe
COPD: Chronic Obstructive Pulmonary Diseases
Source: (105)

In spite of the fact that ischemic heart diseases are ranked in the 5th position as a cause of health loss, it is the first leading cause of death (Figure 35) (105). Figure 35 show that ischemic heart diseases, road injury, stroke and diabetes are the leading causes of death in Oman. Figure 35 compares Oman to other countries in the Middle East and North Africa Region and the Globe.

Chapter 5
Leadership and Governance in the Health System in the Sultanate of Oman

Quality Care, Sustained Health

عناية راقية وصحة مستدامة

Chapter 5

Leadership and Governance in the Health System in the Sultanate of Oman

Leadership and governance is important in improving overall health system performance and affects all health system functions. Leadership and governance (or stewardship) simply means that the health system should be able to carefully, responsibly and wisely manage resources and revenues to protect people from health problems and their consequences (mainly financial consequences), and to respond to their non-health needs. This function of stewardship is mainly the responsibility of the Government, as it makes the rules that are followed in providing the services, both in the public and the private sectors. Ministry of Health, representing the Government of Oman, performs this through policy analysis and development, strategic planning, standard setting and regulation, organization of service provision, ensuring inter-sectoral coordination, and monitoring and evaluation of health plans implementation.

Health Planning and Health Policy Development

The Government of Oman, through the Ministry of Health, has developed a health policy that is based upon several basic principles: Provision of comprehensive public and personal health services to its population through a health system with primary health care as its cornerstone; Equity in the distribution of health services and fairness of financial contribution among different population groups according to health needs; Community involvement in planning and implementation of its health care aimed at developing community self-reliance for sustainable health development; Responsiveness to health and non-health needs of the community; and Inter-sectoral co-operation with other health-related sectors to ensure positive impact on community health.

Oman has been engaged in health development planning since 1976. Health Development Plans (of Ministry of Health) have gone through three distinct phases, each with its own features and characteristics that suited the situation of development at the time. The first phase which included 3 plans (1976-1990) was directed towards building the country's health infrastructure almost from scratch (66), (106). The second phase included also 3 plans (1991-2005) and had focused on development of various components of the health system (66), (107), (108). The beginning of that second phase had coincided with a comprehensive review of the health system; at that time, and defining future strategic directions characterized with a number of strategies. Two main strategies were defined; "The development of a dedicated planning division at Undersecretary level within the organizational structure of MOH" and "Introducing a decentralized health system to 10 health regions (now 11 Governorates)". During this second phase, health development plans were developed using detailed programming covering: developments in health infrastructure and human resource; and the development of health programs directed toward priority health problems. Plans were developed at central, regional and lately local or wilayat levels. These plans had used the Managerial Process for National Health Development (MPNHD) approach advocated by World Health Organization (WHO) (109).

The third phase of health plans started with the beginning of the process for developing the "7th Five-Year Health Development Plan (2006-2010)" (110), and includes the seventh and eight plans (96), (110). Ministry of Health built on the experience gained during earlier phases of planning and has made a move to develop more comprehensive plans with three major components: Strategic Planning at the central level; Detailed or Operational Planning at regional (Governorate) level and Supportive plans at local (Wiayate) level. The 7th plan was developed using elements of both the MPNHD and Results-Based Management approaches. The 7th plan responded to the specific challenges that were expected during the years of the plan (2006-2010). These challenges were identified through detailed situation analysis of the demographical, economical, social as well as the epidemiological trends and profile. Strategic approaches and the recommendations of international organizations such as UNICEF, WHO and World Bank were also considered in the analysis. The eighth plan had followed the steps of the seventh plan to identify challenges and develop strategies to face these challenges.

Based on situation analysis of health status and challenges identified during each Five-Year Health Development Plan, a health policy was developed and partially modified. The health policy in each phase of development describes the goals, the directives and the priorities for such phase and coinciding with the health development plan. The Sultanate of Oman national health policy statement is seen in the Appendix.

Decentralization

For organizing the national health system, the country is divided into 11 self-contained health Governorates, each comprising districts (wilayats) (initiated in 1991 as 10 health regions). Ministry of Health has adopted decentralization through the delegation of a number of financial and administrative authorities and responsibilities to health Governorates. It has been argued that decentralization would encourage local initiatives, local planning, administration, budget control through greater cost consciousness and greater local accountability which all would collectively contributed to developments in the health status of the community.

Decentralization was also extended to Wilayat (district) level after the establishment of an integrated health system in each of the Wilayats in 1993. Wilayat Health Directors/ Superintendents supervise the provision of health services at the Wilayat level. These supervisors also participate in Wilayat health planning. Local health workers, trained in problem solving techniques, were effectively involved in Wilayat-level planning. The decentralization to Wilayat level was further strengthened by the appointment of family physicians as directors of health services at Wilayat level. Ministry of Health took decentralization a step further by adopting "Hospital Autonomy Initiative" in 2001 and has been implemented in nine referral hospitals; the executive directors of these hospitals have received management education and training. Hospital Directors have been accounted responsible for the delivery of health services provided by their respective hospitals as they enjoy administrative and financial authority, and thus were expected to manage hospital services efficiently.

Responsiveness of the Health System

Responsiveness of the health system is a measure of how the system responds to non-health needs of the people, their expectations of how they are treated by health providers as well as their expectations of non-personal services.

The Oman World Health Survey in 2008 (27) showed that about three-quarters of the surveyed people needed some sort of health care during the three years preceding the survey and that 98.4% received the care they needed; only 1.6% did not receive care (Table 29). The table shows that gender and economic status of individuals had no effect on receiving care.

Table 29: Receiving the needed health care according to gender and economic status

Category	% of individuals who needed health care within the 3 years preceding the survey	% who did not receive care
Males	68.4%	1.5%
Females	79.9%	1.6%
Lowest Wealth Quintile	66.7%	1.7%
Highest Wealth Quintile	74.0%	1.3%
Total	74.2%	1.6%

Source: (27)

The people surveyed had stated that the health system was responsive to their overall non-health needs with an average score of about 76% for inpatient services and slightly more that 77% for outpatient services (Table 30). The table clearly shows that the people are satisfied with how health care providers treat them as well as with the quality of the amenities of the health services.

Table 30: Responsiveness of the Omani health system to non-health needs

Elements	Average Score of Satisfaction	
	Inpatient Services	Outpatient Services
Respect for dignity (Treated respectfully)	79.0%	80.9%
Confidentiality (Talking privately with provider)	75.8%	78.7%
Autonomy to participate in choices (Involved in decision making)	74.0%	75.7%
Prompt attention (Waiting Time)	77.3%	72.2%
Amenities of adequate quality (Cleanliness in health facility)	77.4%	81.5%
Choice of provider (Ease to meet provider)	73.0%	75.5%
Clear explanations	73.7%	77.1%
Overall	75.8%	77.4%

Source: (27)

The results of the OWHS (27) showed that people in Oman were overall slightly more satisfied with responsiveness of the private sector than the public sector (Table 31).

Table 31: Overall score of satisfaction with responsiveness of the health system

Health Sector	Inpatient Services	Outpatient Services
Public Sector	75.1%	75.3%
Private sector	83.6%	78.9%

Source: (27)

Visions for Leadership and Governance

Vision 1: Updated Policies and Strategies Based on Needs and Priorities.

A national health strategy exists implicitly within the health policy that is published in the "Five-Year Health Development Plan". A revision of the current health policies and strategies is required because of expected changes in performance of the health system, the challenges of epidemiological transition, aging of the population and rapid developments in technology.

Actions:

- Establish a "Health Council"; chaired by Ministry of Health, to supervise (oversee) all aspects that relate to health at the national level, such as; health policies and strategies, health care, health professions education and health research. The "Health Council" should instigate national health policies and act as an umbrella for all health institutions; Governmental and private, as well as institutions associated with health professions education; oversee policy implementation and grant licensure for health professions.

- Update the organizational structure of Ministry of Health to strengthen governance at MOH and to suit the challenges and reforms.

- Update the "Public Health Law" and other legislations.

- Review periodically the policies and strategies to meet changes in needs and priorities. This could coincide with each Five-Year Health Development Plan.

Vision 2: An Accountable and Transparent Health System

An accountable and transparent heath system should be able to answer to the community for policy implementation, successes and responsiveness of the system, and failures and non-responsiveness of the system. Director Generals for Health Governorates and Hospital Directors are among the most important posts having impacts on health services and health system functions and their developments. Their responsibilities should enhance accountability of the health system.

Although Ministry of Health is the main health care provider, it cannot alone be held accountable for the health system. In addition to Ministry of Health, other actors in the health system can be identified: the Parliament, professional associations, health care providers (public and private), funding agencies, insurance companies, health-related sectors as environment, water, education, etc., as well as service users or patients. All stakeholders should be held accountable for health system development.

Sanctions constitute the other defining feature of accountability and broadly include implementation of the requirements and penalties embodied in laws and regulations,

professional codes of conduct and incentives to switch from low-quality to high-quality facilities.

Actions:

- Appoint high-rank leadership positions in the health system based on clear policies and accountable for defined sets of responsibilities. Highly trained consultant physicians will be appropriate candidates for such posts in the coming phase of development of the health system.

- Review the responsibilities of health system leaders in order to assess their accountability. There are three main areas of accountability:
  - Financial accountability concerns transparent reporting on allocation, disbursement, and utilization of financial resources;
  - Performance accountability refers to demonstrating performance in terms of services, outputs, and results;
  - Political/democratic accountability has to do with the institutions, procedures, and mechanisms that ensure that the health system delivers with equity and responds to society needs and concerns.

- Ensure that strategic policy frameworks and manuals exist, are updated and are published for proper dissemination.

- Supervise effectively the implementation of regulations.

- Identify and review the roles of each health system stakeholder to hold them accountable for health system development with attention to health system design and organizational structure.

- Build strong and sustainable partnerships with all stakeholders of the health system, namely; other health care providers, other health related sectors (environment, electricity, water, education, etc.) and the community.

Vision 3: A Structured Accountable Decentralized Health System.

Finding the appropriate level for policy making, implementation and administration in the health system is a real challenge. There are arguments in the literature for and against decentralization in health care; it seems that the key arguments of enhancing efficiency of the health system have been used by both sides of the debate. A Decentralization Policy has been partially implemented within the health system in Oman. However, there are no studies to show that decentralization has achieved efficiency and to understand the problems of its implementation. The responsibilities of health professions holding high-ranking posts in the health system; namely Directors General of Health Governorates and Hospital Directors should go hand in hand with delegations.

Actions:

- Study the effect of more than 20 years of implementation of various levels of decentralization in the Omani health system. There is a need to understand what problems decentralization is trying to solve? What services need to be made more appropriate and accessible to local populations? Improving efficiency of health system? Others …?

- Update the Decentralization Policy based on the results of the evaluation.

- Review the responsibilities of health system leaders and how much delegations of responsibilities with the Decentralization Policy should be allowed.

Vision 4: Health System Responsive to Health and Non-Health Needs of the People

A successful health system should be responsive to the needs of the population, whether health or non-health needs related to health care delivery.

Actions:

- Develop mechanisms to measure peoples' needs, satisfaction and utilization of health services and ensure that the health system is responsive to these needs. These mechanisms should empower individuals to express their views to government bodies.

- Enhance health system research.

Chapter 6
Health System Financing in the Sultanate of Oman

Quality Care, Sustained Health

عناية راقية وصحة مستدامة

Chapter 6

Health System Financing in the Sultanate of Oman

Sustaining health system financing is one of the most important challenges countries are currently facing. The Sultanate of Oman does not have a "National Health Account (NHA)" system and estimates used to express health spending are based on WHO estimates. These estimates were in consistent with estimates for the year 1998 developed by the World Bank from actual data in 2000 during a mission to assess the cost-effectiveness of the health sector in Oman (111). The absence of NHA makes it difficult to monitor health spending devoted to some programs or to some population groups e.g. health spending for primary health care, health spending for children aged less than 5 years, and others.

Level and Structure of Health Care Spending

Oman spent about 2.7% of its GDP on health in 2010 (33) (Table 32). This percentage can be viewed as low spending if compared with other countries especially developed countries (Table 33). Oman was among the lowest three member states as regards health spending expressed as percentage of GDP and its spending was less than two-thirds that for the Eastern Mediterranean Region (4.5%), less than half the average for the African Region (6.2%) and less than some Gulf States (Table 33) (Figure 36). The "Total Health Expenditure (THE)" as percentage of GDP was as high as 9.3% in the European Region, 14.3% in the Region of Americas and 17.6% in USA (33). Oman's per capita health expenditure (expressed as PPP international dollars for comparability purposes) amounted to 591. The per capita health expenditure in USA was almost 14 times that of Oman, in the UK it was more than 6 times and in New Zealand it was 5 times (Table 33).

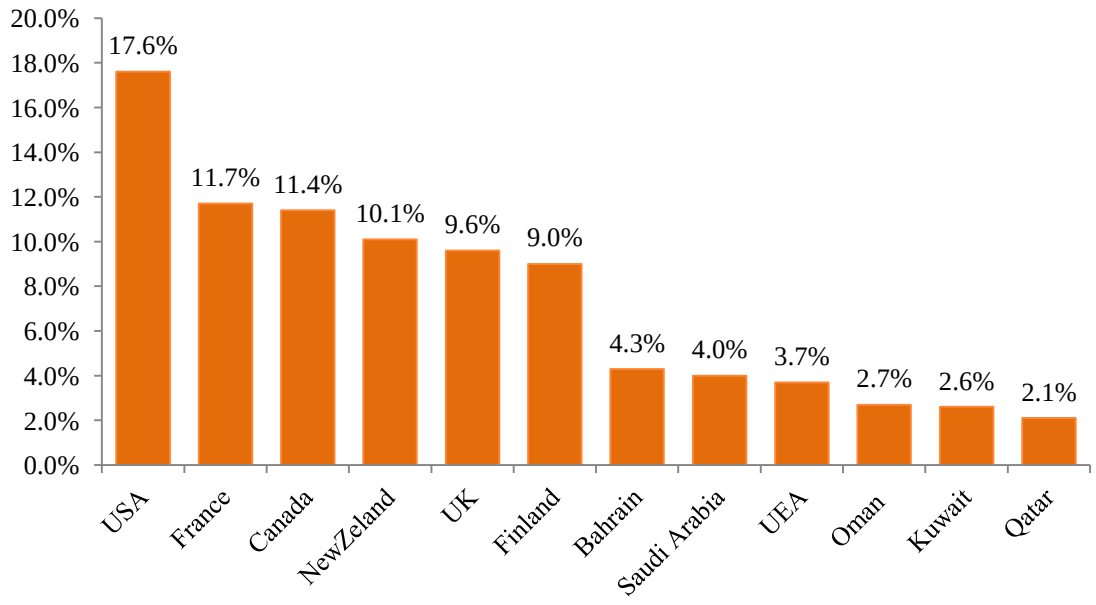


Figure 36: Total Health Expenditure as a percentage of Gross Domestic Product (GDP)
UEA: United Arab Emirates, USA: United States of America; UK: United Kingdom
Source: (33)

Table 32: Health Expenditure in the Sultanate of Oman

Indicator	1998[a]	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Total Health Expenditure as % of Gross Domestic Product (GDP)	3.5%	3.1%	3.0%	3.2%	3.1%	3.0%	2.6%	2.3%	2.4%	2.1%	3.0%	2.7%
General Government Expenditure on Health as % of Total Expenditure on Health	81.1%	82.3%	83.7%	83.8%	83.8%	82.7%	83.3%	82.3%	78.7%	75.5%	78.8%	81.1%
General Government Expenditure on Health as % of Total Government Expenditure	7.1%	7.3%	6.5%	7.0%	6.9%	6.1%	6.1%	5.4%	5.2%	4.9%	5.8%	6.2%
Private Expenditure on Health as % of Total Expenditure on Health	18.9%	17.7%	19.3%	16.4%	16.2%	17.3%	16.7%	17.7%	21.3%	24.5%	21.2%	18.9%
Out-of-Pocket Expenditure as % of Private Expenditure on Health	50.8%	65.1%	42.9%	61.1%	60.3%	60.4%	58.3%	57.7%	61.3%	61.4%	63.5%	61.4%
Per Capita Total Expenditure on Health at Average Exchange Rate (US$)	222	254	225	263	277	295	318	332	375	459	520	568
Per Capita Total Expenditure on Health (PPP Int. $)	341	461	343	535	549	558	526	526	688	600	826	591
Per Capita Government Expenditure on Health at Average Exchange Rate (US$)	180	209	181	219	232	244	265	273	296	347	410	461
Per Capita Government Expenditure on Health (PPP Int. $)	277	380	277	447	460	461	438	433	542	453	651	479

PPP Int. $: Purchasing Power Parity International dollars
Source: (33)
[a] Source for 1998 data: (111)

Table 33: Health Expenditure in the Sultanate of Oman compared to Some Selected Countries (2010)

Indicator	Oman	UEA	Saudi Arabia	Kuwait	Bahrain	Qatar	USA	Canada	Finland	France	UK	NZ
Total Health Expenditure as % of Gross Domestic Product (GDP)	2.7%	3.7%	4.0%	2.6%	4.3%	2.1%	17.6%	11.4%	9.0%	11.7%	9.6%	10.1%
General Government Expenditure on Health as % of Total Expenditure on Health	81.1%	73%	66.0%	80.4%	71.1%	77.5%	48.2%	71.1%	74.5%	76.9%	83.2%	83.2%
General Government Expenditure on Health as % of Total Government Expenditure	6.2%	8.8%	6.8%	6.9%	9.6%	5.2%	19.9%	18.3%	12.0%	15.9%	15.9%	19.8%
Private Expenditure on Health as % of Total Expenditure on Health	18.9%	27%	34.0%	19.6%	28.9%	22.5%	51.8%	28.9%	25.5%	23.1%	16.8%	16.8%
Out-of-Pocket Expenditure as % of Private Expenditure on Health	61.4%	63.2%	57.3%	90.6%	60.9%	71.0%	22.7%	49.0%	75.5%	32.2%	53.1%	62.6%
Per Capita Total Expenditure on Health at Average Exchange Rate (US$)	568	1,467	659	1,225	748	1,489	8,233	5,257	3,955	4,618	3,495	3,267
Per Capita Total Expenditure on Health (PPP Int. $)	591	1,562	914	1,133	937	1,621	8,233	4,443	3,252	3,997	3,433	2,992
Per Capita Government Expenditure on Health at Average Exchange Rate (US$)	461	1,071	435	984	531	1,153	3,967	3,736	2,947	3,553	2,908	2,719
Per Capita Government Expenditure on Health (PPP Int. $)	479	1,140	603	910	666	1,256	3,967	3,157	2,423	3,075	2,857	2,490

PPP Int. $: Purchasing Power Parity International dollars
Source: (33)
UEA: United Arab Emirates, USA: United States of America; UK: United Kingdom, NZ: New Zealand

The health system in Oman is predominantly financed by the Government; in 2010 the Government spent more than 81% of the total health expenditure (Figure 37). In this, Oman is among the top one-tenth of Member States. Oman is not different from some of European and other countries such as Sweden (81%), Norway (85.5%), UK (83.2%), New Zealand (83.2%) and Denmark (83.9%) (33). However, the Government of Oman spent only 6.2% of its total expenditure on health and this percentage is among the lowest 21 out of 192 Member States (Table 33).

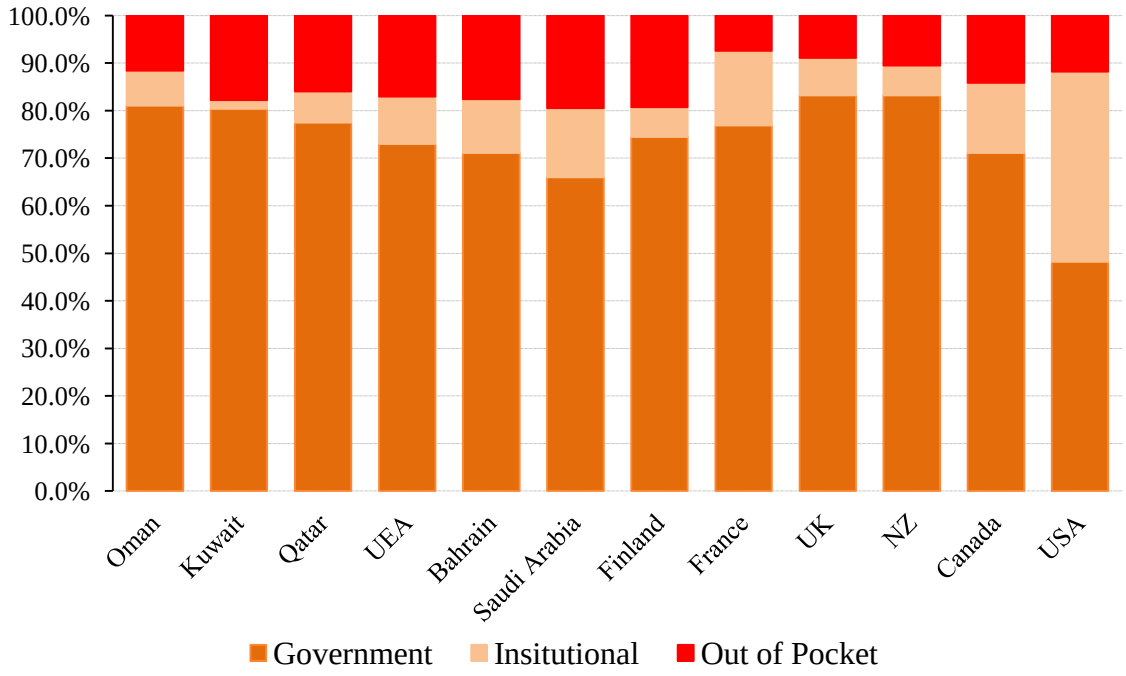


Figure 37: Source of health expenditure in Oman and other selected States
UEA: United Arab Emirates, USA: United States of America; UK: United Kingdom, NZ: New Zealand
Source: (33)

Financial Risk Protection

Out-of pocket expenditure in 2010 was about 11.6% of the total health expenditure or 61.4% of private health expenditure in Oman (33). As previously discussed (page 50) the contribution of private health sector in Oman, unlike other countries, is still limited, pushing the burden of providing health care onto the public health sector. Private health expenditure was almost one-fifth (18.9%) of the total health expenditure and the out-of-pocket had slightly increased from one-half to over 60% of private health expenditure over the years. Such a pattern slightly increases the burden to buy health services and care on families and individuals in the country. However, out-of-pocket expenditure as a percentage of the total health expenditure in Oman is still considered among the lowest in the Gulf States. The pattern of private expenditure in Oman is better than that seen in the European Continent where the private health expenditure is about 25.5% on average (compared with 18.9% in Oman) and out-of-pocket expenditure is about 68.7% of private health expenditure (compared with 61.4% in Oman). The situation is different in the Americas where private health expenditure is about half (51.8%) the total health expenditure and out-of-pocket expenditure is 22.7% of private health expenditure. Although both models the European and the Americas

reduce the burden on individuals to share in health expenditure to similar levels (out-of-pocket expenditure is about 17.5% and 11.8% of the total health expenditure; respectively) and are slightly higher than in the Omani health system (11.6%), it seems that the Americas model reduces the burden on the government to finance health and may ensure financial sustainability of the health system (Table 33) (Figure 37).

The Government of Oman is committed to providing health care and services to all citizens free of charge and has considered equity in financing health services across different health Governorates with the aim of ensuring financial protection for all. The World Health Report 2000 by the World Health Organization (WHO) (23) had assessed fairness of financial contribution to health systems in all Member States and the index was estimated for Oman as 0.952 (with uncertainty 0.932-0.970) (maximum equal to 1) and Oman was ranked 57th among 191 Member States. Table 34 shows the per capita recurrent expenditure of Ministry of Health distributed according to health Governorates. The data do not show wide variation among health Governorates. Expenditure is not biased to urban regions, instead regions with low population density and relatively far in distance from the capital show higher levels of per capita expenditure, possibly because of the high costs for providing services in such relatively remote areas.

Table 34: Recurrent expenditure of Ministry of Health in 2012 distributed according to Health Governorates in Rials Omani (RO)

Governorate	Recurrent Expenditure ('000 RO)	Per Capita Expenditure
Muscat	52,836	45.7
Dhofar	31,037	87.3
Musandam	7,272	210.3
AlBuraimi	11,170	121.1
AdDakhiliyah	38,592	103.6
North AlBatinah	42,114	69.2
South AlBatinah	26,501	81.2
South AshSharqiyah	27,003	109.9
North AshSharqiyah	23,815	106.9
AdDhahira	20,783	120.2
AlWusta	4,427	120.5

Other recurrent expenditures not included in the table: Ministry of Health Headquarter HQ 18.2 m RO, Central Budget 53.5 m RO, Education and Training 14.7 m RO, National Committee for drugs 0.08 m RO and Royal Hospital 51.6 m RO.
m RO: million Rials Omani
Source: (3)

Cost Sharing

Ensuring long-run financial sustainability is a concern in the Omani health system, given the Government's commitments, the high public budget contribution, future revenues and the demographic and epidemiological health transition in Oman. The health system has made a number of measures in that direction. Minimal cost-sharing was imposed in 1998 in the form of one RO (US$ 2.6) for annual file registration and RO 0.200 (US$0.5) per outpatient consultation (children aged less than 5 years, visits to birth spacing and antenatal care clinics, patients with chronic diseases and limited-income groups were exempted). Such action has reduced unnecessary utilization of outpatient services (a 25% drop in outpatient visits) (81).

Charges for private rooms in hospitals were another source of revenues accounting for about RO 1.84 million in 2012. Cost recovery for services provided to employees of the private sector has been established by revising the service charges to recover actual costs. This action is also in line with activities to strengthen the contribution of the private sector in providing health services. Management of trauma cases due to road traffic accidents (RTAs) is a burden on health services and the Government has imposed cost recovery for managing such cases from auto insurance companies; insurer had to, nominally, increase the amount paid for auto insurance. This was established in coordination with the Royal Omani Police and auto-insurance companies. Lately, several studies have been performed to assess alternatives for enhancing revenues for health services in Oman (80).

Table 35 shows Ministry of Health (MOH) revenues in selected years. The table shows the increase in revenues in 1998 after introducing cost-sharing fees. It also shows that revenues represent only about 5% of the recurrent expenditure of MOH. The bulk of revenues (about 80% of revenues) come from health services provision such as clinical visits, surgeries, investigations and sale of medicine. Other revenues come from charges for private rooms, rents and sale of used furniture.

Table 35: Ministry of Health revenues in selected years

Revenues	1997	1998	2004	2010	2012
Health revenues (R.O.)	451,229	2,359,440	9,516,637	9,884,716	18,232,910
Other revenues (R.O.)	4,641,871	5,145,662	1,169,251	6,815,628	4,538,101
Total Revenues (R.O.)	5,093,100	7,505,102	10,685,888	16,700,344	22,771,011
Total revenues as % of recurrent expenditure	4.5%	6.2%	6.8%	5.6%	5.1%

RO: Rials Omani

Cost Effectiveness of the Health System in Oman

Health systems have a number of goals, but the main reason health systems exist is to improve health. Health systems with similar levels of health expenditure show variations in health outcomes (112). This is partly explained by the fact that some systems adopt expensive interventions with small effects on population health, while others tend to choose low cost interventions with relatively large effects. Cost-effective interventions are those that provide "high value for money", in other words interventions that maximize health for the available resources.

The cost-effectiveness of the health system in Oman was assessed by a "World Bank Mission" that visited Oman in December 1999 in response to a request by the Government of Oman. The assessment revealed that the health system in Oman performed well on most of the basic objectives of health systems, spending was not excessive and health outcomes were reasonable given the amount of spending (111). However, from a microeconomic efficiency perspective, performance was not that good. Among these are the following:

- The rapid and excessive growth in hospital beds during 1990s and the years that followed; in spite of its justifications, is one of the interventions that has had deleterious effects on cost of the health system, as it resulted in overall low bed

utilization over the years; bed occupancy was 69% in 1995 and has declined to reach 59% in 2012 (3).

- There is some variability in staffing hospitals with, for example, physicians. Some hospitals have relatively larger numbers of physicians compared to bed occupancy. Examining the data shows that the number of physicians is strongly correlated to bed capacity (r=0.91) but not very well correlated to occupancy rates (r=0.58).

- The availability of ambulatory surgery is limited to a few hospitals in the Sultanate of Oman. Some procedures that could be performed on the basis of day care still require admissions. Even a hospital that would provide ambulatory surgery/procedures utilizes beds in the inpatient wards and not separate day beds.

- There is significant variability in the availability of services and resources, especially hospital services, among the health Governorates. For example, both Musandam and AlWusta are under-served by specialty care and this usually results in the transfer of patients who need such care to the nearest secondary or tertiary care facility with its impact on cost of managing such patients. The variability in services among regional hospitals also affects the cost per inpatient service day which ranges from RO 30 to 102.8, with a median of RO 62. The cost per outpatient visit also varies among regional hospitals from RO 9 to RO 59.4 with a median of RO 17.3 (113).

- The variability in cost per outpatient visits in primary health care is much less than variability in outpatient visits in hospitals; it ranges from RO 6 to RO 16 with a median of RO 8.2.

- The overall Omanization (i.e. proportion of Omanis) in the health sector is about 59%(3). It differs greatly from almost 100% in support staff to varying levels in medical and technical staff, for example 29% among physicians, 54% among nurses, 27% among pharmacists and 20% among dentists. The variability of Omanization among medical and technical staff depends mainly upon the availability of training in the country. The high proportions of non-nationals especially among medical and technical staff poses a burden on the health system because of a number of issues, including high attrition rates, extensive training needs to promote homogenous health care in the country and others. Such effects have deleterious effects on the efficiency and sustainability of the health care system.

The health system in Oman has made several reforms for cost containment and improving efficiency. Such reforms have considered the fact that reducing expenditure is not equivalent to improving efficiency, and that cost containment and efficiency have to go hand-in-hand. The following are reforms considered by the health system for cost rationalization and cost containment:

- The health policy in the Sultanate of Oman considers primary health care, the most cost-effective health care, as the first and basic entry point for all levels of health care.

- The health system in Oman covers an extensive set of services (benefits). In an attempt to rationalize cost, some benefits that are not cost-effective such as dentures and cosmetic plastic surgery were considered not essential and could be performed by the private sector upon personal requests.

- The Department of Rational Drug Use was established according to drug policy in 2000. The Department has been effective in introducing the use of generic names of medicines and rationalizing medicine use.

- All procurements of medicines and medical supplies are done in collaboration with other countries of the Gulf region "Gulf Cooperation Countries (GCC)". The common purchase of medicines has led to reasonable reduction in prices of medicines through the purchase of large quantities.

- A referral system was established between different levels of care and different institutions and its first manual came out in 1999 and was updated in 2004. The referral system aims to control and rationalize utilization of high-cost services in hospitals. Proper implementation of the referral system with its feedback component will improve patient care at all levels of care. With the introduction of electronic automation of patient management, an electronic patient referral system was introduced in 2009.

- The Ministry of Health and the Government of Oman are concerned to develop nationals in health-related specialties. It has, thus, invested in medical education and in training nationals in nursing and other paramedical professions as a priority (see page 129).

- Out-sourcing of non-clinical services by contracting private sectors has also increased efficiency of the health care system.

Challenges Related to Financial Resources

Health system financing is mainly governmental, as the Government finances about four-fifths of the total health expenditure. Analysis of Ministry of Health expenditure as the main health care provider shows that, the average annual increase in recurrent expenditure was about 13.5% during the period 2005 to 2012 (Table 36). Salaries and allowances alone represent about 73.5% of the recurrent expenditure in Ministry of Health (3) and it has shown an average annual increase of about 15% over the same period. The increase in salaries is the result of increase in numbers of health workers (6.5% annually) and the annual increase in salaries of existing workers. During the same period the total population showed an annual increase of 5.4% (Omani population showed an annual growth of 1.8%).

The analysis suggests that the annual increase in recurrent expenditure over the past seven years only covers annual increase in salaries, population growth, and increase costs of imported medical supplies and is not a real increase to promote health developments. There is an average annual increase in the development expenditure of 12.8% during the same period.

Development expenditure is manly consumed in building and establishing new health care facilities as explained in "Health Services" (on page 102).

Table 36: Ministry of Health Expenditure over the Years

Expenditure (m R.O.)	2005	2006	2007	2008	2009	2010	2011	2012
Total Expenditure	199.6	210.6	247.6	288.2	329.7	376.0	422.7	482.0
Recurrent Expenditure	185.0	202.6	233.3	268.5	299.6	327.2	383.8	448.1
Annual increase in recurrent expenditure		9.5%	15.2%	15.1%	11.6%	9.2%	17.3%	16.8%
• Salaries and allowances	123.7	134.2	165.6	188.9	205.1	228.3	268.9	329.5
• Annual Increase in Salaries		8.5%	23.4%	14.1%	8.6%	11.3%	17.8%	22.5%
• Supplies and Materials	28.4	31.1	29.8	35.4	47.4	49.4	62.3	58.2
• Services	19.2	19.9	23.6	27.3	30	31.4	33.9	42.7
• Electricity, Water and Communications	7.2	9.8	8.8	8.4	8.6	9.1	9.3	9.8
• Contribution to National and International Organizations	0.3	0.2	0.7	0.5	0.9	0.9	1.1	1.4
• Furniture, Vehicles and Tools	6.2	7.4	4.8	8.0	7.6	8.1	8.4	6.5
Development Expenditure	14.6	8.0	14.3	19.7	30.1	48.8	38.9	33.9
Annual Increase in Development Expenditure		-45%	79%	38%	53%	62%	-20.3%	-12.9%

Source: (3)

Health expenditure is affected by the type of challenges facing the health system and the results expected to achieve. The population growth and aging, the epidemiological transition to non-communicable diseases that are difficult and costly to mange, the demand to provide health services to the scarce population distribution in remote areas, the expected escalating costs of health resources (human resources, medical products, equipments and consumables and advanced technologies) together with the expectation from the Omani community to have access to highly developed and specialized care (tertiary and quaternary) suggest the need for significant increases in health system financing. The absence of a "National Health Account" system makes the proper analysis of where and who consumes the health expenditure a challenge.

Visions for Health Financing

Governments are greatly concerned with their ability to adequately finance health care and insure its sustainability in the face of escalating costs. The following are visions related to sustaining health system finance:

Vision 1: Total Health Expenditure 8-10% of GDP by the Year 2030

Countries differ remarkably as regards health expenditure. In 2010, the per capita health expenditure, estimated in PPP international dollars, ranged from 17 to 8,233; in

other words the maximum per capita health expenditure was almost 484 times the minimum. Also, the total health expenditure as a percentage of the gross domestic product (GDP) ranged from a minimum of 1% to a maximum of 20.8% (33). Countries also vary as regards the percentage of government expenditure on health of total government expenditure from 1.3% to 29%. Government expenditure on health in Oman represent only 6.2% of total Government expenditure and the per capita health expenditure is estimated to be 591 International dollars and this sums up to account for 2.7% of GDP (33).

In the literature there is conflicting evidence that health care spending is a determinant of health outcomes. On one hand, evidences show that public health spending is a relatively poor predictor of cross-country differentials in health indicators (114), (115). On the other hand evidence shows that health care spending is statistically significantly negatively associated with probability of mortality (115), (116), (117), (118). The question is, thus; how much should a country spend on health? Health expenditure is expected to be affected by the type of challenges facing the country, in other words its epidemiological profile, and the results the country expects to achieve. Other determinants of health expenditure are; the current infrastructure of the country as regards local availability of manpower, medicines and technologies; and the relative value or costs of other demands on social resources (119). In spite of the fact that The World Health Organization (WHO) does not recommend a level of health spending, there are some documents that refer to 5% of the GDP (or GNP "Gross National Product") as a minimal level for health spending. In 1981, the WHO published the "Global Strategy for Health for All by Year 2000" and listed among the global indicators to be monitored; the number of countries in which at least 5% of the GNP is spent on health (120). In the African summit on HIV/AIDS, tuberculosis and other related infectious diseases held in Abuja, Nigeria on April 2001, African countries committed themselves to spend 15% of their national budget to improve their health sector (121).

Actions:

- Urge the Government to increase health system financing based on the following:
  - Increased financial resources are necessary to meet the expectation of the Omani people to have a developed health care system with international standards;
  - The escalating costs associated ageing of the population, the epidemiological transition to non-communicable diseases requiring expensive diagnostic technologies and therapies;
  - The continuous emergence of new costly technologies;
  - There are a number of developments proposed in "Health Vision 2050" that will require increased financial resources, such as demands for a specialized health workforce; improvement of the social conditions of medical and paramedical staff; expansion in tertiary care in the form of

establishing medical cities; specialized primary health care; upgrading of biomedical technologies and expansion and renovating of health services.

- Encourage private health sector to invest and finance the health system.

Vision 2: Sustained Health System Financing for Universal Health Coverage

If the Government continues to finance 81% of the total health expenditure, then it is expected to spend about 18% of its total expenditure if THE is increased to 10% of GDP. The increased financial burden on the Government to sustain the health system development will be affected by such financial demand. Alternative sources for financing the health system should therefore be sought in addition to Government commitment. This should consider financial risk protection for the population. Data from the Oman World Health Survey conducted in 2008 (27) showed that 2.6% of households had catastrophic health expenditure and 1% had impoverishment health spending.

Actions:

- The establishment of a "National "Social" Health Insurance System" is essential for sustainability of the health system. The "Health Vision 2050" strategy is to have a national health insurance program that will guarantee access to quality health care and health services to all individuals living in Oman. The insurance program should be administered by the Government of Oman. It is expected to spread financial risk associated with illness across society to protect every-one and thus having a different role from the for-profit insurers. The program would start covering all expatriates living in Oman and be expanded to cover Omanis.

- Increase Ministry of Health revenues to five times their current values by 2030 and to 20 times by 2050. In 2012, Ministry of Health raised revenues of RO 22.8 million (Table 35 on page 91). About 80% of revenue comes from health-related activities such as clinical visits, surgeries, diagnostics as laboratory tests and x-rays and selling medicine. Business-oriented health facilities mean running health facilities to raise revenues, implementing cost-effective interventions and providing quality services. Revenues can be raised through the following:
  - Increase the number of **Private Rooms** in Ministry of Health hospitals: currently there are 121 private rooms (beds) out of 4,659 beds (2.6%) and these have raised RO 1.84 million in 2012. The vision is to increase private beds to 20-50% of beds during the construction of new hospitals and to 50-70% of the beds in the Medical City.
  - Ensure complete **cost-recovery for managing trauma cases** due to road traffic accidents from auto-insurance companies.

  - Appropriate increase of **fees for licensing** practicing physicians in the private sector, private clinics and private pharmacies.
  - **Coffee shops, restaurants and gift shops** should be considered during the design and construction of the Medical City, new hospitals and health centers. These are expected to be contracted annually.

- Establish a "Health Fund" to retain Ministry of Health revenues to be invested to finance the health system. Financial experts can suggest ways to invest such revenues.

- Taxing unhealthy products such as cigarettes, alcohol, and others

- Introduce Endowment (Islamic Waqf) as a source for financing health services. The argument is whether this could finance the current regular expenses or only the investment or projects' costs?

- Build a culture of "Paying for Health Care" within the community. The Government of Oman is committed to providing health care to all citizens free of charge. Such political commitment should clearly be defined, whether to be applied to both health care and curative services or only to health care and not to curative services. Curative services are mainly restoration of health lost, in most cases due to personal non-healthy behaviors. To ensure the success of the "National Health Insurance Program" the culture to pay for health services and for health care should be built gradually.

Vision 3: Rationalized Expenditure of the Health System

A number of measures can be considered to reduce the expenditure of the health system. About 95% of all consumables and pharmaceuticals used by Ministry of Health are imported.

Actions:

- Encourage local production of consumables such as medical gloves and syringes, which will contribute significantly to reducing their cost.

- Strengthen health research on biomedical technology and pharmaceuticals and encourage local pharmaceutical production to achieve suitable levels of self-reliance to reduce health expenditure.

- Invest in primary healthcare, diseases prevention and promoting healthy life-styles which will result in a lesser burden on hospitals and on expensive curative care of chronic diseases.

- Increase public awareness of the costs of health services to reduce unnecessary over-utilization of services.

- Perform economic studies for example cost-effectiveness and cost-benefit analysis to evaluate implemented and planned interventions

Vision 4: Established and Well-functioning System of Health Account

The lack of a well-functioning "National Health Account System (NHA)" not only makes monitoring health spending difficult, but also does not allow conducting economic studies that guide the health system to cost-effective strategies.

Actions:

- Establish a NHA system.

- Establish a body within the organizational structure of Ministry of Health to supervise and ensure data collection for NHA system.

- Tailor the NHA system to policy needs.

- Enhance health economic studies to guide for cost-effective strategies.

Vision 5: Health Care Facilities Budgeted Based on Outcome

Currently health care facilities are budgeted based on the available services irrespective of health outcomes of such services. The health system should be concerned with outcome of services and impact on health of the people.

Actions:

- Budget health facilities based on outcome. Outcome-based budgeting is expected to contribute to improvements in quality of care as well as cost containment.

- Develop key performance indicators to judge outcome of health facilities.

- Develop the capabilities of health facilities directors to manage their health facilities based on outcomes and not on services.

Vision 6: Enhanced Private Health Sector

Any health care system can be described on a continuum, ranging from full public financing and service provision at one extreme to full private financing and service

provision at the other. In fact, no health system can easily fit into the taxonomy of full public versus full private. In most health system there is a range of partnerships between the public and private sectors which can be seen from outsourcing of services, such as transportation, cleaning, logistics, and others to private hospital networks, both local and foreign. The private health sector has been slowly growing in Oman. It has limited contributions to health care delivery. Public-private partnership is essential for sustainability of the health system. The vision is to have 50%-50% partnership by the year 2050m with the private owning and running 50% of health services, especially expensive inpatient services.

Actions:

- Perform health system studies to find an appropriate role for the private sector in health care delivery and not only for outsourcing of services.

- Consider, in the near future, out-sourcing of ancillary and curative services and production of pharmaceuticals based on appropriate regulations.

- Enhance the development of health system research to develop means the Government can encourage the private sector to invest in health care and strengthen the public-private-partnerships (PPP).

- Develop public regulations for the private health sector.

- Review and assess the decision that allows publically employed health personnel to be engaged in private practice.

- Develop a clear description of the services package for the public sector to allow the private sector to appropriately plan for services provision. This service package should be revisited regularly for updates. Recently, there has been increased demand for alternative medicine, cosmetic surgery, high-technology interventions (Lasik, dental implants, hearing aids, etc.) which may go beyond what the public is willing and able to provide fully from public resources.

Chapter 7
Health Services in the Sultanate of Oman

Quality Care, Sustained Health

عناية راقية وصحة مستدامة

Chapter 7

Health Services in the Sultanate of Oman

Although the Sultanate of Oman witnessed the beginnings of modernization and development in 1970, after the accession of His Majesty Sultan Qaboos, it was only in the eighties that basic health care infrastructure could be made available to make meaningful contribution to the health development of the country. Prior to 1970, health status and infrastructure were very poor. There were only two small hospitals and a few dispensaries in the country. There were only 13 physicians each serving more than 50,000 people on an average. Morbidity and mortality rates were very high (122).

In an attempt to assign a governmental official body to face health challenges, to build health infrastructure and to develop health in the country, a Royal Decree was issued to establish a Ministry of Health in August 22nd, 1970. The Decree set the role of the Ministry in accordance with a number of pillars: develop and implement health policies and plans, insure the availability of quality health services across the country, improve population health and control of communicable diseases, develop maternal and child health care, health educate the population and collaborate with other governmental and non-governmental sectors to improve health (106). This was followed by a number of laws and rules to regulate the practice of medicine (Rule No. 9/1973) and revision of the role of Ministry of Health regulating the national administrative body in 1975 (Rule No. 26/1975) and the Royal Decree (No. 38/2002) defining the role of Ministry of Health (see other related Decrees and Laws in chapter 2).

For the 10 years following 1970, Ministry of Health alone carried the burden of providing health services and care through establishing health care facilities across the country (106). Table 37 shows that in 1970 there were only two small hospitals with only 12 beds and 19 clinics distributed across the country. At that time, one hospital bed served about 50,000 of the population and a clinic served about 35,000. This has changed over the following 42 years to 54 public hospitals owned by the Government and 11 private hospitals with a total of 5,977 hospital beds. There is now one hospital bed to serve about 606 of the population and one public health center to serve about 14,971 of the population. The average annual growth rate for hospital beds was highest during the period 1970 to 1975 (146.4%) (60) showing the Government's commitment to developing health services. The growth of hospital beds continued to be relatively high during the period 1976 to 1990, a period that witnessed the maximum investment in health infrastructure (Table 37). Health centers increased during the same period by six fold to become 136 in 1990.

Public health care providers other than Ministry of Health have contributed to the growth of health services only after 1985, except for Medical Services for Armed Forces which established two hospitals, but no health centers or clinics, in 1975 (Table 37). In 1985 public health care providers other than Ministry of Health have shared about 5.9% of the hospital beds and 39.2% of health centers and dispensaries. Their contribution to hospital beds' capacity has grown over the years to reach 14.6% but has declined with regard to primary health care units to only 20.7% in year 2012 (Table 37) (3).

Table 37: Health Services in the Sultanate of Oman over the Years

Category	1970[a]	1975[a]	1980[a]	1985[a]	1990	1995	2000	2005	2010	2012
No. Hospitals										
Ministry of Health	2	24	28	40	47	47	47	49	50	49
M.S. Armed Forces		2	2	2	3	3	3	3	3	3
M.S. ROP				1	1	1	1	1	1	1
SQU					1	1	1	1	1	1
M.S. PDO				1	0	0	0	0	0	0
M.S. Diwan of Royal Court										0
Private						1	3	4	7	11
National Total	**2**	**26**	**30**	**44**	**52**	**53**	**55**	**58**	**62**	**65**
No. Hospital Beds										
Ministry of Health	12	1,000	1,784	2,861	3,419	3,958	4,534	4,542	4,692	4,659
M.S. Armed Forces		89	89	112	249	261	260	260	260	323
M.S. ROP				45	65	47	48	48	50	74
SQU					140	292	297	294	476	473
M.S. PDO				22	0	0	0	0	0	0
M.S. Diwan of Royal Court										
Private						6	51	126	279	448
National Total	**12**	**1,089**	**1,879**	**3,040**	**3,873**	**4,564**	**5,190**	**5,270**	**5,757**	**5,977**
Beds/10,000 pop	**0.2**	**13.6**	**18.6**	**22**	**24.3**	**21.8**	**21.6**	**21**	**17.8**	**16.5**
Average Annual Growth[c]		146.4%	11.5%	10.1%	5.0%	3.3%	2.6%	0.3%	1.8%	1.9%
No. Health Centers										
Ministry of Health	19	40	55	79	94	120	118	144	176	192
M.S. Armed Forces				27	27	30	30	31	31	35
M.S. ROP				3	4	3	3	3	3	3
SQU						1	1	1	1	1
M.S. PDO				21	11	9	9	9	9	9
M.S. Diwan of Royal Court									1	2
National Total	**19**	**40**	**55**	**130**	**136**	**163**	**161**	**188**	**221**	**242**
Population per HC	**34,632**	**19,900**	**18,455**	**10,607**	**11,706**	**12,828**	**14,919**	**13,346**	**14,649**	**14,971**
Private Clinics										
Specialized				7	34	35	102	159	229	265
General			198	222	278	389	364	384	387	432
Dental				26	32	38	74	112	134	206
Others[b]							20	58	64	72
Total			**198**	**255**	**334**	**471**	**560**	**713**	**814**	**975**
Private Pharmacies					**158**	**254**	**321**	**331**	**400**	**476**

[a] During the year 1985, dispensaries were re-named as health centers; mini-health centers and health centers as hospitals. The figures shown adopt 1985 definitions

[b] include Chinese and Indian clinics, Medical laboratories and diagnostic centers

[c] Relative to previous cell

H.S.: Health services; H.S. ROP: Health Services Royal Oman Police; SQU: Sultan Qaboos University; H.S. PDO: health Services Petroleum Development Oman; HC: Health Center

The private sector's contribution to the provision of health care started as early as the late 1970s with a number of small general clinics (198 clinics in 1980). In October 8th, 1978 Ministry of Health formed a special committee to consider applications for establishing private hospitals and clinics (106). The contribution of the private sector has continued to grow. In 2012 there are a total of 975 clinics of which about 27.2% are specialized clinics compared with 3.1% in 1985. In addition, there are 11 hospitals with 448 hospital beds (Table 37) (3).

The period 1991-2000 was characterized by qualitative and quantitative developments of health services. Developments considered equity through proper geographical distribution of such services, aided by the Decentralization Policy adopted by Ministry of Health at the beginning of that period. The Decentralization Policy empowered management and planning of health services at Governorate level. It has necessitated the building and renovations of referral hospitals; outside Muscat, in an attempt to make available at least one referral hospital to serve each health Governorate (region at that time). During the fourth Five-Year Health Development Plan (1991-1995) the average annual growth rate for hospital beds was 3.3% and this became 2.6% in the sixth plan (1996-2000) (Table 37). The same period witnessed an 18.4% increase in primary health care services. Some of health centers were furnished with maternity beds to provide maternity services to areas far from hospitals. Extended health centers providing specialized services at outpatient level were established to reduce the burden on hospital clinics (66), (67).

The past decade since 2000, has showed an average annual growth of hospital beds of not more than 1% (0.3% for 2001-2005 and 0.8% for 2006-2010). The average annual growth of hospital beds even declined to -0.35% in the period 2010-2012. The strategies of the sixth and seventh health development plans did not aim to increase the number of hospital beds in the country but only to replace old unsuitable hospital buildings with new or renovated ones to provide appropriate care (123), (124). The strategies aimed to improve efficiency of the health system as bed occupancy rates were low at that time. Low bed occupancy was the result of building or renovating a number of hospitals to act as regional referral hospitals with enough hospital beds to face the rapid demographic growth seen during the 1990s. However, the control of communicable diseases, especially the remarkable reductions in malaria cases (see page 65) and the introduction of recent management procedures that resulted in reduction of length of stay in hospitals and the decline in fertility all resulted in low bed occupancy. Bed occupancy in Ministry of Health hospitals is only 59% and 72% in other public hospitals in 2012 (3).

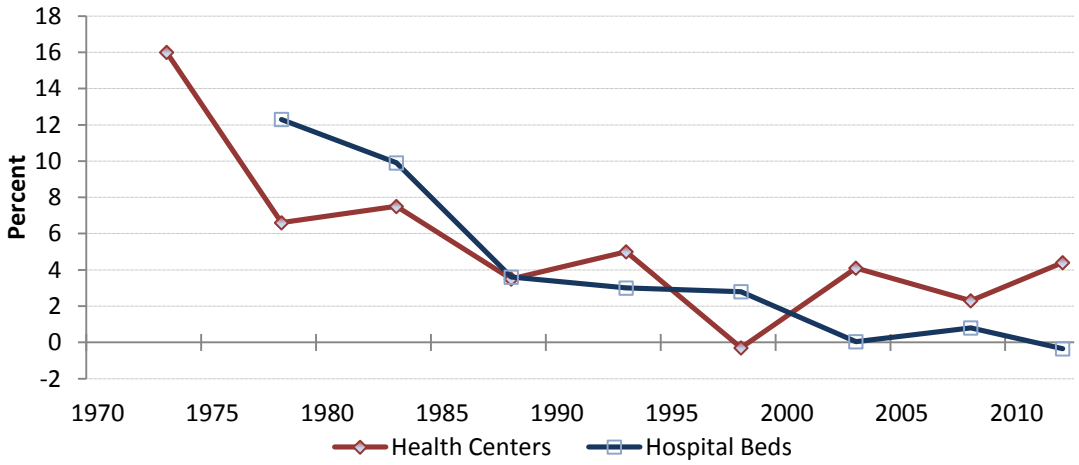


Figure 38: Average annual growth rates for health centers and hospital beds

Average annual growth rate for hospital beds for 1970-1975 was estimated to be 142.2% as this period coincided with the rapid growth of health infrastructure at the beginning of the Renaissance (removed from graph for simplification).

Figure 38 shows the average annual growth rates for hospital beds and health centers. It shows that the rate of growth for both was high during the early phases of development after

the renaissance in 1970 to build the health infrastructure and started to decline thereafter to achieve efficiency of the health system.

Figure 39, on the other hand, shows availability of hospital beds to the population over the years. The figure shows the rapid increase in the number of hospital beds made available to every 10 thousands of the population over the years 1970-1990, in spite of the rapid population growth during the same period. In other words, the rate of growth of hospital beds exceeded the rate of population growth during that period. In spite of the fact that the absolute number of hospital beds increased from 3,873 beds in 1990 to 5,977 in 2012, the bed availability indicator reached a plateau then slightly declined, showing that the rate of growth of bed availability was lower than the population growth during that later period. As previously mentioned, this was a planned strategy included in the policy of the Sixth and Seventh Five-Year Health Development Plans to improve health system efficiency.

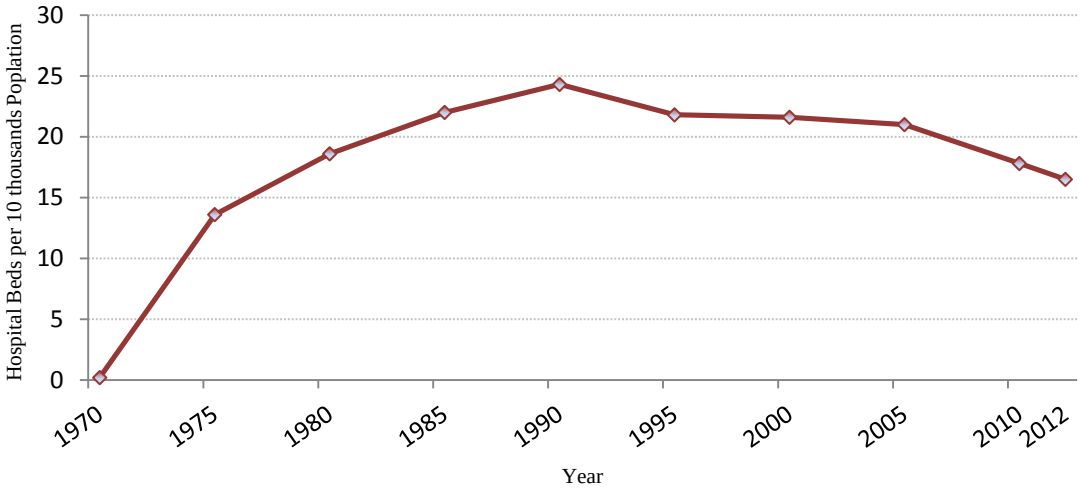


Figure 39: Hospital beds per 10 thousands of population over the years

Table 38 and Figure 40 show the availability of hospital beds to the population in the health Governorates. Both North AlBatinah and South AlBatinah Governorates appear to be underserved with hospital beds compared with other health Governorates. They have 9.1 and 9.2 beds for every 10 thousands of the population, respectively, while the national average is 16.5 beds for 10 thousands of the population (3). However, the bed occupancy rates in these two Governorates were found to be 65.8% and 61.3%, respectively, and were found comparable to other Governorates and to the national figure of 59%. These later findings show that there is no real under-serving of these two Governorates with hospital beds. On the other hand, the increase in the availability indicator of hospital beds in Musandam Governorate was found to be associated with low bed occupancy rate of 22.8%. The high bed availability and low utilization in Musandam Governorate can be explained by the fact that Musandam has a small area with a low population density and is separated from the main-land of the country in the north which necessitates making beds available, regardless of the cost efficiency.

Table 38: Distribution of health services in the Health Governorates, 2012

	Hospitals					Health Centers and Clinics			
	MOH	Public non-MOH[a]	Private	Total Hosp. Beds	Hosp. beds per 10,000	MOH	Public non-MOH[a]	Private Clinics	Pop. per private clinic
Muscat	6	4	6	2,473	21.4	31	3	427	2,705
Dhofar	7	1	2	653	18.4	30	2	66	5,385
Musandam	3			156	45.1	4		12	2,881
AlBuraymi	2			156	16.9	7		40	2,306
AdDakhiliyah	6			544	14.6	23	2	61	6,104
N AlBatinah	5		2	555	9.1	22		156	3,903
S AlBatinah	5			301	9.2	17		53	6,159
S AshShgarqiyah	4		1	450	18.3	19		27	9,099
N AshShgarqiyah	6			367	16.5	16		28	7,955
AdDhahira	2			254	14.7	14		59	2,930
AlWusta	3			68	18.5	9	8	46	798

[a] Include Medical Services of Armed Forces, Royal Oman Police, Royal Court, Petroleum Development Oman and Sultan Qaboos University Hospital but does not show distribution of clinics or dispensaries of Medical Services of Armed Forces

Hosp.: Hospital; Pop.: Population

Source: (3)

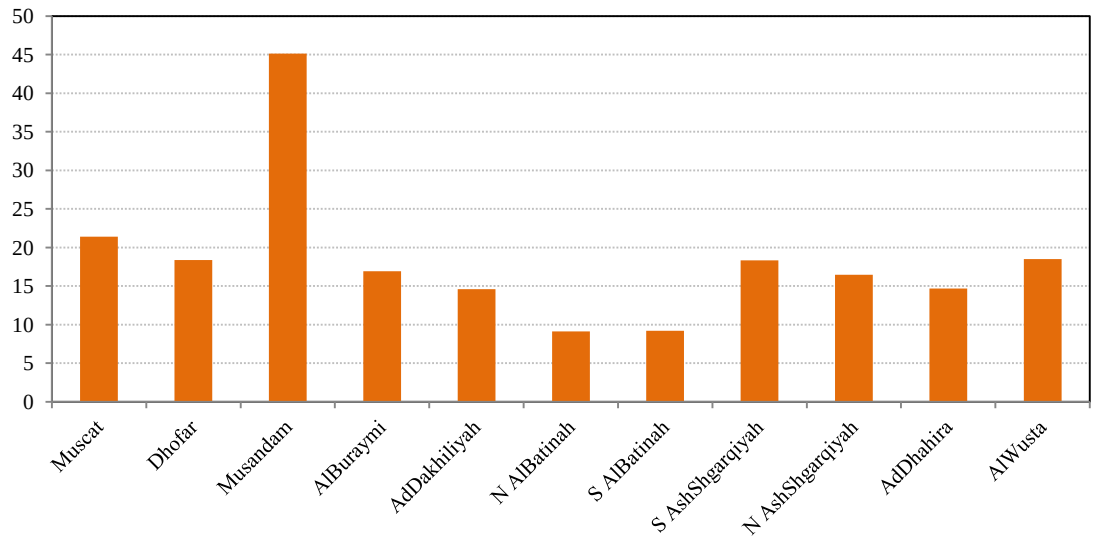


Figure 40: Hospital beds per 10 thousands population in Health Governorates, 2012
Source: (3)

The average number of the population served by a single public health center or dispensary declined dramatically during the period 1970-1985 (Figure 41); in other words, more public ambulatory care units were made available to serve the population. However, the growth of these public ambulatory care units was almost equal to the population growth during the period following 1985, giving the plateau shown in Figure 41. A single public unit serves about 14,971 in 2012 compared with 34,632 in 1970 (see Table 37 and Figure 41). However, not all the 242 public ambulatory care units are true primary health care (PHC) units that provide the defined package of primary health care (see package of PHC in appendix). The units that are run by public health care providers other than Ministry of health; namely the

Medical Services Armed Forces, the Medical Services Royal Oman Police, the Medical Services Diwan of Royal Court and the Petroleum Development Oman are merely ambulatory medical care units providing medical care services to their employees. The actual PHC units are defined as the health centers and local hospitals that are run by the Ministry of Health and one health center run by the Sultan Qaboos University Hospital; totaling 220 PHC units and each serving about 16,468 of the population in 2012.

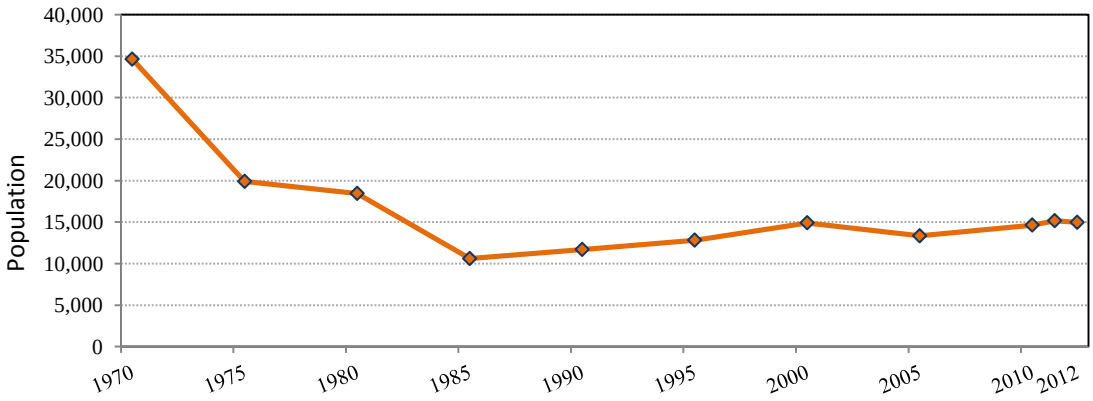


Figure 41: The Number of population served by a health center or a dispensary

The population size served by each PHC unit in different Governorates is shown in Figure 42. It is clear that Muscat, North AlBatinah, South AlBatinah and to a lesser extent AdDakhiliyah Governorates are considered under-served if compared with other Governorates. This is possibly explained by the fact that these governorates have high population densities. However, in these governorates, PHC units are staffed with physicians, nurses and other paramedical staff in proportion to the population to provide the essential care. On the other hand, Figure 42 shows that each PHC in Musandam, AlWusta and Dhofar Governorates serve small numbers of the individuals, explained by the sparse nature of the population in these areas.

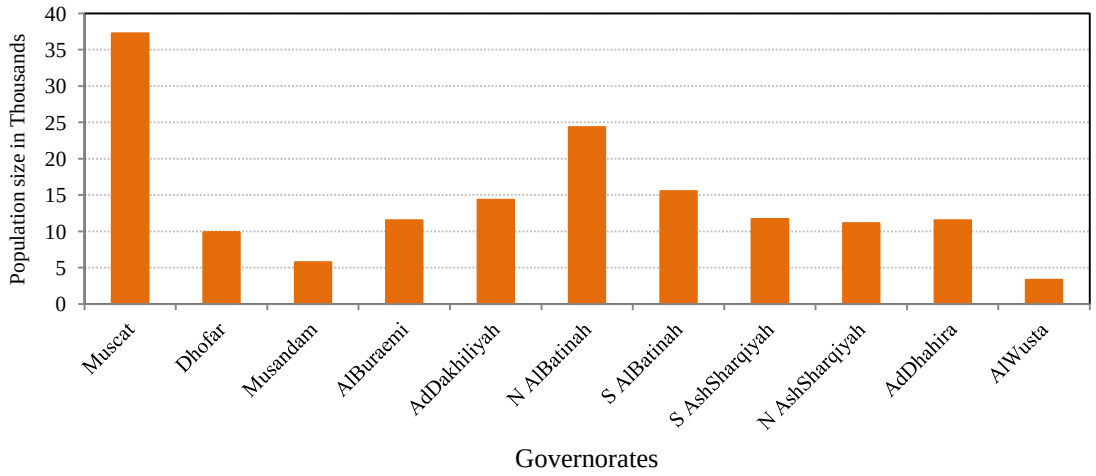


Figure 42: Population served by each Primary Health Care Unit in the health Governorates, 2012

In spite of the tremendous growth of private clinics in the Sultanate of Oman, their distribution in the health Governorates vary greatly as seen from the number of individuals served by each private clinic (Figure 43). The figure shows that most Governorates are under-served by private clinics when compared with Muscat (the capital) and other border Governorates as Musandam, AlBuraymi and AdDhahira.

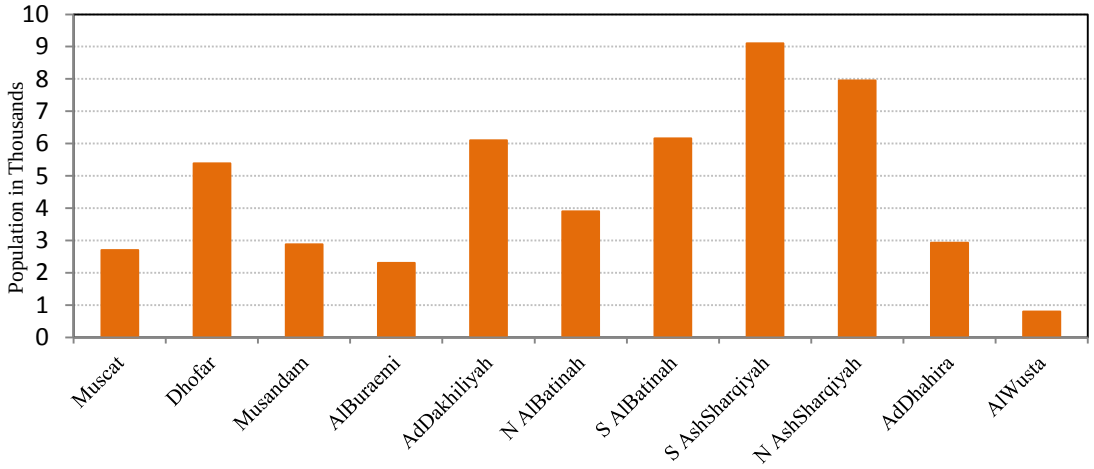


Figure 43: Average number of population for every private clinic in the health regions, 2012

Utilization indicators of Ministry of Health's health services of are shown in
Table **39**. The decline of outpatient visits in 2000 compared with 1995 is attributed to the 25% reduction in outpatient visits in 1998 after nominal charges for outpatient visits were introduced. The introduction of such charges reduced un-necessary visits to health services. In spite of the fact that the total number of visits increased over the years and reached its level before the introduction of the charges, the average number of visits made per person during the year remained relatively low. The increase in number of visits is thus attributed to population growth while visits per person per year remained low suggesting that the majority of visits are necessary visits. The percentage of visits made to health centers has increased over the years from 35% in 1990 to 73% in 2012 showing shift to relying on primary health care services provided at health center level. This is also explained by the fact that health centers in Ministry of Health almost doubled during the same period (from 94 to 192 Table 37). There are also additional 1.3 million visits made to public health services other than Ministry of Health facilities and about 8.9 million visits to the private sector (3). The private sector shares about 37.8% of the burden of outpatient services.

The low bed occupancy rate presented in Table **39** is discussed on page 104. The decline in bed occupancy despite the increase of hospital discharges (Table **39**) is explained by the increase in bed capacity shown in Table 37 and the shortening of the length of hospital stay shown in Table **39**. The increase in the number of hospital discharges over the years can partly be explained by the increase in the number of deliveries and surgeries and by the complexity of obstetric services, reflected by the increase in the percentage of caesarian sections from 5.1% of total deliveries in 1990 to 17.5% in 2012 (Table **39**).

Table 39: Utilization services at Ministry of Health Institutions

Indicators	1990	1995	2000	2005	2010	2012
Outpatient Visits						
At Hospitals	5,625,713	7,400,908	5,267,649	4,348,261	3,425,773	3,600,456
At Health Centers / Extended HC	2,970,837	4,832,294	4,638,551	6,268,649	8,967,519	9,743,701
Total Visits	8,596,550	12,233,202	9,906,200	10,616,910	12,393,292	13,344,157
% HC visits (of total visits)	35%	40%	47%	59%	72%	73%
Average Daily Visits	23,552	33,516	27,066	29,087	33,954	36,459
Mean number of visits /person / year	5.4	5.8	4.1	4.2	3.8	3.7
Omanis	na	na	5.3	5.6	5.7	6.1
Expatriates	na	na	0.6	0.5	0.4	0.4
Inpatient Services						
Total Hospital Discharges	183,201	220,846	225,868	219,849	267,996	293,251
Bed Occupancy Rate (%)	70%	69%	55.9%	52.9%	54.5%	59.0%
Mean Length of Stay (days)	4.7	4.4	4.1	3.8	3.4	3.3
Total Deliveries	44,131	44,210	39,986	42,050	55,631	61,380
Caesarian Sections (% of total deliveries)	5.1%	6.8%	9.7%	12.6%	16.4%	17.5%
Emergency/Elective Caesarian Sections		5.95	4.8	3.8	3.3	3.2
Total Surgical Procedures	69,404	86,297	101,951	82,636	92,219	90,804
Major Procedures (% of total procedures)	23.5%	24.2%	30.8%	42%	40.5%	45.3%
Total Laboratory Procedures	4,420,838	6,117,002	9,592,298	11,565,355	15,673,499	19,499,997
Mean no. of lab procedures/person/year	2.78	2.9	4.0	4.6	4.8	5.4
Total no. of Radiological Procedures	391,444	592,030	799,452	897,758	1,097,085	1,247,016
Radiological procedures / 1000 population	246	283	333	365	339	344
Total no. of Dental Visits	247,371	359,118	407,843	437,270	292,139	264,537
Dental **visits / 1000 population**	152	172	170	178	90	73

Source: (3)

In spite of the increase in the proportion of caesarian sections out of total deliveries, the emergency/elective sections ratio had decreased from about 6 to only 3.2; reflecting the quality of antenatal care services in the health system. The increase in the proportion of major surgeries can be considered as proxy indicator to the development of the quality of services; major surgeries constitute 45.3% of surgical procedures in 2012 compared with 23.5% in 1990. The data show high utilization of radiological and medical laboratory services as about one third of the population receive a radiological procedure and each person in the population receives on average 5.4 laboratory tests. The effect of utilization pattern discussed above on efficiency of the health system should be carefully considered.

Challenges Related to Health Services

As previously mentioned (page 14), the Sultanate of Oman has had three censuses; 1993, 2003 and 2010. The 2003 census showed that about 95% of the enumeration areas were populated with less than 1,000 individuals and they collectively made up only 17.6% of the population (9) and this was also seen in the 2010 census, which shows that 93.7% of the enumeration areas (towns) have a population less than 1,000 individuals and they collectively constitute 15.2% of the total population (10). Figure 44 shows a diagrammatic map of Oman showing how the population is scattered over a relatively large country area; the figure shows population as dots, with each dot representing 100 individuals. The scarce population distribution poses a considerable challenge to provide health services with equity. On the other hand there are highly populated areas in Muscat, North AlBatinah and South AlBatinah Governorates (along the coastal line) (Figure 44). Such population distribution has required establishing health care facilities (health centers) serving small populations and others serving

large numbers of individuals in their catchment areas. About 9.5% of the health centers serve less than 1,000 individuals (Table 40) and this resulted in a burden on the services especially in Dhofar Governorate, AlWusta Governorate and AlBuraymi Governorate where 37.9%, 22.2% and 16.7% of health centers serve small populations, respectively.

On the other hand, 20.8% of health centers serve more than 15,000 individuals, while the planned norm is only 10,000. These health centers are located in the highly populated areas of Muscat, North AlBatinah and South AlBatinah Governorates, where more than 70% of health centers serve large numbers of individuals (Table 40). To deal with the workload, Ministry of Health had to staff such health centers with higher numbers of physicians and other paramedical staff higher than the norm for health centers; creating a challenge for running such health care facilities. Figure 44 shows the difficult topography of the country with large mountains forming a belt between the coast and the desert. It also shows the large desert areas (AlRub AlKhali) forming barriers between areas in the country affecting accessibility to services.

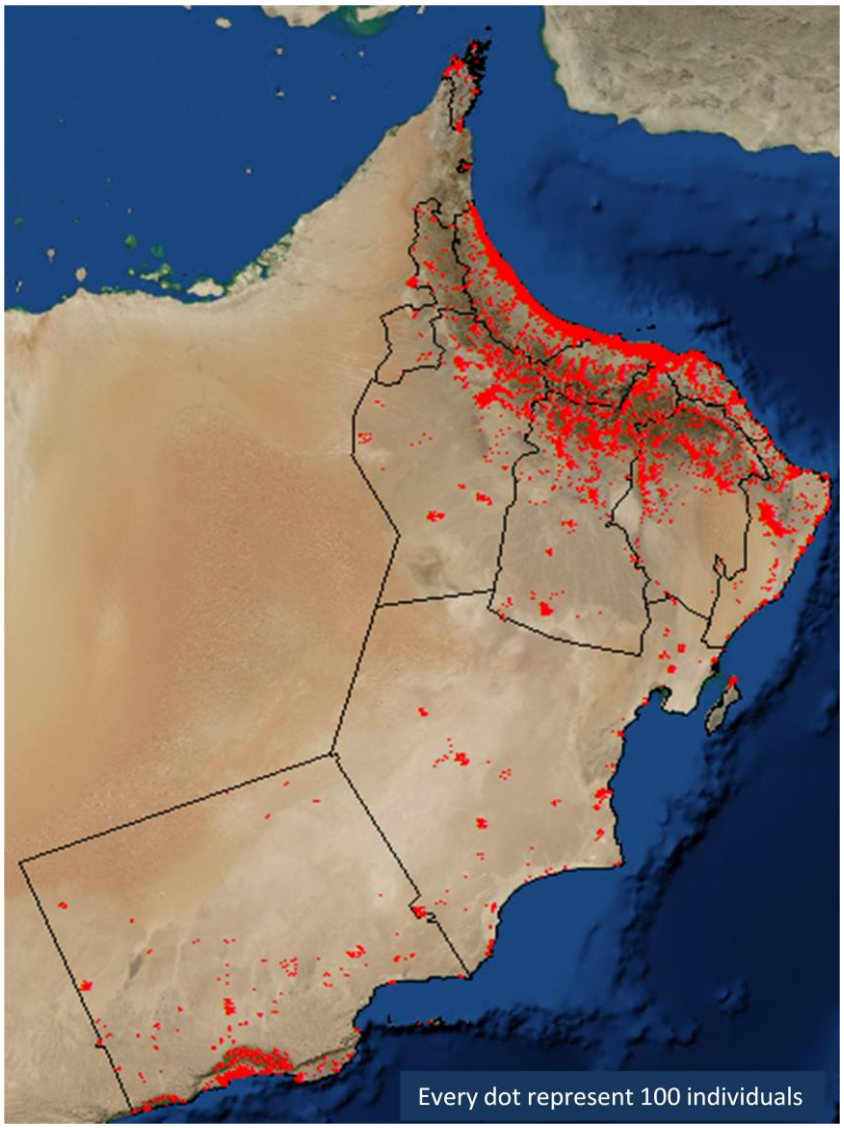


Figure 44: Diagrammatic map of Oman showing the scattered population, 2010

Table 40: Health centers that belong to Ministry of Health and population they serve

Governorate	Total Health centers[a]	HC serving less than 1000 individuals		HC serving more than 15,000 individuals	
		No.	% of total HC	No.	% of total HC
Muscat	27	1	3.7%	19	70.4%
Dhofar	29	11	37.9%	4	13.8%
Musandam	3	0	0.0%	1	33.3%
AlBuraimi	6	1	16.7%	1	16.7%
AdDakhiliyah	19	0	0.0%	8	42.1%
North AlBatinah	17	1	5.9%	15	88.2%
South AlBatinah	14	0	0.0%	10	71.4%
South AshSharqiyah	17	0	0.0%	5	29.4%
North AshSharqiyah	14	0	0.0%	4	28.6%
AdDhahirah	13	0	0.0%	2	15.4%
AlWusta	9	2	22.2%	0	0.0%
Total	168	16	9.5%	35	20.8%

[a] Does not include 24 extended health centers and 30 local hospitals

Visions for Health Services

Vision 1: A Strong, Responsive and Sustainable Primary Health Care System as the Main Entry Point and Backbone of Health Care

Ministry of Health, the main health care provider in the Sultanate of Oman, considers "Primary Health Care (PHC) as the main entry point for health services" as one of its directives documented in its health policies. Primary Health Care was continuously developed over the years and was praised for its universal coverage in the "World Health Report 2008: Primary Health Care: Now More Than Ever" (24). It is essential to sustain achievements and further strengthen PHC in the light of the epidemiological transition to non-communicable diseases, aging of the population and the continuous advances in health care technology. The review of health status in the country showed that the health system was able to improve the health of the population continuously over the years. However, in-depth review shows that some governorates have poorer health than others. Dhofar, AdDakhiliyah and North AshSharqiyah Governorates have higher levels of morbidity related to both communicable and non-communicable diseases compared with other Governorates. North AshSharqiyah and South AshSharqiyah Governorates have high levels of childhood malnutrition. Such differences among Governorates cannot be explained by inequity of health services distribution. Primary and secondary health care services are shown to be distributed with equity among Governorates; as the health system has always strived to reach equity. Such difference in morbidity seen among Governorates is possibly related to how primary health care functions in these governorates. Is primary health care doing its main function to prevent illness in the first place, or is it directed at managing basic diseases.

At present, we cannot predict all the innovations and ideas that will help to develop our primary health care over the coming 40 years. Some of the changes in primary health care will be complex and will take time.

Actions:

- Review functions of PHC to ensure that; "Healthy Individuals" and not "the Patients" are at the heart of PHC. Primary health care reform should target strengthening the essential role of disease prevention and go hand-in-hand with adding specialty care. Primary health care reform and planning should continue to consider complete population coverage, equity, quality care and responsiveness to the continuing changes in peoples' needs. Each primary health care center should be equipped with professionals and facilities to accomplish the "Elements of Primary Health Care" and not only to treat patients; it should not be thought of as primary medical care. Elements of primary health care that target preventing illness are similar to those presented at the "Alma Ata" declaration. Primary health care should include additional elements that have promotive, preventive, curative and rehabilitative services.

- Enhance community participation. Transparency and communication with the people will provide clear vehicle for improving quality. People and patients will have a more clear idea about services and care provided, enhancing appropriate utilization and will have a better share in planning and improving services. Patients' choice to access services should be emphasized.

- Incentivize and budget PHC facilities individually based on outcomes, as this will have a positive impact on quality of care.

- Introduce specialty care in PHC. Prevention of disease complications, by following-up patients with chronic diseases, is a secondary role of primary health care in addition to its primary role providing preventive care for primary diseases and curative care for acute basic conditions. As previously described, the epidemiological shift to non-communicable diseases requires that primary health care is equipped with specialty care to be able to follow-up on chronic diseases. It is, thus, essential to qualify family physicians with specialty interests. This will contribute to reducing health inequalities as every 'at risk' person wwill have access to support and services to make healthier choices. Larger health centers with multiple clinics are thus needed.

- Introduce geriatric care to the main elements of PHC. With the increase in life expectancy at birth, more people will live longer and be exposed to the risks of old age. Population projections show that the proportion of the elderly aged 60 years and above is expected to increase from its current values of 6.1% of the total population to 13.1% in 2050. The number of elderly in 2050 will become about 617 thousands or about five fold their current numbers. Those who live to 80 years and above will represent 7% of the elderly aged 60 years and above (see Expected Population Growth on page 20 and Challenges Related to Health Problems on page 70). Geriatric health care policy, strategy and services should be developed. Geriatric health care clinics should be made available in primary health care facilities. Home care should also be

considered for geriatric patients who find it difficult to attend health facilities. Home care should also be extended to the terminally ill or those with chronic long term conditions.

- Ensure sufficient investments in PHC. It should be emphasized that insufficient and poor investment in prevention of disease is associated with increased hospital utilization and this will limit resources to invest in disease prevention, resulting in more diseases and poor health (Figure 45). The wide area of responsibility of primary health care makes it necessary to ensure sufficient numbers of highly qualified health professionals in different specialties, in addition to increasing numbers of PHC facilities.

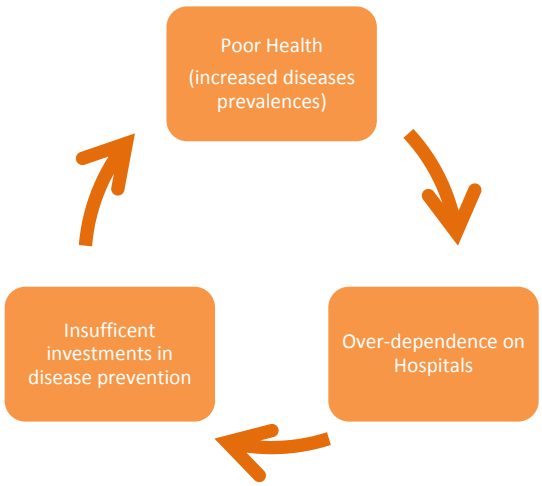


Figure 45: Inefficient and poor investment in disease prevention is usually associated with increased hospital utilization

- Review the norm for establishing PHC units. Currently, there are a total of 220 PHC units in Oman, each serving 16,468 people on average. The norm of one primary health care unit for every 10,000 population has been adopted for years. The norm should be reviewed periodically in terms of the sparsely scattered population of Oman; it may need to vary among health governorates as population density varies; the main criterion should be accessibility.

- Develop a proper referral system in accordance with developments in PHC policies and elements. In terms of developed policies and functions of PHC with their emphasis on specialty services and geriatric health as additional elements, the referral system to higher levels of care should be revisited. A referral system should ensure that primary health care facilitates provision of access and equity to secondary and tertiary care services to the people of Oman. Patient information should be made available at both primary and higher levels of care to support continuity of care.

Vision 2: Establishment of State-of-the-Art Tertiary Care Services Provided Through Medical Cities

Currently tertiary care hospitals are congested and cannot accommodate expansion of the existing subspecialties or the addition of new super-specialties and new services. The congestion seen in tertiary care services and the lack of subspecialties has forced many patients to seek tertiary care outside the country; partly at the cost of the Government and partly as out-of-pocket expenditure. The new super-specialty procedures require high technological ancillary services, more operation theater time, and more intensive infection control procedures. Alterations and / or upgrading of the existing tertiary care services will not be ideal in terms of logistics and technological requirements. The construction of fresh state-of-the-art tertiary care facilities should thus be considered for future development of tertiary care services. Analysis of the expected admission rates to tertiary care, population growth and disease profile suggests the construction of 2,000 beds for different specialties.

Comprehensive care requires multi-disciplinary inputs, suggesting that the construction of the proposed tertiary beds should be in the same campus, as in a Medical City. Having such services in one place will also optimize utilization of staff and technology.

In the coming years, we should aim at world-class tertiary care in hospitals of excellence. This will reduce health expenditure made by patients seeking care outside the country and will provide care to patients nearer to their homes and within their families. Ensuring the availability of tertiary care to patients close to their families will not only have financial implications but also social implications. To make curative services accessible to the people of Oman, efforts need to be made to provide the best possible diagnostic, therapeutic and rehabilitative services and to introduce certain super-specialty services that are not available in the country, which will reduce seeking medical care abroad.

Actions:

- Build Medical Cities to provide tertiary care. The construction of the Medical City in the capital area (by 2020) will continue to make tertiary services efficient and accessible to the majority of the people of Oman. The Medical City will also facilitate the training and education of health care professionals, reducing the cost of training abroad and achieving self-reliance in higher-level training and continuing education of health care professionals. It will also enhance clinical research in national priority areas.

- Construct Medical Cities in the Northern (North AlBatinah Governorate) and the Southern (AlWusta Governorate) parts of the country. The concentration of tertiary care in the capital has made tertiary services efficient over the years. However, patients who live in areas far from the Capital Muscat have difficulty accessing such tertiary services. Distant areas, namely Dhofar Governorate, AlWusta Governorate and Musandam Governorate will require

tertiary care services as such areas are developed. Sohar and AdDuqum are examples of areas with plans for significant economic and social developments. There is, therefore, a need to develop a Medical City in the northern part of North AlBatinah Governorate (by 2035) and another in AlWusta Governorate (by 2045) to provide highly advanced tertiary care services to such areas of the country.

- Develop a world class "Pre-Hospital Care System" (Ambulance System – Emergency Medical Services). As mentioned earlier, Oman has a disease profile with non-communicable diseases and injuries prevailing. Such disease profile together with the fact that the country extends over a relatively wide area, a proper well advanced pre-hospital emergency medical service system will make a difference to patients who develop their outside the health facility. It will also act as an effective and safe measure to refer critical patients to a higher level of care.

Vision 3: Types and Construction Plans for Health Facilities Redefined According to New Roles For Health Facilities

Simply investing in the existing health services may limit opportunities for doing things differently. The revision of the functions of PHC and the introduction of new health care services and elements will require re-construction of PHC units. The developments of new technologies and developments in tertiary and secondary care as visualized for the future will also require re-defining hospitals.

Actions:

- Redefine PHC units to two types of health centers; Health Center B and Health Center A. Primary health care (PHC) is currently provided by health centers, extended health centers and local hospitals. As additional elements are planned to be added to PHC, re-defining PHC units and re-designing their construction is essential. Extended Health Centers have added additional level of care; secondary care at outpatient level. The role of EHC will be accomplished after strengthening PHC with specialty services. EHC will be demolished gradually with the development of additional health centers. Local hospitals will not provide PHC as hospital types will also be re-defined (see page 116). Health centers are to be classified into only two types; Basic Health Centers (Type B) and Health Centers with Beds (type A). Summary of their structure and services are shown in the table below. Further details of how health centers are planned and constructed are available in a strategic study for health services.

Health Center Type B	Health Center Type A
20 clinics, a pharmacy, medical store of sufficient size, diagnostic medical laboratory, x-rays facilities and treatment room with treatment beds	
-	Maternity services including 2 delivery suites and recovery beds

- Re-define hospitals to three types; 300-bed, 150-bed and 50-bed hospitals. There is a need to set out a framework for the development and re-structuring of the public hospitals that will ensure that secondary and tertiary care are sustained and made accessible to the needy, along with the increase in shift of resources towards primary health care, as mentioned earlier. Currently, there are functionally four types of hospitals; national referral hospitals providing tertiary and secondary care, referral governorate hospitals providing secondary care, wilayat hospitals providing secondary care and local hospitals providing primary health care with basic inpatient services. Local hospitals will be demolished over the years and their function for providing PHC will be provided by health centers. Analysis shows that, 26 out of the 31 local hospitals were built before 1987 and most building structures are not suitable for providing inpatient services.

  Tertiary care is planned to be provided by Tertiary Care Hospitals within Medical Cities; structured and constructed to accommodate the latest advances in technology and its expected developments, provide state-of-the-art tertiary care and act as centers of excellence for health professions education. Public hospitals will be redefined into three types: 50-bed, 150-bed and 300-bed (and more) hospitals. These are expected to provide secondary care and some tertiary care, depending on the needs of the population according to the following table.

Hospital Type	Population served
50-bed Hospital	50 thousands individuals
150-bed Hospital	50-100 thousands individuals
300-bed (and more) Hospitals	More than 100 thousands individuals

A detailed description of the components of these hospitals is given in a strategic study for health services. The following is a summary of their important characteristics:

1. They should be “General Hospitals” with specialties based on the needs and epidemiology of the catchment population;
2. The 300-bed (and more) hospitals should include subspecialties according to needs;
3. They should be constructed as multi-story hospitals (2, 3, 4 or more floors) in 50-bed blocks and should be expandable to accommodate services for a growing population;
4. All hospitals should include “Day Care”, the number of day-care beds will depend on the specialties that will provide day-care and advances in technology;
5. All hospitals should provide rehabilitation services;
6. All hospitals should have a “Renal Dialysis Unit” (20, 30 beds or more)

7. The number of beds in critical care units (Intensive Care Units (ICU), Coronary Care Units (CCU), Special Care Baby Units (SCABU)) should be at least 20% of the total number of hospital beds;
8. All hospitals should have sufficient outpatient department (35, 50 clinics or more as needed during planning of specific hospital) together with treatment rooms, ECG and other diagnostic rooms;
9. All hospitals should have isolation rooms and special rooms to accommodate at least 10% of the beds;
10. All hospitals should have private rooms to accommodate 20-50% of beds (to increase hospital revenues);
11. For 300-bed (and more) hospitals, there should be accommodation for patients' companions (to increase hospital revenues)

Vision 4: Umbrella of Health Facilities Expanded and Renovated to Achieve Universal Coverage and Parallel to Population Growth

Currently one PHC unit serves 16,468 individuals and every 10,000 individuals are served by 16.5 hospital beds. As discussed before there is a need to expand the umbrella of health service to a norm that will provide universal coverage and accessibility to quality health services. The current structure of the health facilities is not expected to keep up with the advances in technology, the expected disease profile and ageing of the population and this will require renovation of health facilities.

Actions:

- Expand the umbrella of and renovate health centers to act as PHC units. A number of assumptions need to be made to estimate the numbers of health centers required; these are follows:
  - The assumption of providing one PHC unit to serve 10,000 of the population should hold (till reviewed) and continue till 2050. There are scarcely populated areas in Oman need to be served with PHC. There may thus, be PHC units serving less than 10,000; however, the overall average should hold as before.
  - Since the current average is one PHC unit for every 16,468 people; it may be difficult to reach the proposed norm in a few years. The assumption is to reach this norm by 2020.
  - Local hospitals should not provide primary health care and should be replaced by hospitals that provide secondary care as mentioned in hospitals redefinition (see page116). Therefore, there is a need to replace such local hospitals by health centers to function as PHC units. This may need to take place over a period of time expected to last until 2030.
  - The current health centers have been designed to provide PHC. There are limitations in their physical design to expand and to provide specialty services, as discussed, and also to provide patient social services such as children's play area. A number of health centers were built since since some time ago and buildings need to be replaced and re-designed for

projected services. Health centers should be replaced if their life span has reached 30 years.

– Health centers built after 2013 may need reconstruction and extension 40 years after they were built.

Ministry of Health has made projections for the numbers of health centers required to provide PHC mainly to Omani population. Table 41 shows the numbers of health centers projected to be constructed by Ministry of Health during each health plan and shows the projected number of Omanis served by each health center at the end of each health plan. Projections show that the norm of health center to population ratio will be achieved by 2015. However, construction of health centers will be extended over a period of time to achieve the norm by 2020, according to availability of resources. Detailed distribution of health centers in the governorates will be shown in detail in a strategic study for health services. Similar projections should be made for private sector and how it will share in PHC.

Table 41: projections for the number of Health Centers till 2050 in Ministry of Health

Period of Health Plan	Primary Health Care Units		Existing Health Centers at end of Health Plan	Population Served by PHC unit at end of Health Plan
	To replace old health centers	Total HC to be Constructed during Health Plan		
2012-2015	40	47	239	9,486
2016-2020	0	46	285	9,046
2021-2025	0	26	311	9,274
2026-2030	0	26	337	9,451
2031-2035	0	31	368	9,531
2036-2040	24	33	401	9,665
2041-2045	30	40	441	9,725
2046-2050	42	52	493	9,579
Total 2012-2050	**136**	**301**		

PHC: Primary Health Care

- Expand umbrella of and renovate hospitals to provide tertiary and secondary care. A number of assumptions need to be made to estimate the numbers of hospitals and hospital beds required; these are follows:

  – The vision is to have Medical Cities to provide state-of-the-art tertiary care and three types of hospitals to provide secondary care and some tertiary care; 300-bed (and more) hospitals, 150-bed hospitals and 50-bed hospitals.

  – The projection of the number of hospitals and hospitals beds is based on the assumption to reach an average of 30 hospital beds for every 10,000 of the population (similar to international rate).

  – Medical Cities:

a. Medical Cities will include tertiary care hospitals. Three medical cities are proposed (in the capital area, in North AlBatinah Governorate and in AlWusta Governorate).

b. Bed occupancy for hospitals currently providing tertiary care ranges from 52% to about 90%. Studies show that certain departments have a shortage of beds and the number of beds needs to be increased, especially in intensive care units. The annual bed occupancy rate should average 65%-70% at any time to accommodate for periods (days or months) of high utilization.

– Public Hospitals

a. They should be general hospitals that provide secondary care and may contain some tertiary care services.

b. They will be distributed such that each governorate is served by one or more of these public hospitals.

c. Current secondary care hospitals (regional and wilayat hospitals) will be replaced gradually over the years with new buildings that suit the advanced clinical diagnostic and curative services as well as proposed social services.

d. New secondary care hospitals are expected to be built to cover some under-served geographical areas where people have to travel long distances to reach secondary care services.

The total number of Ministry of Health hospitals is expected to become 113 hospitals in 2050 compared with 49 hospitals in 2012 (an additional 64 hospitals). The number of beds is expected to be increased to 14,559 beds compared with 4,659 beds in 2012 (or 30.8 beds per 10,000 population compared with 12.9 in 2012) (Table 42).

Table 42: Expected number of Ministry of Health hospitals and hospital beds until 2050

Period of Health Plan	To replace old Hospitals			Hospitals to be Constructed during Health Plan			Hospital Beds at end of Health Plan	Hospital Beds per 10,000 Pop at end of Health Plan
	50	150	300	50	150	300		
2012-2015	24	5	5	5	3	3	6,259	27.6
2016-2020	0	0	0	1	2	0	6,609	25.6
2021-2025	0	0	0	1	5	1	7,709	26.7
2026-2030	0	0	0	0	6	0	8,609	27.0
2031-2035	0	0	0	0	5	2	9,959	28.4
2036-2040	1	0	3	0	7	1	11,309	29.2
2041-2045	2	0	4	4	7	2	13,159	30.7
2046-2050	2	0	2	1	7	1	14,559	30.8
Total	**29**	**5**	**14**	**12**	**42**	**10**		

Chapter 8
Human Resources for Health in the Sultanate of Oman

Quality Care, Sustained Health

عناية راقية وصحة مستدامة

Chapter 8

Human Resources for Health in the Sultanate of Oman

Human resources constitute an important pillar of the health system, not only because they constitute more than 73% of health expenditure (3) but because the quality of health care is dependent on the quality of the workers. The recruitment of sufficient numbers of qualified staff and their continuous development are major challenges. The Sultanate of Oman has witnessed remarkable developments in the numbers of human resources and related indicators that have developed hand-in-hand with developments in the health services. Table 43 shows the development in the numbers of medical staff and nurses over the years within different health care providers. The achievements in human resources for health indicators are shown in Table 44. The indicators of availability of medical and paramedical staff to the population continued to grow and their growth has exceeded population growth (Figure 46) unlike the growth of some health services that has reached a plateau (see Figure 39 and Figure 41).

The number of physicians serving 10,000 population has more than doubled in the past two decades from 9 in 1990 to 19.5 in 2012 and nurses has almost doubled from 26 to 43.1. Similarly, dentists and pharmacists have increased four and three fold, respectively, during the same period (Table 44) (3). Not only have the overall numbers increased but also the proportion of specialist physician of all physicians has increased from 28.3% to 40.8% during the same period. Hospital beds–physician ratio and hospital beds-nurse ratio presented in Table 44 have both shown improved services provision as one hospital bed is served by about 1.2 physicians and 2.5 nurses in 2012 compared with 0.4 physicians and 1 nurse in 1990.

The average annual growth of human resources for health over the past decade (since 2000) has been variable depending on the category. It was highest for pharmacists (10.6%) followed by dentists (9.8%), physicians (6.7%) and nurses (5.9%) (Table 43) (3). The growth of human resources for health was also variable from one health care provider to another. The total human resources for health in the private sector has grown by an average annual growth rate of 10% during the past decade compared with 6.3% in Sultan Qaboos University Hospital and 5.9% in Ministry of Health. The private sector provides slightly less than one quarter of the physicians (23%), about 63% of the dentists, 72% of the pharmacists and only 14% of nurses. This shows the importance of the private sector in health care provision in Oman.

Table 43: Developments in health manpower over the years in the Sultanate of Oman

Category	1970[a]	1975[a]	1980[a]	1985[a]	1990[a]	1995[a]	2000[a]	2005[a]	2010[a]	2012[a]
No. Physicians										
Ministry of Health	13	147	289	638	994	1,800	2,253	2,981	4,123	4,957
M.S. Armed Forces				81	116					
M.S. ROP				14	27	31	33	32	37	46
SQU					53	121	189	242	396	430
M.S. PDO					8	10	8	8	9	11
M.S. Diwan of Royal Court									25	23
Private			225	292	357	517	775	919	1,272	1,588
National Total Physicians	**13**	**147**	**514**	**944**	**1,439**	**2,479**	**3,258**	**4,182**	**5,862**	**7,055**
No. Dentists										
Ministry of Health	0	6	12	23	40	77	106	168	259	269
M.S. Armed Forces				12	15					
M.S. ROP				1	2	1	5	6	6	8
SQU						4	6	7	10	12
M.S. PDO									0	0
M.S. Diwan of Royal Court									4	5
Private			11	29	42	61	145	267	375	511
National Total Dentistis	**0**	**6**	**23**	**53**	**84**	**143**	**262**	**448**	**654**	**805**
No. Pharmacists										
Ministry of Health		8	9	22	33	63	78	154	279	402
M.S. Armed Forces				20	22					
M.S. ROP				6	6	0	0	1	4	9
SQU					4	12	20	25	36	40
M.S. PDO				1	1	1	1	1	1	2
M.S. Diwan of Royal Court									1	3
Private			38	164	203	280	396	572	930	1,201
National Total Pharmacists		**8**	**47**	**193**	**247**	**356**	**495**	**753**	**1,251**	**1,657**
No. of Nurses										
Ministry of Health		450	903	1,947	3,512	5,128	6,619	7,909	10,059	12,050
M.S. Armed Forces				132	139					
M.S. ROP				66	90	89	87	83	112	120
SQU					210	473	507	555	1,066	1,139
M.S. PDO				31	36	36	36	35	36	40
M.S. Diwan of Royal Court									30	49
Private			193	278	299	310	580	695	1,562	2,229
National Total Nurses		**450**	**1,096**	**2,288**	**4,147**	**6,036**	**7,829**	**9,277**	**12,865**	**15,627**
Total Health Workers										
Ministry of Health	121	2,488	4,970	8,501	11,743	15,451	16,503	20,438	26,592	31,709
M.S. Armed Forces				1,001	1,005					
M.S. ROP				119	168	233	246	260	286	382
SQU					406	1,151	1,269	1,478	2,407	2,636
M.S. PDO				74	79	75	61	59	61	76
M.S. Diwan of Royal Court									136	249
Private			467	811	1,52	1,271	2,492	3,228	5,776	7,781
Total Total Workers	**121**	**2,488**	**5,437**	**9,505**	**13,448**	**18,181**	**20,571**	**25,463**	**35,258**	**42,833**

[a] National Totals do not include workers in MS Armed Forces

H.S.: Health services, MS Armed Forces: Medical Services Armed Forces, M.S. ROP: Medical Services Royal Oman Police, SQU: Sultan Qaboos University, M.S. PDO: Medical Services Petroleum Development Oman, HC: Health Center

Table 44: Manpower indicators in the Sultanate of Oman

	1970	1975	1980	1985	1990	1995	2000	2005	2010	2012
Per 10,000 Population										
• **Physicians**	0.2	1.8	5.1	6.9	9.0	11.8	13.6	16.7	18.1	19.5
• **General practitioners**	0.2	1.2		5.4	6.5	8.2	9.0	10.9	10.7	11.4
• **Specialists**[a]		0.7		1.6	2.6	3.7	4.5	5.7	7.4	8.1
• **Dentists**		0.1	0.2	0.4	0.5	0.7	1.1	1.8	2.0	2.2
• **Pharmacists**		0.1	0.5	1.4	1.6	1.7	2.1	3.0	3.9	4.6
• **Nurses**		5.6	10.8	16.6	26.0	28.9	32.6	37.0	39.7	43.1
Nurse/physician Ratio		3.1	2.1	2.4	2.9	2.4	2.4	2.2	2.2	2.2
GP/Specialist Ratio		1.8		3.4	2.5	2.2	2.0	1.9	1.4	1.4
Hospital bed/physician	0.9	6.8	3.5	3.1	2.5	1.7	1.6	1.3	1.0	0.8
Hospital bed /nurse		2.2	1.6	1.4	0.9	0.7	0.7	0.6	0.4	0.4

[a] Specialists include administrative physicians

GP: General Practitioner

Indicators do not include Medical Services Armed Forces

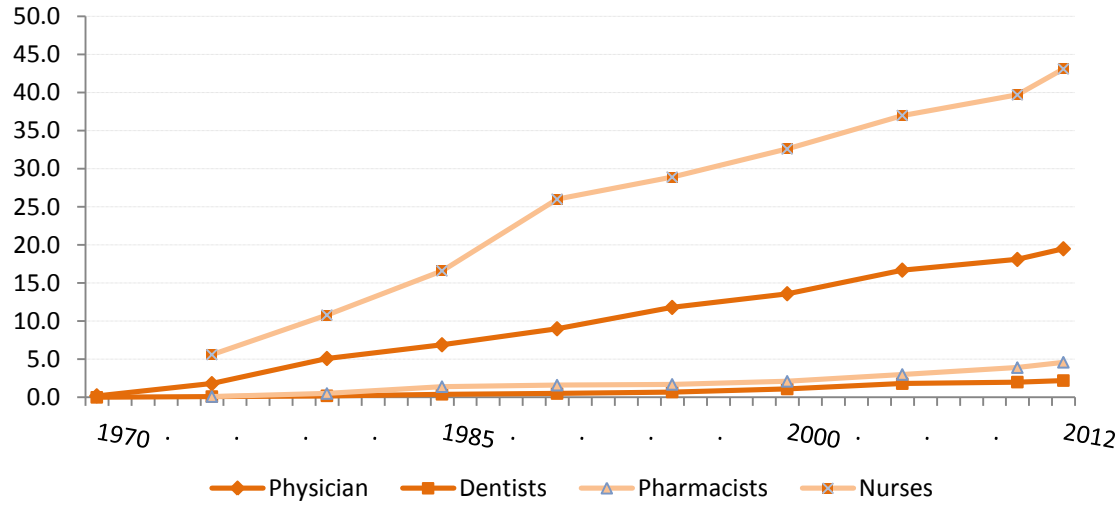


Figure 46: Manpower availability per 10,000 population in Sultanate of Oman

The data in Table **45** and Figure 47 show that the variability in the availability of human resources for health among governorates is not significant except for Muscat and Musandam. Muscat is the capital area and has the major four national referral hospitals; namely, Royal Hospital, Khawla Hospital, AnNahdha Hospital and Ibn Sina Hospital. Musandam is a border governorate isolated in the north from the main land of Oman and has to be properly serviced regardless of efficiency.

Table 45: Availability of human resources for health in health Governorates of Oman, 2012

Health Governorate	Per 10 thousands of Population				Hospital Bed / Physician	Hospital Bed / Nurse
	Physicians	Nurses	Dentists	Pharmacists		
Muscat	26.2	58.1	3.2	8.2	0.8	0.4
Dhofar	14.5	38.7	2.1	2.6	1.2	0.4
Musandam	35.3	54.1	4.9	3.2	1.3	0.8
AlBuraymi	20.5	38.3	3.6	3.1	0.8	0.4
AdDakhiliyah	17.8	36.8	1.6	2.4	0.8	0.4
North AlBatinah	14.2	30.7	1.6	2.3	0.6	0.3
South AlBatinah	16.2	29.7	1.5	2.4	0.6	0.3
South AshSharqiyah	14.9	35.2	1.4	3.1	1.2	0.5
North AshSharqiyah	14.8	39.1	1.6	2.6	1.1	0.4
AdDhahira	17.6	45.2	1.7	2.9	0.8	0.3
AlWusta	15.2	58.3	1.6	1.9	1.2	0.3

Indicators do not include Medical Services of Armed Forces,
N.B. Muscat hospitals act as national referral hospitals

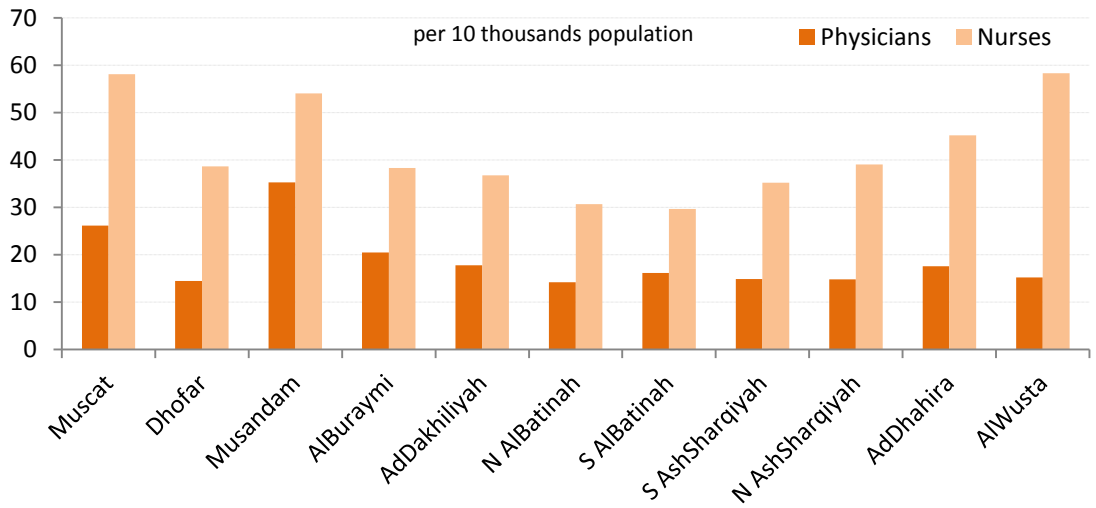


Figure 47: Availability of physicians and nurses per 10 thousands population in health Governorates in Oman, 2012

Omanization of Medical and Paramedical Categories

During the early stages of development of the health system in Oman, the Government had to rely on expatriate human resources for health. However, along with the health services and human resources for health developments, extreme efforts were directed to develop national workers in different health categories.

Table **46** shows that only 29% of physicians are nationals in 2012 compared with 21% in 2003. The data show that the proportion of nationals is higher in Governmental health care providers compared to private sector; national physicians make up about 36% of all physicians in Ministry of Health and are 45% in other public health care providers compared with only 3% in the private sector (Table **46**) (3).

Table 46: Comparison of Omanization level within different medical and paramedical categories between 2003 and 2012

Category	2003				2012			
	MOH	Public Non-MOH	Private	Total	MOH	Public Non-MOH	Private	Total
Physicians	24%	48%	2%	21%	36%	45%	3%	29%
Specialist	17%	19%	5%	16%	27%	47%	5%	24%
Dentists	36%	92%	2%	17%	50%	60%	2%	20%
Pharmacists	35%	76%	0.5%	9%	80%	54%	8%	27%
Nurses	49%	17%	5%	44%	66%	26%	5%	54%
Physiotherapy	67%	75%	13%	62%	69%	92%	1%	53%
Radiographers	56%	51%	4%	53%	66%	51%	1%	53%
Laboratory Technicians	47%	60%	0.6%	41%	61%	68%	0.5%	50%
Assistant Pharmacists	66%	44%	0%	52%	68%	77%	30%	57%
Total Health Manpower	61%	52%	5%	53%	71%	55%	10%	59%

MOH: Ministry of Health

Similar levels of Omanization are seen in other medical categories; dentists 20% and pharmacists 27%. The efforts and the duration required to graduate a qualified physician together with the need for service expansion to meet the population growth, limit the escalation of Omanization levels for medical categories. Omanization levels, on the other hand, are higher among paramedical categories; exceeding 50% (Figure 48). The public sector attracts nationals. Local educational health institutes are not yet enough to provide the public sector with all its needs of locals in different medical and paramedical categories.

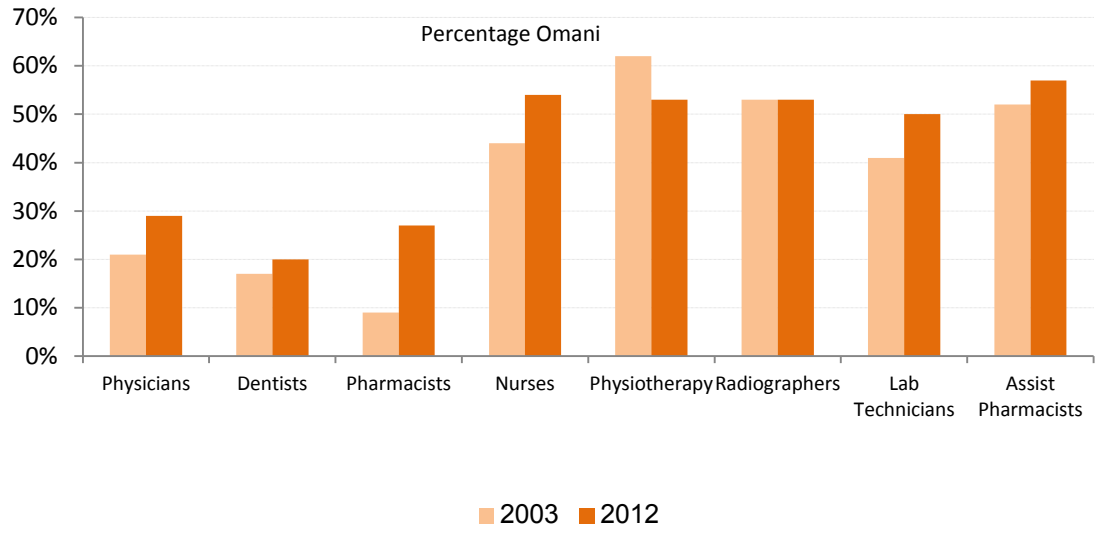


Figure 48: Omanization level for health manpower in the Sultanate of Oman in 2003 and 2012

Table 47 and Figure 49 show that the proportions of nationals working in the capital Muscat are higher than those in other health Governorate except for nurses. A possible explanation is the distribution of educational institutes being mostly in Muscat Governorate particularly for

medical categories and the existence of nursing educational institutes in Governorates outside Muscat. This had an impact on proportions of nationals as part of human resources for health in these Governorates.

Table 47: Omanization level in Ministry of Health Institutions, 2012

Governorate	Physicians	Dentists	Pharmacists	Nurses	Physiotherapy	Radiographers	Lab Tech	Assist Pharmacists
Muscat	55%	95%	95%	53%	74%	66%	66%	73%
Dhofar	13%	19%	20%	44%	36%	54%	31%	56%
Musandam	18%	43%	57%	40%	83%	54%	57%	70%
AlBuraymi	15%	60%	67%	66%	57%	39%	51%	70%
AdDakhiliyah	37%	24%	85%	78%	65%	75%	72%	72%
North AlBatinah	36%	50%	88%	81%	63%	65%	61%	76%
South AlBatinah	26%	52%	81%	79%	90%	74%	67%	68%
South AshSharqiyah	14%	5%	97%	85%	77%	72%	70%	70%
North AshSharqiyah	19%	5%	77%	74%	54%	66%	58%	64%
AdDhahira	32%	54%	77%	91%	57%	85%	56%	84%
AlWusta	0%	0%	0%	6%	0%	14%	0%	24%

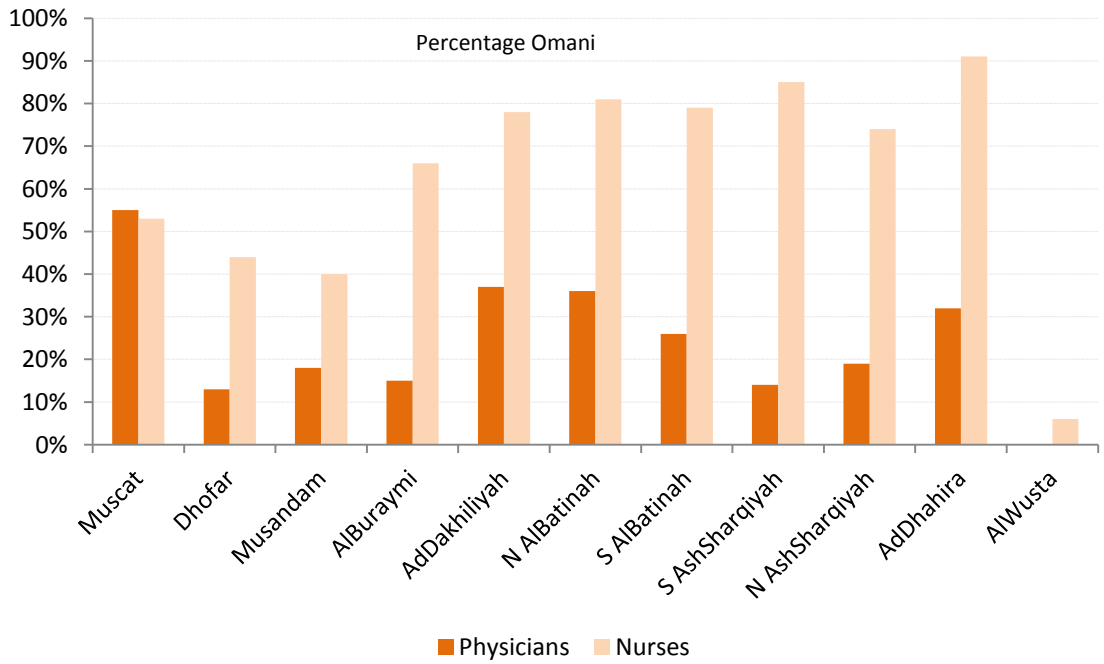


Figure 49: Omanization level in physicians and nurses in Health Governorates, 2012

Education and Training of Medical and Paramedical Human Resources for Health

Medical education commenced in Oman in 1986 with the establishment of the College of Medicine & Health Sciences at Sultan Qaboos University (SQU) in Muscat. Prior to that,

Omani students had to travel abroad in order to pursue medical degrees. Table 48 shows the health professions education institutes in Oman in 2013. The College of Medicine & Health Sciences at Sultan Qaboos University (SQU) enrolled its first batch of 45 students for the MD program in 1986 and graduated a total of 1,676 of medical graduates from 1993 to 2012 (Table **49**) (67)(125). The MD degree from Sultan Qaboos University is accredited by the General Medical Council of the United Kingdom. The Ministry of Higher Education also supports a number of nationals to travel abroad for undergraduate medical education. There are a total of 658 students studying specialties related to health abroad (37). The Oman Medical College (OMC); a private medical college, was established in 2001 with an intake of 69 students. The Oman Medical College is affiliated to and accredited by the University of West Virginia in the United States of America (126). It provides undergraduate teaching for physicians and pharmacists. A total of 264 physicians have graduated from Oman Medical College (Table **49**).

In 2012, the Oman Dental College (ODC) graduated the first batch of dental students. These were the first local graduates dentistry in Oman. A total of 47 dentists graduated, of whom 39 were Omanis and 9 were expatriates.

Table 48: Health professions institutes in The Sultanate of Oman, 2013

Institute	Year of Establishment	Health Program
Public		
• **Sultan Qaboos University (SQU)**	1986	• Medical • Nursing • Medical Laboratory
• **MOH Health Institutes (14 Institutes)**	1982, 1991-1997	• Nursing • Medical Laboratory • Radiology • Physiotherapy • Assistant Dentists • Physiotherapy • Midwifery • Assistant Pharmacists • Medical Records
Private		
• **Oman Medical College (OMC)**	2001	• Medical • Pharmacy
• **University of Nizwa (UON)**	2004	• Nursing • Pharmacy
• **Oman Dental College (ODC)**	2006	• Dentists

Table 49: In country graduates of medical and paramedical staff at bachelor level

Year of Graduation	Physicians			Nurses			Pharmacists			Medical Lab	
	SQU	OMC	Total	SQU	UON	Total	OMC	UON	Total	SQU	Total
1993	45		45								
1994	40		40								
1995	41		41								
1996	56		56								
1997	63		63								
1998	82		82								
1999	75		75								
2000	59		59								
2001	88		88								
2002	74		74								
2003	78		78								
2004	84		84								
2005	91		91								
2006	86		86							7	7
2007	98		98	44		44	33		33	21	21
2008	108	28	136	42		42	24		24	23	23
2009	118	31	149	61	1	62	23	37	60	20	20
2010	103	69	172	53	22	75	18	89	107	23	23
2011	145	67	212	41	17	58	26	40	66		
2012	142	69	211	41	20	61	36	81	117		
Total	**1,676**	**264**	**1,940**	**282**	**60**	**342**	**160**	**247**	**407**	**94**	**94**

SQU: Sultan Qaboos University, OMC: Oman Medical College, UON: University of Nizwa

Table 50 shows public and private health institutes that provide education in health related specialties in the Sultanate of Oman in 2012 with their estimated capacity for enrolling students.

Table 50: Public and Privates Educational Institutes for health in Oman in 2012

Health Programs	Number of Institutions	Capacity[a]
Medical	2	172
Postgraduate Training (OMSB)	1	Flexible
Dentistry	1	48
Pharmacy	2	107
Nursing (Bachelor)	2	100
Laboratory Technology	1	23
Nursing (Diploma)	11	599
Midwifery (Post-Basic Diploma)	4	63
Paramedical Training	5	164
Specialized Nursing (Post-Basic Diploma)	1	160

[a] Capacity is defined to be the annual number of graduates from these institutions.
OMSB: Oman Medical Specialty Board

Sultan Qaboos University has also graduated of a number of paramedical graduates at bachelor level in nursing and medical laboratory. In addition to OMC, another private university; University of Nizwa (UON), was established in 2004/2005 and offers undergraduate programs for pharmacy and nursing at bachelor level. Table **49** shows local graduates at bachelor level. Table 50 shows the numbers of public and private educational institutes offering different programs.

The Oman Medical Specialty Board (OMSB) was established in 1994 through the collaboration between Ministry of Health and Sultan Qaboos University. It is currently the highest supervisory body of all postgraduate medical training programs in Oman (126). OMSB had enrolled a total of 1,197 physicians in different specialties from 1994 to 2012 and there are 600 physicians registered for postgraduate studies during 2012 (Table 51) (6). The highest numbers are studying medicine followed by child health and family and community medicine (FAMCO).

Ministry of Health also considers sending physicians abroad for postgraduate training. Physicians will thus be exposed to different experiences and to the latest technologies as well as advances in diseases management techniques. Table 51 shows that there are 101 physicians registered for postgraduate studies abroad in different specialties. Data show that 28 physicians finished their postgraduate training from highly reputable training centers abroad in 2012 (3).

Table 51: Physicians registered for postgraduate studies, 2012

Specialty	OMSB			Abroad		
	Male	Female	Total	Male	Female	Total
Child Health / Pediatrics	23	50	73	4	6	10
FAMCO	29	44	73			
Psychiatry	7	20	27			
Laboratory Medicine	17	37	54	1	6	7
Medicine	62	40	102	7	4	11
Radiology	21	23	44	1	1	2
Surgery	16	14	30	17	1	18
Obstetrics and Gynecology	2	30	32	0	4	4
Emergency	30	26	56	1	2	3
Anesthesia	17	19	36	1	4	5
Dermatology	6	9	15	0	3	3
ENT Surgery	12	12	24	1	1	2
Maxillofacial Surgery/ Dentistry	2	1	3	4	3	7
Ophthalmology	6	10	16	1	0	1
Orthopedics	14	1	15	8	1	9
Public Health				8	5	13
Hospital Administration				3	0	3
Clinical Toxicology				1	1	2
Medical Education				1	0	1
Total	264	336	600	59	42	101

OMSB: Oman Medical Specialty Board
FAMCO Family and Community Medicine
Source: (3)

Local education and training of nationals to work as paramedical staff started as early as 1959 when a missionary nurse trained 16 in nursing. In 1970 ArRahma Nursing School (a missionary school) was established in ArRahma Hospital as the first local health-training institute in Oman. With its inception in 1970, Ministry of Health supervised ArRahma Nursing School and 83 nurses graduated as assistant nurses during the period 1970-1981 (67).

Table 52: Paramedical graduates from educational institutes of Ministry of Health

Year of Graduation	Nurses	Nutrition	Medical Records	Medical Lab	Radiography	Physiotherapy	Assistant Dental Surgeon	Sanitarian	Health Education	Assistant Pharmacists	Total
Before 1984	126										126
1984	52										52
1985	54										54
1986	37			8							45
1987	37			8							45
1988	50			12							62
1989	27			11							38
1990	26			6	11	5					48
1991	37			28	2						67
1992	59			25	8	8					100
1993	116			31	12	10		34			203
1994	193			12	16	9	10	35		33	308
1995	221			17	11	10	12	32	27	35	365
1996	331			15	30	9	10	29	33	33	490
1997	276			19	16	12	14	34	38	28	437
1998	305			20	13	16	12			35	401
1999	373	30		24	19	21	14			35	516
2000	438	32		32	22		12			50	586
2001	442			23	20		13			48	546
2002	417			27	29	1[a]	15			44	533
2003	522			33	30		13			47	645
2004	531		14	29	28		16		36	49	703
2005	554		18	40	29		16			52	709
2006	493		19	39	29	18	17			49	664
2007	487		20	36	27		17			43	630
2008	494		19	48	24	14	18			41	658
2009	522		16	41	30	15	13			49	686
2010	483		18	40	25	16	12	17[c]		50	661
2011	485		13	50	26	15	15	18[c]	22[b]	45	689
2012	370		22	38	23	19	14	0	14[b]	39	539
Total	**8,558**	**62**	**159**	**712**	**480**	**197**	**263**	**199**	**170**	**805**	**11,606**

[a] From previous batch
[b] for bachelor holders
[$] Batches for Muscat Municipality

The "Health Sciences Institute (HIS)" was established in 1982 and ArRahma nursing school was considered part of it. Additional curricula were added at a basic diploma level, such as general nursing and medical laboratory sciences with its establishment, and others were added in the following years; radiology and physiotherapy in 1986 and assistant dental surgery in 1993. In 1991, Ministry of Health set up new training institutes, namely the; Oman institute of

Public Health, Oman Institute for Assistant pharmacists and five regional Nursing Institutes in; Nizwa, Sur, Sohar, Ibri and Salalah Wilayates. Additional nursing institutes were established in Muscat and Ibra in 1993, in Rustaq in 1994 and a second one in Sohar and Ibri in 1996, in AdDakhiliyah in 1997 and Oman Nursing Institute in Muscat in 2000 (67). The establishment of nursing institutes in the health Governorates not only trained locals from such governorates but also contributed to the overall development of the Governorates and provided sufficient numbers of locals to operate the health services in their own Governorates.

This was followed in 2001 by the establishment of the "Specialized Nursing Institute" providing training in specialized nursing area for general nurses at post- basic diploma level. Specialized nursing areas currently include; nephrology, midwifery, pediatric critical care and neonatology, critical adult care, mental health, infection control, administrative and a bachelor-level nursing (BSN) bridging program. A total of 11,606 have graduated with basic diploma in different paramedical programs (8,558 nurses) and 2,218 with a post-basic diploma (1,932 nurses and 286 in areas as physiotherapy, health education and health management) (3) from Ministry of Health educational institutes since their establishment (Table 52 and Table 53).

Table 53: Graduates from specialized post-basic programs in MOH training health institutes until 2012

Specialty	Graduates till 2012
Specialized Nursing	**1,932**
Nephrology	308
Critical Care Nursing in Pediatric & Neonatology	286
Critical Care Adult	207
Midwifery	619
Infection control	62
Nursing Administration	228
Mental Health	136
BSN-bridging program	86
Other Allied Health Workers (Specialized)	**286**
BSN Physiotherapy	13
BSN Radiography	10
BSN Medic l Laboratory	8
Physiotherapy	25
Health Management	144
Health Education	86
Total	**2,218**

MOH: Ministry of Health,
BSN: Bachelor-level nursing,
BS: Bachelor of Science level
Source: (6)

Challenges related to Human Resources for Health

In spite of the fact that Oman has achieved remarkable health improvements as well as achievements in human resources for health, there is still a need to fill shortages as well as for further improvements. Oman is facing a strong epidemiological transfer to non-communicable diseases that requires highly qualified specialists.

Data analysis shows that to maintain the current physician-population ratio (see Table 44) an additional 7,000 physicians need to be recruited during the years up till 2050; also the number of specialists needs to be increased to about 5,700 compared with the 2,923 currently available (i.e. an additional 2,800 specialists). Even higher numbers are required to achieve improvements in the physician-population ratio to levels seen in developed countries. Considering the current output from medical educational institutes (see "Education and Training of Medical and Paramedical " on page 127), the situation is a real challenge. The situation regarding the availability of physicians becomes more complex given the fact that only 29% are Nationals and the remaining are Expatriates. The attrition rate of physicians is high (8.4%) (127). About 70.4% of physicians who resigned from Ministry of Health in 2009 spent less than 6 years in service. Thus, retaining physicians and recruitment sufficient numbers with suitable qualifications and experience and proper mix are real challenges, given the global competition for recruiting physicians and especially within the neighboring region. The output from the current local medical schools will hardly be able to produce enough National physicians for self-reliance in the health sector. The situation with other medical and paramedical health workers is slightly better than with physicians, but is still a major challenge.

Visions for Human Resources for Health

Human resources, as mentioned before, are the most important resources of any health system, not only because they consume about 70% of its health expenditure but also, because health outcomes are mainly dependent on their availability in sufficient numbers and their performance. Visions for "Human Resources for Health" are as follows:

Vision 1: "Human Resources for Health" Numbers and Mix Fit-for-Purpose and Equitably Distributed

The expansions and developments proposed for primary health care units as well as for secondary and tertiary care hospitals require greater numbers of human resources, particular highly specialized human resources for sustainability of the health system. This requires a higher ratio of human resources to population. However, advances in technology are expected to automate some of the laboratory and imaging procedures and thus there will not be a need to significantly increase availability of some paramedical staff in the long term.

Actions:

- Increase "Human Resource for Health–Population Ratio". The vision is to increase the availability of medical staff (physicians and dentists), pharmacists and nurses such that the ratios of staff to population are similar to the current (2012) values seen in high-income countries for physicians, and in European Countries for dentists, pharmacists and nurses. The ratio of all other paramedical staff to population will initially be increased to satisfy needs until technological advances have their effect and requirements for laboratory and imaging staff will then be adjusted according to needs.

  Several steps and phases are proposed to achieve the required Human Resources-Population ratio. These include:

  – The health system will need an initial boost to increase numbers of human resources to face shortages. This initial boost will need to be accomplished as fast as possible in the coming few years, possibly by 2015 or 2020. Accordingly, the preliminary analysis shows that the health system will need to recruit about 5,740 physicians before 2020 to achieve a physician-to-population ratio similar to that currently seen in high-income countries. To maintain the physician-to-population ratio at levels seen in high-income countries, an additional 9,109 physicians will need to be recruited during the years 2021-2050; or in other words about 304 additional physicians will need to be recruited annually. Attrition rates have been taken into consideration when estimating these numbers. Table 54 shows the numbers of other human resources categories required over the years until 2050.

  – Running an effective health system requires increasing numbers of other human resources in categories such as health economists, clinical statisticians, health planners and health system researchers.

Table 54: Current and projected health human resources for health

Category	Current (2012)		Projected by 2050		Initial Boost (Number to be added 2012-2020	Numbers to be added in the period 2021-2050	Annual average of requirements 2021-2050
	Ratio per 10,000	Numbers	Ratio per 10,000 [a]	Numbers			
Physician	19.5	7,055	28	19,736	5,740	9,109	304
Dentists	2.2	805	5	3,524	1,416	1,455	49
Pharmacists	4.6	1,657	5.4	3,806	532	1,423	48
Nurses	43.1	15,627	65	45,816	12,863	24,187	807

[a] Projected ratios are based on ratios seen in high-income and European countries; Sultanate of Oman is classified economically among high-income countries

- Increase the proportion of specialized human resources for health. In view of emerging non-communicable diseases and the need to introduce advanced and sophisticated health and medical care for their control, specialized care should

be increased in all levels of health care; primary, secondary and tertiary health care. The vision is to increase the proportion of specialized human resources, especially physicians and nurses. The proportion of consultant physicians needs to be increased from the current 6.4% to 35%, and nurses from 35.7% to 52%. These percentages will allow for servicing the proposed increase in tertiary care facilities and beds (see Visions for Health Services on page 111). It will also allow that about half of the physicians working in primary health care to be specialists.

Initially the health system will need to recruit an additional 2,008 consultant physicians and 6,689 specialized nurses during the period 2012-2020. The numbers in Table 55 show that about 164 physicians and 571 nurses should be qualified to consultant and specialized nurses, respectively, every year for the years 2021-2050.

Table 55: Current and projected specialized physicians and nurses

Category	Current (2012)		Projected by 2050		Initial Boost (Number to be added 2012-2020	Numbers to be added in the period 2021-2050	Annual average of requirements 2021-2050
	% of total	Numbers	% of total	Numbers			
Consultant Physicians	6.4%	318	35%	6,908	2,008	4,900	164
Specialist Nurses	35.7%	4,302	52%	23,824	6,689	17,135	571

- Ministry of Health (MOH) needs to coordinate with Ministry of Higher Education to send not less than 50 general diploma (high school) students per year to study human medicine in native English speaking countries (Australia, Canada, New Zealand, United Kingdom and United States of America) starting from the year 2012. They are expected to remain in these countries after the completion of their graduate studies to immediately continue their post-graduate specialty education which extends from 5 to 7 years, after which they return to Oman having attained their fellowship in different medical specialties. The Ministry of Higher Education will sponsor the first phase of their graduate studies and the Ministry of Health will sponsor the second phase of their postgraduate specialty education.

- Increase the numbers of Omani physicians who will be trained in postgraduate specialties (fellowships) at highly reputable universities.

- Continue to provide scholarships to physicians for postgraduate (higher) training through the Oman Medical Specialty Board and abroad such that every Omani doctor/physician graduate and trainee will have the opportunity for postgraduate (higher) specialty training in the country or abroad.

- Develop a human resources mix for needs and with additional specializations. Continuous monitoring of the epidemiological profile in the country is essential to tailor the mix of human resources. With the developments proposed in tertiary care, new categories of human resources for health should be considered, including: clinical pharmacists and specialists in pharmacokinetics, occupational therapists and dieticians. This will be accomplished through medical education and training, both local and abroad. Collaboration between Ministry of Health and Ministry of Higher Education should facilitate the necessary resources for making such categories available.

Vision 2: Human Resources for Health Developed to Sustain the Health System

The sustainability of the health system requires achieving a certain level of self-reliance as regards human resources running the health system. On the one hand, the need to increase the human resources for health to population ratio (page133), the need to upgrade primary, secondary and tertiary health care services (page 111), and the need to increase the proportion of specialized human resources, all put pressure on the health system in Oman to increase the numbers of human resources for health and promote their specialization. On the other hand local production of national human resources for health, especially medical staff, is limited. This paradox will thus limit the ability of the health system to be dependent on nationals. The numbers of human resources for health that need to be recruited in the coming years cannot be met with the available medical and paramedical educational institutes. Figure 50 shows the gap between requirements and local production of physicians and nurses.

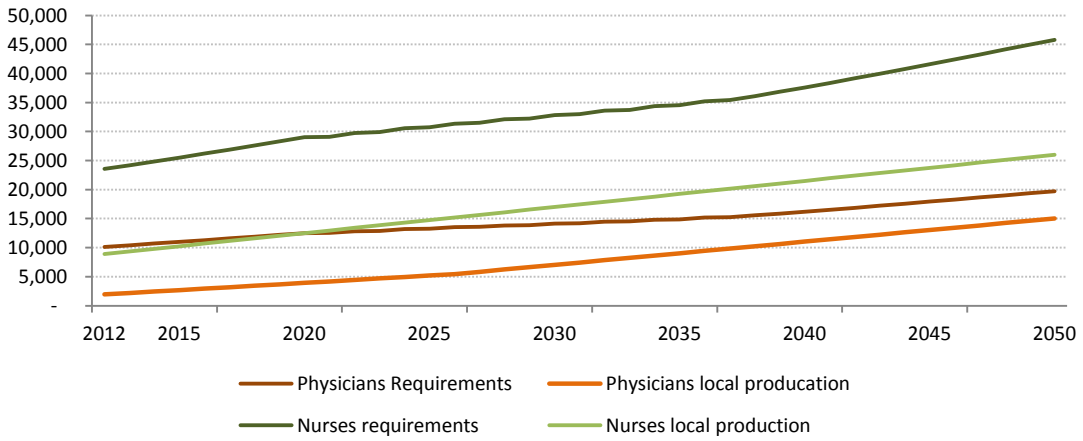


Figure 50: Relationship between requirements and local production of physicians and nurses in Oman

Analysis shows that self-reliance can be achieved by 2050 only if the followings are implemented:

a. Local production of physicians is increased by at least 2.5 fold.
b. In spite of the fact that production of other medical staff (dentists and pharmacists) seems sufficient, their qualifications upgrade is essential.
c. Production of paramedical staff is increased by 2 fold.

d. All paramedical human resources including nurses are upgraded to bachelor level.
e. Introduce local production of human resources in specified categories for advanced health and medical care.

Actions:

- Increase intake in the existing medical school(s). This requires revising the numbers of teaching staff of medical schools to accommodate such increase and make enough facilities and hospital beds for undergraduate and postgraduate training available. The Medical City (see page 114) is expected to act as the center for health professions' education at both graduate and post-graduate levels. The developments in the secondary and tertiary hospitals described in "Visions for Health Services" (see page 111) will allow an increase in the number of students recruited in the "College of Medicine and Health Science" in "Sultan Qaboos University" to the desired levels.

- Upgrade Ministry of Health Training Institutes to college level and increase intake.

- Establish of a state-of-art Health School for postgraduate training for paramedical human resources and provide postgraduate training in areas as clinical pharmacists and specialists in pharmacokinetics, occupational therapists and dieticians

- Establish " School of Public Health"

Vision 3: Human Resource for Heath Qualifications Fit-for-Purpose

Appropriate professional qualifications and development are of great importance for human resources to provide appropriate quality care. For health professions to keep up with the rapid advances in science and technology there is a considerable need to continuously train and upgrade health workers. There is thus a need to define the required qualifications of all categories of human resources and describe the path for their education, as well as ensuring the availability of sufficient resources for continuing professional education for human resources for health.

Medical education is unique and different from education in other fields both at graduate and post-graduate levels with regards to content, length and awarded degrees (Figure **51**). Undergraduate medical education extends to approximately 7 years followed by a one year internship. After the internship, graduates hold their first professional undergraduate degree; Medical Doctor (MD) or Bachelor in Medicine and Surgery (MBBCh) and are allowed to practice medicine under supervision as physician trainees. To be able to provide appropriate quality professional medical care, they require an additional 5-7 years in specialized higher education. Specialized higher education is preferably as fellowships.

Whereas the attainment of a masters or a doctorate is by choice in fields such as engineering, education, economics, and other sciences, post graduate education in medicine is essential and compulsory to produce consultant physicians who are able to provide quality health and medical care. Graduate and postgraduate education in medicine should thus be considered as two phases in one process of qualifying physicians.

Physicians, nurses and other paramedical human resources work as a team to provide health and medical care. The necessity that physicians attain higher postgraduate education necessitates that the whole team be highly qualified to provide quality care. There is a need for all nurses to be qualified with a university bachelor degree (BSN). Qualifying nurses to bachelor level will partly reduce workload on physicians in some areas. Other paramedical human resources should also have at least a bachelor degree.

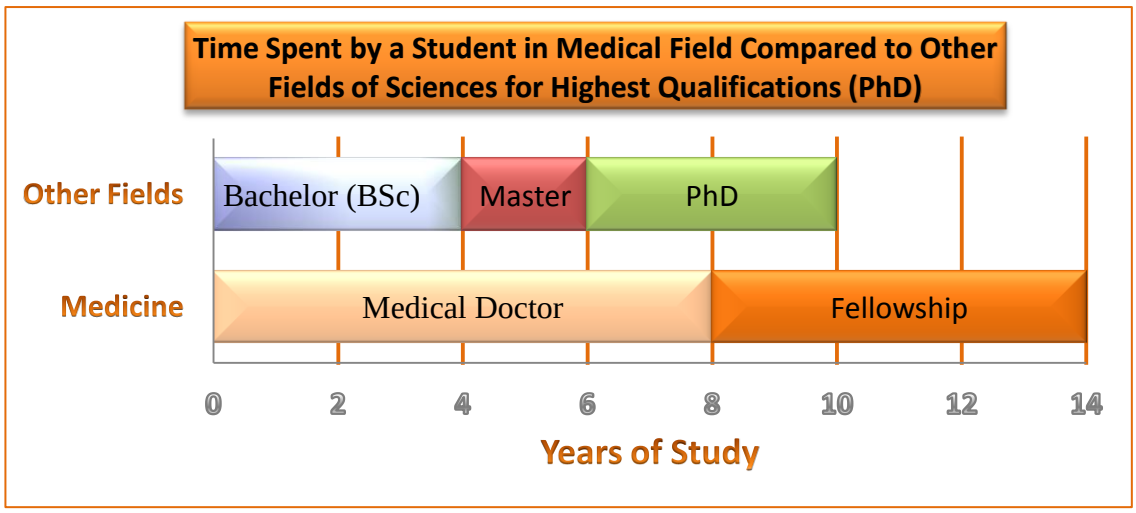


Figure 51: Time path for Medical education compared with other specialties

All health professions, medical and paramedical, need continuous training both locally and internationally to keep up with the rapid developments in science and technology. Continuous professional development should thus be an essential component of the health system with all the financial implications that will result. It will necessitate increasing the numbers of human resources to compensate for those in training especially as it should be a continuous process. Mechanisms should also be developed to ensure continuous professional development in the private health sector as it is an essential component of the health system and is expected to play an increasing role in health care.

Studies in fields such as engineering, economics and others are mainly conducted in university and college campuses at both theoretical and practical levels. Medical education, on the other hand, requires that 60% of educational activities take place in hospitals and other health care facilities during graduation phase (bachelor degree level) and only 40% take place in colleges or universities. Second phase of medical education (postgraduate or specialization phase) requires that 100% of educational

and training activities take place in hospitals and other health care facilities. The same applies for paramedical staff such as nurses, medical laboratory, imaging specialists and others. Accordingly, the quality of medical and paramedical education depends mainly on the quality of hospitals and other health care facilities and on the competence of human resources working in such facilities.

Actions:

- Ensure financial resources for training increased numbers of graduate physicians both locally and abroad, to attain their proper higher education degrees and fellowships; and increased numbers of paramedical human resources to attain bachelor degrees and as well as higher educational degrees.

- A "Health Council" should specify the numbers of students who have completed their general diploma (high school) to be educated and trained in the government/public and non-government/private colleges and universities, at both national and international levels in coordination and collaboration with the Education Council and Ministry of Higher Education. It should also establish the necessary standards and systems for accreditation of hospitals as centers for health and medical education as well as standards for establishing new medical schools, both public and private.

- Establish a state-of-the-art faculty that provides health professions education and health research, namely the “Faculty of Medical Sciences and Public Health" within the upcoming University of Oman that builds on the existing infrastructure for health professions education avoiding, duplication and repetition of existing ones in the country. The "Faculty of Medical Sciences and Public Health” should emphasize on postgraduate health and medical studies and in areas related to clinical pharmacy, pharmacokinetics, occupational therapy, dietetics and other areas of public health.

- Upgrade Ministry of Health training institutes to college level.

- Enhance and upgrade the quality of hospitals, both physically and functionally, to act as centers for undergraduate and postgraduate clinical training.

- Equip hospitals and other health care facilities with well trained human resources. Qualifying physicians to consultant and specialized levels is a complicated process requiring high competent educational hospitals and time. The same applies for other paramedical human resources. There is a need for initial reliance on consultants and specialist physicians from abroad and other well-qualified paramedical human resources, with all the financial implications.

- Establish "The Medical City" (see page 114) to act as a stat-of-the-art center for health professions' education at undergraduate, graduate and post-graduate levels for Sultan Qaboos University and University of Oman.

- Enroll all graduates of medical colleges/schools in specialized postgraduate medical education. In view of the needs for specialist and consultant physicians discussed above, all graduates from medical colleges should be enrolled in specialized postgraduate medical education, either locally through OMSB or abroad. This will allow successions of physicians to be highly qualified and trained to act as educators and trainers for their successor junior physicians or trainees. Figure 52 shows the proposed health profession education framework.

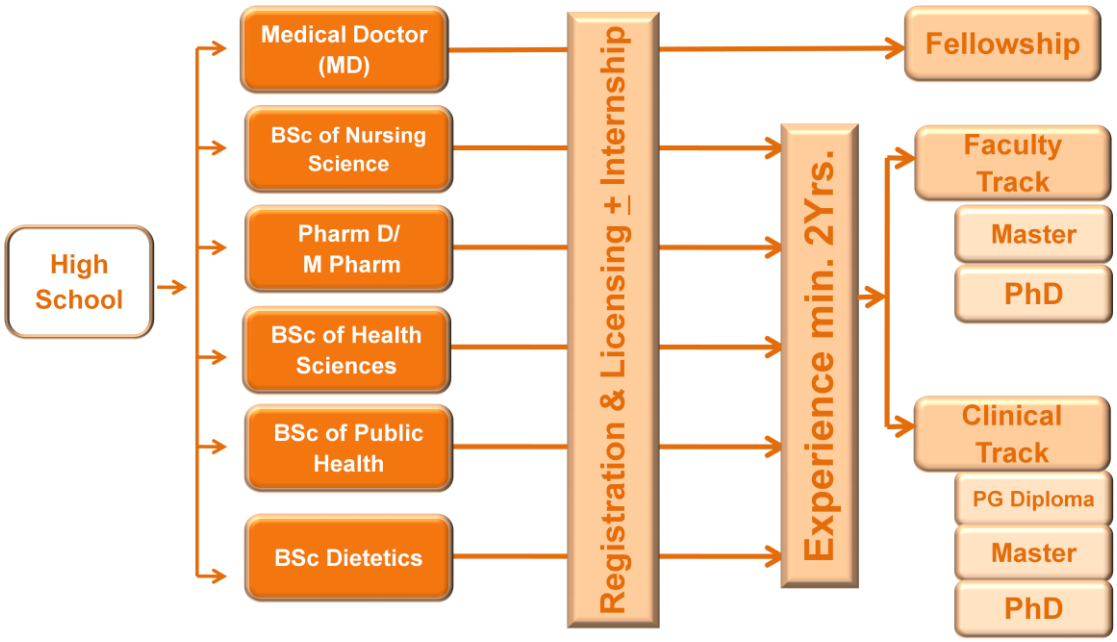


Figure 52: Health professions' education framework

- Establish a practicing licensing system for all health care professions. Licenses should ensure suitable qualifications, research activities and evidence-based practice.

Vision 4: Motivated "Human Resources for Health" Management System

Social requirements in terms of living allowances and the social needs of both public and private health workers are important determinants of staff satisfaction, which is in turn a determinant of staff performance.

Actions:

- Develop policies and strategies for staff retention.
- Incentivize quality care and develop an outcome-based payroll.
- Develop mechanisms to enable human resources for health posted in remote areas to keep up with advances, as they should not be forgotten.
- Periodically review social requirements of human resources for health by an independent body.
- Implement transparent methods in planning and accreditation, and ensure equal opportunities for human resource for health.
- Implement staff performance studies.

Chapter 9
Medical Products and Technologies in the Sultanate of Oman

Quality Care, Sustained Health

عناية راقية وصحة مستدامة

Chapter 9

Medical Products and Technologies in the Sultanate of Oman

The health system in the Sultanate of Oman makes every effort to ensure improved access, quality and use of medical products and technologies. In Health Vision 2050, medical products refers to medicines (drugs), surgical instruments and consumables and laboratory items, while medical technologies refers to all biomedical equipments.

Ministry of Health; the main health care provider, spends about 7.3% of its recurrent expenditure on medicine (drugs) (3). The "Oman National Drug Policy" was issued and approved in July 2000 (128). The Policy laid out its general objective in its own words as: "The objective of the National Drug Policy is to develop, within the resources of the country, the potential that drugs have to control common diseases and alleviate suffering. The policy aims to ensure and express Government commitment to this objective and to serve as a guide for action by all involved parties in the government, academia, professional organizations, non-governmental organizations, industries, patients and consumers". In this regard, the health system has taken all the steps to ensure that all legislations and regulations related to medicines and medical products are regularly updated to ensure accessibility to the proper, safe, effective, cost-effective medicines that meet the approved standards and specifications and their distribution to the needy. The health system also makes steps to ensure the rational use of medicines by the health care providers, the individuals and the community. A "Drug Pricing Control Policy" for all medicines was developed and implemented in January 2002 (129). This had ensured affordable accessibility to medicines by those who need them.

Ministry of Health has set up two departments to ensure the proper implementation of the "Oman National Drug Policy", namely; the "Directorate General of Pharmaceutical Affairs and Drug Control (DGPA&DC)" and the "Directorate General of Medical Supplies (DGMS)". The DGPA&DC was set up as a regulatory body for ensuring the safety and effectiveness of pharmaceuticals and drugs, manufactured locally as well as those imported. The DGPA&DC is responsible for registration of pharmaceutical companies and products, herbal products and vaccines and issuing marketing authorization for such through local registration or in cooperation with other GCC countries. The DGPA&DC is also responsible for licensing pharmaceutical establishments such as local manufacturers, retail pharmacies and private drug stores as well as pharmacists and assistant pharmacists working in the country. In 2012, 29 companies were registered, 23 were re-registered and 141 products were registered making a total of 432 registered companies providing 3,152 registered products (for the number of private pharmacies working in Oman, see page 103 and for pharmacists registered and working in the country see page 123).

"The Directorate General of Medical Supplies (DGMS)" was set up to be responsible for caring for procurement, storage and distribution of drugs and surgical and laboratory consumable items, and to provide technical supervision of pharmacy services. In February

2011, DGMS was awarded the ISO 9001:2008 certification for quality management in procurement, receipt, storage and distribution of medical supplies (130).

Every effort is made to procure quality medicines that are safe and effective for patients. Buying medicines is in accordance with specifications of the required quality. The "Central Quality Control Laboratory (CQCL)" is responsible for ensuring the quality, safety and efficacy of pharmaceutical products in the country. The CQCL participates in the WHO Proficiency Testing Scheme, a form of external assessment of quality control management system using inter-laboratory comparisons. It has been recognized by the "Executive Board of Health Ministers' Council for Cooperation Council of Gulf States" since 2005 as a reference laboratory for central drug registration for all dosage forms except parenterals and in 2012 for all dosage forms (131). There is an exchange of quality reports among Gulf States to ensure procurement from quality manufacturers.

Procurement mechanisms for pharmaceuticals and medical supplies include GCC joint tenders; Gulf, international and local. The DGMS took the stand to procure directly from original sources (manufacturers) and not through local agents for specialized medicines and expensive surgical materials. This has resulted in about 35% saving in such materials. A policy was also approved for procuring from generic companies; within the Gulf, international and local tenders, for medicines that do not require advanced technical manufacturing. This policy also contributes to the optimal use of available resources and has provided another source of significant saving. The process of procurement synchronized with Gulf tenders and joint procurement with other governmental health care providers in the Sultanate of Oman has also contributed to reduce pressure on the budget. The procurement value of supplies, through group purchase, accounts for about 35% of the total value of supplies. There exists an effective system to provide emergency needs for items not on tender, to cover deficit in stock and to make available specific needs of patients. Research pharmaceutical products in the country account for about 85% of the total market, while generic products account for only 15% (132).

About 91.1% of requirements from pharmaceuticals and surgical consumables, and all laboratory items are met through imports; in other words only 7.6% of pharmaceuticals and consumables are purchased from local manufacturers (130). The health system in Oman strives to reduce its reliance on imported pharmaceuticals through encouraging the establishment of local manufacturers. The pharmaceutical manufacturing sector is still small in Oman. It has witnessed growth during recent years and currently there are three local manufacturers; National Pharmaceutical Industries Co SAOG (NPI), Oman Pharmaceutical Products (OPP) and Twam Pharma in addition to Oman Chemicals and Pharmaceuticals (OCP) producing raw materials. There exists only one manufacturer for surgical consumables; "Salalah Medical Supplies". Among registered products (3,152 products), only 105 are registered by local manufacturers representing only 3.3% of registered products (131) and representing about 7.6% of expenditure on drugs and consumables by Ministry of Health (133). This illustrates the need to further encourage and support local manufacturing of pharmaceuticals and consumables if self-reliance is to be achieved (134).

There is a "Central Medical Store" with a total area of 8,560 m^2 located in the Capital, Muscat, and two stores each with a total area of 1,569 m^2 located outside Muscat (in Nizwa and Salalah). Continuous analysis of inventory data and consumption and cost of materials

distributed to health units allows proper monitoring of fast- and slow-moving items, as well as any emerging needs. It also reduces the value of expired medical supplies. Expired items amount to about RO 181,140 in 2012, representing about 0.6% of total expenditure on pharmaceuticals and drugs compared with 5.7% in 2010. H1N1 supplies accounted for about 62.6% of all the expired items in 2012 compared with 98.3% in 2010 (132). In addition to the above mentioned stores, there is the "Strategic Reserve Store" with an area of 1,569 m^2, located in Muscat, which stocks vital items as a precautionary measure in case of emergencies. The budget for a reserves inventory has increased over the years and this has led to an increase in the number of stored items (556 items) and in the amount stored to be sufficient for periods ranging from two to six months, based on the period of validity of the stored item. The DGMS ensures the cycling of supplies between the reserve and main stores to maintain shelf life, as well as to act as a buffer in emergencies. Storage facilities are seen to be inadequate but are managed by opting for part deliveries of bulk items (130). There is a lack of medical gas store in Nizwa regional warehouse which has resulted in transferring medical gases long distances from the central warehouse in Muscat to health facilities in AdDakhiliyah, AlWusta and AdhDahira Governorates.

Table 56 shows the Ministry of Health's total expenditure on medical products for the period 1995-2012. It shows that medical products represent 12.2% of the recurrent expenditure in 2012; medicines (or drugs) alone represent 7.3%. Although the amount of expenditures for medical supplies has increased more than three and a half times since 1995, the proportion spent as a percentage of total recurrent expenditure has decreased from 14.5% to 12.2% (3). The per capita expenditure on drugs and medical supplies has more than doubled over the past seventeen years, from RO 7.2 to RO 15.1 (Table 56). The escalating global price of medical supplies has contributed to this increase, the proportion of which to be studied. The per capita expenditure on drugs only accounted for RO 9.0 in 2012.

Table 56: Total recurrent expenditure and expenditure on medical products in Ministry of Health

Parameter	1995	2000	2005	2010	2012
Total recurrent expenditure (million RO)	103.5	137.2	185.0	327.2	448.1
Drugs					
RO (thousands)	10,793	12,937	15,032	26,036	32,726
Average annual growth (%)		3.7%	3.1%	11.6%	12.1%
% of recurrent expenditure	10.4%	9.4%	8.1%	8.0%	7.3%
Per capita (RO)	5.2	5.4	6.0	9.5	9.0
Laboratory Items					
RO (thousands)	927	1,331	1,361	5,840	7,451
Average annual growth (%)		7.5%	0.5%	33.8%	13.0%
% of recurrent expenditure	0.9%	1.0%	0.7%	1.8%	1.7%
Surgical instruments, consumables and prosthetics and orthotics					
RO (thousands)	3,262	3,265	5,281	9,048	14,603
Average annual growth (%)		0.0%	10.1%	11.4%	27.0%
% of recurrent expenditure	3.2%	2.4%	2.9%	2.8%	3.3%
Total expenditure on medicines & consumables					
RO (thousands)	**14,982**	**17,533**	**21,674**	**40,924**	**54,780**
Average annual growth (%)		**3.2%**	**4.3%**	**13.6%**	**15.7%**
% of recurrent expenditure	**14.5%**	**12.8%**	**11.7%**	**12.5%**	**12.2%**
Per capita (RO)	**7.2**	**7.3**	**8.6**	**14.9**	**15.1**

RO: Rials Omani

Table 57 shows expenditures on pharmaceutical and medical products according to place of spending. Per capita expenditure on drugs and medical products by Ministry of Health accounts for about RO 15.1, representing about 12.2% of the total per capita of recurrent expenditure by Ministry of Health. On average, a patient episode costs RO 4.0. Data shows that expenditures vary according to health governorate. However, when examined per capita or per patient such variability is much less. Cost of drugs and medical supplies is high in Muscat, Dhofar and AlBuraymi and least in AlWusta. The Royal Hospital and Khawla Hospital show a high cost per patient as they are national tertiary care centers in Oman.

Table 57: Ministry of Health expenditure on medical supplies by place of expenditure, 2012

Place of expenditure	Items			Total			
	Drugs	Lab Items	Surgical Instruments and Consumables	Total	% of grand total	Per Capita (R.O.)	Per Patient (R.O.) [b]
Central Budget [a]	3,590	1,481	98	5,169	9.44%		
Royal Hospital [a]	9,868	1,563	4,129	15,560	28.40%		76.1
Khawla Hospital [a]	919	370	2,414	3,703	6.76%		22.4
Muscat Gov	4,458	378	1,773	6,609	12.06%	5.72	3.2
Dhofar Gov	2,633	419	980	4,032	7.36%	11.35	3.1
Musandam Gov	279	162	104	546	1.00%	15.79	2.2
AlBuraymi Gov	558	214	291	1,063	1.94%	11.52	2.7
AdDakhiliyah Gov	2,154	793	987	3,634	6.63%	9.76	2.1
North AlBatinah Gov	3,094	700	1,321	5,115	9.34%	8.40	2.0
South AlBatinah Gov	1,467	467	723	2,657	4.85%	8.14	1.8
South AshSharqiyah Gov	1,509	521	710	2,739	5.00%	11.15	2.0
North AshSharqiyah Gov	1,139	357	581	2,077	3.79%	9.32	1.9
AdDhahira Gov	958	291	458	1,707	3.12%	9.87	2.1
AlWusta Gov	100	35	34	169	0.31%	4.60	0.8
Total	**32,726**	**7,451**	**14,603**	**54,780**	**100.00%**	**15.12**	**4.0**
% of Total Medical Supplies	**59.7%**	**13.6%**	**26.7%**	**100.0%**			

[a] Provide services as national referral

[b] Sum of inpatients and outpatients

It is worth examining the cost of drugs per patients at different levels of the health system. As expected, Table 58 shows that the cost of drugs per patient depends on the degree of specialization provided by the health institution (132), (135). Health centers and local hospitals provide primary health care and thus have the lowest cost of drugs per patient. The table shows that the cost of drugs per patient has increased in extended health centers by about 81.6% compared with 2008 and have been almost stationary in all other types of health facilities. This finding may be explained by the fact that extended health centers have being assigned to provide more specialized care over the years.

Table 58: Cost of drug supplies per patient (RO) in the period 2008 to 2012

Type of health facility	2008	2009	2010	2012
Health centers	0.410	0.390	0.390	0.349
Extended Health centers	0.760	0.910	0.840	1.380
Local Hospitals	0.530	0.480	0.510	0.580
Wilayate Hospitals	0.780	0.540	0.620	0.799
Regional Hospitals	4.000	4.000	3.900	4.2

Source: (132) (135)

Medical technology includes a wide range of health care products that aim to improve the quality of health care delivery, for example by early and accurate diagnoses, less invasive treatment options, optimal rehabilitation care and patients' records management. Biomedical equipments have become essential in medical diagnosis and treatment. Recent years have witnessed remarkable developments in medical technology that have provided new solutions to address chronic diseases; the future challenge to the health system in the country. Medical technologies or biomedical equipments include those procured for new health projects as well as for upgrading and / or replacing of existing ones. In 2012, Ministry of Health spent about RO 11.1 million on medical technologies, representing about 32.7% of its development expenditure. Equipment replacement represented 41.8% of total expenditure on biomedical equipments in 2012. Advances in biomedical technology together with the epidemiological and demographical transitions are expected to increase expenditures on biomedical technology. The fact that development, production and manufacture of biomedical technologies take place outside the Sultanate of Oman and the main suppliers are non-nationals, contributes to their escalating costs as well as the non-continuous flow and interrupted supply and maintenance.

The procurement, replacement and maintenance of medical technology products in Ministry of Health, for both new and existing projects, are the responsibility of the "Department of Medical Technologies". The Department faces a number of obstacles; including:

- The lack of clear plans or policies for upgrading and replacement of biomedical technologies;
- The lack of a full database of the life cycle (history) for every biomedical technology making planning for maintenance and upgrading difficult;
- Poor coordination among operators of the biomedical equipments, planners for equipments and purchasing bodies resulting in a number of issues as providing equipments that are inappropriate or over sophisticated for health need;
- The long procedures and time for tenders;
- The need to integrate with the board of tenders for tenders more than RO 1 million;
- The limited budget for purchasing and for upgrading equipments.

Challenges Related to Medical Products and Technologies

There have been tremendous efforts in the country to ensure safety and effectiveness of pharmaceuticals, other medical products and biomedical equipments and to adopt procurement mechanisms that allow cost saving. However, the main challenges can be summarized as follows:

- Some 91% of pharmaceuticals and surgical consumables and all laboratory reagents and biomedical technologies in the country are imported (130) (136). This is a real challenge for the future sustainability of the health system especially if additional financial resources are not mobilized and in the presence of escalating global prices;

- Poor planning for biomedical equipments and technologies results in costly maintenance and running costs, in addition to initial procurement costs. The challenge

is to properly plan for the procurement of appropriate equipments; not over-sophisticated or complicated, which can result in under-use of expensive equipments;

- The lengthy procurement process results in a time-lag before the required equipments are available. Thus at time of purchase some tendered equipments may be superseded by new technologies and additional data about performance may have accumulated showing its drawbacks compared with other equipments. Coordination with other sectors, especially the "Tender Board" to reduce tender and procurement time is a challenge in the current administrative setting along with the high cost involved in procuring such equipments;

- Servicing and maintenance of medical equipment is partly dependent on the availability of qualified personnel. Training of nationals in such fields is limited.

- There are a number of health care providers within the health system; each has its own standards and norms for managing biomedical equipments.

Visions for Medical Products and Technologies

Given the speed of developments in technology, it is difficult to predict advances in biomedical technologies that will take place over the coming 40 years. However, a number of visions can be listed;

Vision 1: Pharmaceuticals and Medical Products Availability for Health Service Delivery Sustained

The fact that only 7.6% of pharmaceuticals and consumables are manufactured locally (130) may affect their availability for quality health service delivery and increases their procurement costs to levels that may affect the sustainability of the health system.

Actions:

- Establish local manufactures to support self-reliance in the coming years. This is a must and not an option. The Government should consider partnership with pharmaceutical manufacturers.

- Perform operational and feasibility studies to establish local manufacturers to provide the health system with 100% of its needs for some items of medical products and consumables for example surgical gloves, gauze, and others.

- Invite major international pharmaceutical manufacturers to set up production in Oman and/or to tie up with local Omani manufacturers for the production of medicines and vaccines.

- Continue with cost-saving procurement mechanisms currently adopted.

Vision 2: Procurement, Replacement and Maintenance of Biomedical Equipment Sustained

All biomedical equipments are procured outside the country and their maintenance is dependent on the manufacturer. There are shortages of trained nationals for maintenance of biomedical equipments. There is an essential need for the health system to continue to procure, replace and maintain the necessary biomedical equipments against escalating global costs and expansions in health services that will be required to cope with the challenge of the epidemiological transition to chronic non-communicable diseases.

Actions:

- Develop a "National Regulatory Authority for Biomedical Technology" for the health system that will allow proper coordination among the different health care providers within the health system and result in more efficient utilization of biomedical technology. The "National Regulatory Authority for Biomedical Technology" should ensure an un-interrupted supply of biomedical equipments and their reagents, as well as maintenance and replacement of biomedical technology.

- Follow up and evaluate the running costs of medical equipments. This is complex and may need the introduction of innovative methods to assess the cost of patient management and make it part of incentivizing health care provision.

- Consider purchase versus lease of equipments (contracting relationships) to face the escalating costs of frequently updating equipments to keep up with technological developments. This will require detailed studies of the total cost for ownership and life cycle cost of various equipments.

- Encourage national investors to invest in biomedical technology and inviting international investors to invest in Oman.

- Give special consideration to the maintenance, repair and replacement of medical equipments. Proper planning of the cost of biomedical equipments should include its maintenance and repair costs, keeping in mind that maintenance cost of medical equipments range between 5 and 20% of the purchasing costs per year and may increase to 40% in some equipment.

- Increase annual budgets for repair and upgrading is necessary and this should be reviewed annually to accommodate escalating international costs.

- Strengthen and decentralize warehouses and workshops, and staff them with trained and efficient biomedical engineers. Digital recording of the life cycle of all biomedical equipments used in the health system will avoid un-expected failures which may affect patient management.

Vision 3: Evidence-Based Policies for Procurement of Emerging Technologies Established

The lack of clear policies for procurement of biomedical technologies has resulted in procuring technologies that are partly inappropriate for health needs and in some circumstances over-sophisticated.

Actions:

- Design evidence-based policies for procurement of emerging technologies with proper priority-settings that considers population needs, added value and cost-effectiveness of new and emerging technology as well as ensuring an appropriate match between biomedical equipment procurement and health facility function and needs.

- Appropriately match acquired biomedical technology and staff recruitment and training in a timely manner for optimum utilization of biomedical technology.

- Construct new hospitals with a structure that will host and accommodate developments in biomedical technology (see Visions for Health Services on page 111). The current design and infrastructure of hospital buildings may not be suitable for optimum and safe performance of new emerging technologies.

- Develop national norms and standards for quality assurance; regulations and laws to regulate licensing and use of medical equipments; and design an accreditation system.

- Develop a health technology assessment function within the "National Regulatory Authority for Biomedical Technology" to coordinate among operators and purchasing bodies to provide the required equipments without over-sophistication and to ensure that the health system optimally utilizes biomedical equipments and copes with advances in science and technology.

- Revise tendering policies for biomedical technologies and updated with innovative polices to ensure timely procurement.

Vision 4: Effective Connectivity among all Health Care Facilities Established

Information technology (IT) has played a growing role in clinical engineering. In view of the required advanced, comprehensive and multi-disciplinary medical care (see Visions for Health Services on page 111), safe connectivity among all health care facilities in the country is essential for further enhancing health care delivery.

Actions:

- Ensure proper interface between devices and information systems and among devices.
- Implement the use of the national identity and unique identification of users of the health system.
- Implement telemedicine.
- Ensure that the human resources for health or health care providers have sufficient background and training for optimum utilization of technology such as “Tele-health” and “Tele-medicine” to access quality services.
- Ensure coordination with the "Information Technology Authority" to design and implement a national e-health strategy.
- Secure financial sustainability for information technology development.

Chapter 10
Health Information and Health Research

Quality Care, Sustained Health

عناية راقية وصحة مستدامة

Chapter 10

Health Information and Health Research

Reliable, relevant, up-to-date and timely health and health related information is essential for sound health policy formulation, and for the development of health plans and strategies. Health information is also essential for monitoring health status, evaluating the implementation of health plans, health system performance and for all levels of health service management. In fact, what is not measured does not get adequately addressed nor efficiently managed. The "National Health Statistics and Information System (NHSIS)" in the Sultanate of Oman is represented by the Directorate of Information and Statistics (DHIS) in Ministry of Health (137). The NHSIS has greatly developed over the years. In 1990, there were only 9 statisticians in Ministry of Health; they worked at the central level and were responsible for capturing health and health-related data from health facilities. With the establishment of the Under-Secretariat of Planning and the Directorate General of Planning in 1991, remarkable developments have taken place. What was formally the health information section has become the "Directorate of Information and Statistics" (DHIS), and the "Directorate of Research and Studies" (DRS) has also been established. These two bodies are mainly concerned with making health information available. The number of statisticians has grown to 89 in 2012. The DHIS was assigned responsibility for the "National Health Statistics and Information System (NHSIS)". With the implementation of Decentralization Policy and the establishment of health governorates, offices for health statistics and information were established in the governorates. These offices are responsible for both the data collection that was decentralized to governorate level and health research activities in health governorates.

In an attempt to develop nationals to sustain the NHSIS, Ministry of Health has collaborated with Department of Mathematics and Statistics (DOMAS) in Sultan Qaboos University (Muscat, Sultanate of Oman) to establish a BSc degree in Health Statistics (major statistics, minor health statistics) in 1997. The curriculum was developed by DHIS and tailored to fulfill NHSIS requirements. In addition to all requirements of being a full statistician, the curriculum has considers other aspects such as epidemiology, health research, categorical data analysis, demographic and health care statistics and health management. The NHSIS in Oman was viewed by others as a model and a number of countries have had their workers trained within the NHSIS (137).

The main objective of the NHSIS is to ensure that reliable, relevant, up-to-date and timely health and health related information is available and accessible for health managers at different levels of the health system. The available information is designed to allow:

- Decision-making at different levels of health management;
- Formulation of health policies, plans and strategies;
- Monitoring and evaluation of implementations of health plans;
- Health services management at macro levels;
- Measuring health status of the population and monitoring trends and changes;
- Identification of health and health-related problems and their prioritization;
- Identification of health care and medical needs;
- Evaluation of effectiveness of health system performance;

- Evaluation of health status and health system performance in comparison with other relevant and neighboring countries.

Developments in the NHSIS were driven by the political will to allow practicing evidence-based decisions–making and by the belief that health developments can be planned and monitored with quality and timely data and information. A number of operational and policy documents, and committees regulate and control the functions and mechanisms of the NHSIS. These include: Health Statistics Manual (138), Health Research Policy, Statistical Law (139), Statistical Strategy (140) and Statistical Advisory and technical Committees (139). The first Statistical Law in the Sultanate of Oman was issued in 1988 and remained in force until the new Statistical Law was issued in 2001. The new statistical law was promulgated by a Royal Decree (No. 29/2001) and was issued to regulate the collection and publication of statistical data in the country.

As awareness of the importance of statistics and information increased, the number of statistical units in different sectors in the country increased and there has been an increasing need for coordination among these units have emerged over the years. The Ministry of National Economy (currently "National Center for Statistics and Information") has prepared a statistical strategy for the period of 2006-2020 (140). It has the vision to promote the production and utilization of high-quality statistical data through strengthening coordination among different statistical units, employing developments in statistical methods and information technology and facilitating access to data and information. The executive plan for the strategy has strengthened the NHSIS through strengthening coordination among the different health care providers.

The NHSIS has identified a set of indicators to be published on an annual basis. The set of indicators is arranged in such a way to define; inputs to the health system, processes, outcomes and health status (61) (see Appendix for full list of indicators published annually). In addition to publishing the list of indicators, it summarizes and publishes the country's status towards achieving the Millennium Development Goals (MDG). The NHSIS has performed a national health survey on a regular basis, every five years on average since 1988; the "Child Health Survey" in 1988 (12), the "Oman Family Health Survey" in 1995 (65), the "National Health Survey 2000" in 2000 (83) and the "Oman World health Survey" in 2008 (27) with its two companions the "National Reproductive Health Survey" (100) and the "National Elderly Health Survey" (95). The NHSIS has also supervised and monitored a number of health researches projects performed by different health departments based on planning and monitoring needs. A list of health surveys and studies and their findings is published annually with relevant updates (60).

A full assessment of the NHSIS was performed in 2007/2008 (61). It fully described the structure and functions of the NHSIS together with its strengths and weakness. The assessment stands to date. Reviewing the list of indicators shows that there is a lack of indicators that describe determinants of health especially economic, environmental and behavioral indicators. The absence of "National Health Accounts" limits the availability of detailed economic indicators. Recently, mortality data are available from registration of vital events' notifications, which is a system parallel to vital registration system. Data collection methods have been partially altered. Some data from electronic database of the health care facilities can be extracted and introduced directly into the electronic database of the NHSIS.

A number of health research projects have been translated to strategies for health developments. Examples of these strategies are: Universal salt iodination strategy, Vitamin A capsules for mothers and infants along with vaccination program, Nutrition became one of the top priorities due to findings of high Protein Energy Malnutrition among children aged less than 5 years, Targeting of Life style and Non- Communicable diseases and Elderly care program.

The Five-Year Health Development Plans have always emphasized the importance of health research for planning and monitoring achievements. During the sixth Five-Year Health Development plan (2001-2005) a research policy was developed and priority areas for health research were identified. This has continued in the following plans including the eighth plan (2011-2015), with appropriated updates in the policy and in the priorities. Ministry of Health and Sultan Qaboos University both have research and ethics review committees.

However, biomedical research in Oman is still considered of limited benefit. The SCImago Journal and Country Rank portal (141) assessed countries for the number and citations of publications during 1996-2010. It showed that Oman had only 1,522 publications with 7,357 citations. This was not considered favorable and Oman was ranked ninth among 15 countries in the Middle East and North Africa region. A study published in 2011 (142) showed that more than one-quarter of biomedical publications by Omani researchers during the period 2005-2009 were published in journals with no Impact Factor (IF) and more than half were in journals having IF of less than 1. The study concluded that the quality of research originating from Oman is of limited usefulness.

Sultan Qaboos University (SQU) (143) serves as a venue for research and it has nine research centers, these are: Remote Sensing and GIS Centre (RSGISC), Omani Studies Centre (OSC), Centre for Environmental Studies & Research (CESAR), Earthquake Monitoring Centre (EMC), Communication and Information Research Centre (CIRC), Oil and Gas Research Centre (OGRC) Water Research Centre (WRC), Centre for Excellence in Marine Biotechnology (CEMB) and Humanities Studies Centre (HSC). In addition, SQU administers research grants including strategic grants from His Majesty's Trust Fund and from internal, external, joint, and consultancies funds. SQU received 9 out of 17 grants offered by The Research Council (TRC) in 2010; four of these were for the College of Medicine. Publication of scholarly books and scientific journals, and organizing national and international conferences are all venues for research dissemination that can be utilized by MOH. SQU publishes six academic journals; four in science and two in humanities. The relationship between MOH and SQU will further strengthen health-related research studies and will support both institutions in accomplishing their mission.

The Research Council (TRC) (144) was institutionalized to develop a National Research Strategy for the Country. It is expected to translate the national development plans to clear vision to improve research to produce a positive impact on all aspects of life for the people of Oman. TRC acts to achieve its objectives through building a research environment and research capacities to achieve scientific excellence and through assisting research dissemination and utilization.

TRC supports different types of research and innovations in different fields. It offers an open research grant that funds short- to medium-term projects. Its Strategic Research Grant

Program supports initiatives that address national priority research topics such as road traffic accidents. The Research Chair Program funds individual researchers for long-term projects in specific disciplines, such as the Nanotechnology for Water Desalination Project. The Research Centers Program is another program offered by TRC to achieve excellence in research and link various sectors to build the nation's research capacity. An example of such a center is the Animal and Plant Genetic Resource Center. In addition to supporting research, TRC also supports innovation projects in order to enhance or develop a research culture in the Omani community. Figure 53 shows the areas of health research laid down in the TRC strategy.

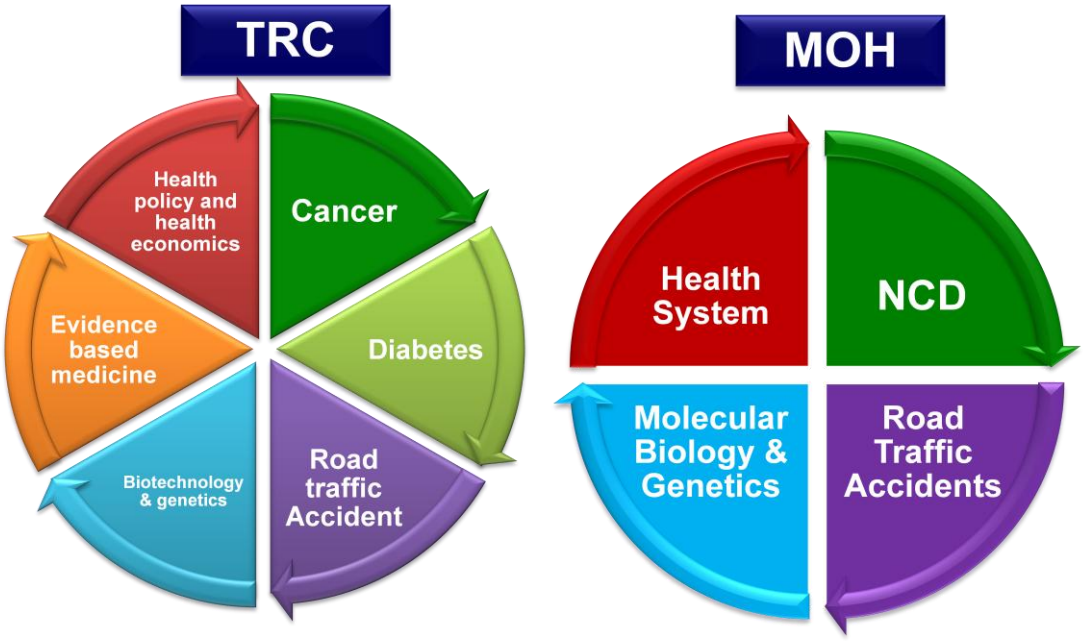


Figure 53: Strategic plans in health research area, as drawn by The Research Council and Ministry of Health

TRC also collaborates with Oman's Cultural Club in funding a national project for publishing 100 books. The availability of TRC provides an opportunity for funding health and social services studies and publishing these researches, thus bridging the gap and meeting the challenges faced by MOH in conducting and disseminating research.

Challenges for Health Information and Health Research

Health information comes from several sources; population-based sources as well as from health services-based sources. Population-based sources include: censuses, vital registration and population-based surveys and health services-based sources include: administrative, health services and health and diseases records. It is thus clear that health information is produced by different parties. The Ministry of Health is the main health care provider in the country and is responsible for developing health polices and monitoring their implementations. Accordingly, the "National Health Statistics and Information System (NHSIS)" comes under the umbrella of Ministry of Health. There are a number of operational

and policy documents and committees that regulated and controlled the functions and mechanisms of the NHSIS; namely the "Statistical Law" issued in 2001 and the "Statistical Strategy (2006-2020)". With the recent development of the "National Center for Planning" and the "National Center for Statistics and Information", the relationship between the NHSIS and these two national bodies should be carefully reviewed and strengthened. The NHSIS needs to have a transparent means of capturing health data and information from other parties.

Almost all of the health care facilities run by MOH and other public health care providers are fully computerized. Patients' records are managed electronically and a wealth of patient information is available. The situation is not the same in the private sector. In spite of the fact that MOH hospitals and primary health care units are fully computerized, data are not directly extracted from health institutions' databases by the NHSIS. Coordination between NHSIS and IT is a challenge for sustaining the flow of health data and information. The absence of a country-wide electronic connectivity of all health care facilities is another challenge for enhanced health service delivery and for extracting health data (sees Information technology within Medical products, vaccines and technologies on page151).

The NHSIS currently lack some essential pieces of information. The absence of a National Health Account system has resulted in a lack of financial and economic information (see Health System Financing in the Sultanate of Oman on page 93). Information about occupational injuries and diseases and environmental risk factors is lacking. A geographical information system (GIS) is a necessary tool that needs to be introduced into the NHSIS. In spite of the fact that mandatory registration of vital events, births and deaths exists since 2004, the quality of the data, especially on cause of death needs to be strengthened.

Health research is an important source of health information. The promotion of research activities within the health system is necessary and will help to use research findings for evidenced-based policy development and formulation. There are a number of challenges for enhancing and developing health research; these would include:

- The lack of sufficient and allocated funds for health research in Ministry of Health;
- Non-adherence of the academia and national programs to the identified research priorities of the MOH;
- Weak co-ordination of research activities between the MOH and academia-supported researchers within and outside the country and poor communication of the research results;
- A limited number of identified research topics in the health development plans are implemented;
- Lack of close monitoring of research activities and their outcome;
- A 'Research culture' has not permeated sufficiently among health care professionals;
- Although collaboration with reputed institutions in other countries exists in the field of health care services and academia, collaborative research is minimal;
- Health service in Oman is highly reliant on medical products originating in and based on research conducted in other countries;
- Private donor agencies are motivated to grant donations for health care but not for research due to lack of sufficient awareness of the relevance of health research;

- Infrastructure for conducting innovative research, particularly in the area of medical products and technology, is lacking;
- Lack of sufficient experience for research in congenital anomalies and genetic disorders is an important challenge to the health system in Oman;
- Poor access to the benefits and products of research, despite dramatic advances in knowledge and technology.

Visions for Health Information and Health Research

The availability of information is essential for evidence-based policy development, planning, and decision making at all level of health management. Health system development adopts the following vision to ensure the availability of information from different sources.

Vision 1: Availability and Accessibility of Reliable, Relevant, Up-to-Date and Timely Health and Health-Related Information Ensured

The NHSIS has development over the years and has made information available for policy development, planning and decision-making. However, certain sets of information are still deficient, such as economic data, detailed environmental data, and health facility performance at micro level. Other data require further quality improvements.

Actions:

- Ministry of Health should continue to host the "National Health Statistics and Information System (NHSIS)" as it is the main health care provider and the body responsible for developing and implementing health policies. National health information and indicators should be the responsibility of the NHSIS.

- Improve collaboration between Ministry of Health and other research institutes within the country like The Research Council (TRC), Sultan Qaboos University and others to enhance health research.

- Strengthen all sources of information; both population-based and record-based, through transparent co-ordination among the different parties producing health and health-related data and coordination with the "National Center for Planning" and the "National Center for Statistics and Information"

- Establish a National Health Research System (NHRS) to face the health research challenges in Oman. Enhancing health research in Oman will aim for better products and services, informed policies and practice, and empowerment of the people. NHRS will ensure research is translated into action for health improvements through enhancing an evidence-informed culture among decision makers.

  The NHRS will have four components; the capability to set relevant and appropriate research priorities, the ability to build, strengthen and sustain human and institutional capacities for research including the capacity to establish effective

national and international networks, set the appropriate framework of norms, standards and translations within which research can take place in an ethical, responsible, accessible and transparent manner and the capacity to translate knowledge into actions that improve health including needed medical products, effective implementation of clinical practice guidelines and effective, evidence-informed health policies and strategies to promote their implementation. These components are shown in Figure 54.

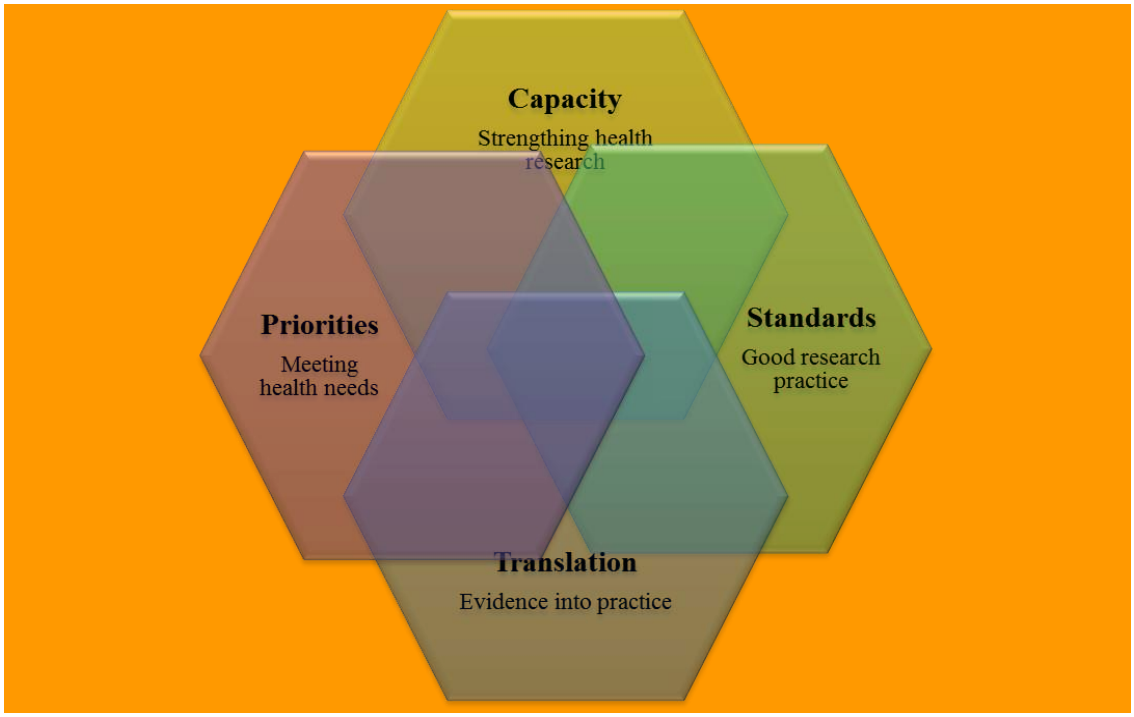


Figure 54: The four building blocks of National Health Research System (NHRS)

- Enhance the research capacity within the health system to promote health research as an important source of health information.
- Enhance coordination between the NHSIS and information technology for electronic extraction of data from administrative, health and disease records.
- Enforce private health care facilities to keep and manage health records electronically to simplify capturing health data.
- Establish safe electronic connectivity among all health care facilities, both public and private.
- Make financial and economic data available through the establishment of a “National Health Account” system.
- Introduce a health "Geographical Information System (GIS)".
- Strengthen and equip NHSIS with the latest technologies.

- Develop and enhance statistical units in different health care providers.

- Implement a "Burden of Disease Study" for Oman. This is of great importance to identify health research gaps and diseases burden and allow a wide range of health economics studies. Reliable mortality and morbidity data from both health records and research results are essential elements for executing a "Burden of Disease Study".

- Consider implementation of national longitudinal studies following cohorts of individuals to identify disease and risk profiles and changes over time.

- Link research results to decision-making, implementation strategies and development. This could be achieved by establishing "Knowledge Translation" unit(s) capable of translating research results into practice

Vision 2: Sustainable Funding for Health Research and Development Ensured

Currently there are no regular funds for health research. TRC acts partly as a national funding body on a competition basis. Sustaining health research in the country is essential for sustaining information availability and for providing the means for self-reliance in a number of aspects including medical products and technologies.

Actions:

- Ensure the allocation of research budget that amounts to at least 0.20% of the GDP and is increased over the years as required. The World health Organization had recommended that health research budget should be about 0.15%-0.20% of GDP.

- Explore possible sources of funding health research for example indirect taxations on tobacco, alcohol, airline travel and internet traffic; voluntary contributions from businesses and consumers; and taxation of repatriated pharmaceutical industry profit and research endowment (Waqf).

- Enhance national and international collaboration and networking with research funding agencies to support research.

Vision 3: Health Research Directed to Identified Priorities

There is a great need to direct research to the priorities of the health system. More than 93% of pharmaceuticals and surgical and laboratory consumables are imported; a fact that threatens sustainability of the health system. Medical technologies are all imported. Their maintenance requires advanced technical skills. Health research in such areas may provide ways to overcome such dependency.

Actions:

- Set priorities for health research on disease-specific, research on risk factor and non-disease specific (health system) research.

- Priority-setting for research should include, among others, areas such as biomedical technology, pharmaceutical industry and other medical products. Research results from such areas will help to achieve partial self-reliance through providing means for the delivery of affordable, effective, safe and quality health products (see Challenges Related to Medical Products and Technologies on page 148).

- Establish a world standard "research hub" at existing and future health professions educational institutes for addressing areas such as Biomedicine, Biotechnology, Nanotechnology applications and Omics (genomics, proteomics, metabolics, cytomics, etc.).

Chapter 11
Intersectoral Partnership / Collaboration in the Sultanate of Oman

Health Vision 2050 الصحة في

Quality Care, Sustained Health

عناية راقية وصحة مستدامة

Chapter 11
Intersectoral Partnership / Collaboration in the Sultanate of Oman

Non-communicable and chronic diseases, nutritional problems, population aging, escalating health care costs and health inequalities are examples of worldwide complex health challenges that have no easy solutions and are difficult to face. Factors such as economic status, education levels, environmental problems, water shortages, housing conditions, individual behaviors and cultures, and even the health status of surrounding countries tend to exacerbate existing health problems and create new health challenges. The health of the population is determined not only by health sector activities but also by controlling such factors by actions that may be beyond the mandate of the health sector. It is thus necessary for the health sector to engage with other sectors of the Government and the society to address such factors that are important determinants of health of the population. In this report, "intersectoral actions (ISA)" refers to actions affecting health outcomes undertaken by sectors outside the health sector, possibly, but not necessarily, in collaboration with the health sector; and "intersectoral collaboration (ISC)" refers to joint actions among the health sector and one or more other sectors to improve health.

The world had learned over the years how the action(s) of different sectors can positively influence the health and wellbeing of the community. Intersectoral actions should not necessarily have the goal of improving overall health, but may be directed towards one or more of the determinants of health. The complexity of the Government structure usually affects intersectoral collaboration. Regulations that may have an impact on determinants of health may be contradictory from one ministry to another; a simple example would be the contradiction between banning smoking in restaurants and public areas and the potential negative effect it may have on tourism. On the other hand, strategies developed at national level may have limited capacity to influence social determinants if they are not supported by initiatives and active participation at community levels. True collaboration among sectors is expected to be effective if it takes place at more than one level; National, Governmental and Community, especially if the activities are integrated through policy or legislation.

Important Sectors Related to Health

The health of the people will be affected by activities in all sectors. However, there are a number of sectors directly related to health in the Sultanate of Oman and these are described below.

Education

Education is considered an important determinant of health. In the Sultanate of Oman, education is the responsibility of the Education Council, Ministry of Education and Ministry of Higher Education. The "School Health Program" was initiated in 1990 to coordinate health-related issues between Ministry of Health and Ministry of Education. Activities include; routine medical examination of students as well as visual, hearing and oral health

activities and immunization against high-risk diseases. A number of committees have been formed to ensure that school environment is safe and healthy. Ministry of Higher Education supervises health professions education.

Areas related to health

- Health education for students is a joint activity between the health and education sectors. The introduction of health education materials within the curriculum for students is essential to provide students with the skills for healthy behaviors.
- Control of risk factors within schools such as smoking, unhealthy dietary habits, lack of physical activity, accidents including road traffic accidents, psychoactive drugs and alcohol as well as others.
- Education of disabled children with special needs.
- Maintenance of a safe and healthy school environment.
- Education of health professions.

Environment

Environmental issues in the Sultanate of Oman require special consideration for their health impact. Ministry of Regional Municipalities, Environment and Water Resource, Muscat Municipality, and Ministry of Housing ensure cleanliness of public areas; consumer protection; suitable housing; optimum city planning; construction and maintenance of sewage infrastructure; food safety; and safe water to the population.

Gas and oil revenues represent more than 84% of total government revenues. Ministry of Oil and Gas in Oman takes cares for all activities related to the production and distribution of gas and oil that may have negative impact on the environment.

Areas related to health

- Safe water supply for household use and for drinking. This is especially important as Oman frequently has long periods of drought and as a result of population growth, social development and changes in life-style; the demand for water is continuously growing. Oman depends on groundwater and its limited rainfall. Activities also include ensuring safe water wells, both existing and drilling new ones as well as safe "Falaj" water, desalination plants, and water tanks and pipes.
- Food safety for products in the market and ensuring they satisfy codes for healthy foods.
- Improved sanitation and wastewater services.
- Health care wastes.
- Preparedness for natural phenomena and disasters.
- Laws and regulation for safety and public health.
- Regulations to ensure healthy standards in gas and oil production and processing facilities.

Agriculture and Livestock and Food Markets

Policies of Ministry of Agriculture are directly related to securing food for the people with its economic and social impacts on the population. This is accomplished through the local production and optimum use of national resources. Securing food not only means making food available in sufficient quantities, it also means food should be safe and healthy. Livestock or animal husbandry is one of the important pillars of food production. It is the source of meat, milk, eggs and other animal products that constitute an important component of healthy food.

It is also crucial that marketed foods, whether produced locally or imported follow national codes. Examples are the availability of iodized salts, oils fortified with vitamin A and fortification of flour with iron and folic acid. Ministry of Commerce and Industry, Oman Chamber of Commerce and Industry and Oman Center for Investment Promotion and Export Development play an important role in monitoring the market and ensuring the implementation of health-related codes in all products, especially food.

Areas related to health

- Use of insecticides for cultivated plants and their effects on health should be monitored.
- Cleanliness of animal houses, including chicken breeding places, and butcheries, as well as their proximity to inhabited areas is an important health issue, not only because of the breeding areas themselves but also because of their wastes.
- Zoonotic diseases, i.e. infectious diseases transmitted between animals and humans, are an important health issue for animal husbandry as the close relationship between humans and livestock results in a risk of disease transmission. Livestock in a lower state of health is more likely to be exposed to zoonoses and also humans in a lower health state are more likely to be exposed to such diseases. Environmental, behavioral and social factors that might contribute to such exposure, as well as veterinary health, veterinary health education for breeders, and immunizing animals against such zoonotic diseases should all be considered.
- Introduction of genetically modified plants and animals in attempt to increase the supply of food with reduced cost and longer shelf life, more nutritious food, tastier food, disease and drought resistant plants that require fewer environmental resources (water, fertilizer, etc.), faster growing plants and animals and others should be carefully studied in collaboration with health sector.
- Developing codes for health products in the market.

Tourism

The importance of tourism had increased dramatically over the past few years. The tourism sector accounts for 9% of worldwide GDP and play a significant role in job creation (54). Oman has tourist attractions related to its heritage, culture, beaches and safari. Tourism and health interact; health issues in the country affect tourism negatively on the one hand and on the other medical tourism enhance the development of tourism. The tourism sector is cared for in Oman by Ministry of Tourism. The Directorate General of Civil Aviation and Meteorology

also plays a significant role in the sector. In addition to the economic and social impacts of the tourism sector, there a number of areas related to health.

Areas related to health

- Medical tourism is an emerging phenomenon in the health care industry and is expected to experience an explosive growth. "Medical Tourism" is the process of leaving home for treatment and care (restoring health) abroad. Health care can be a direct source of income if medical tourism is promoted. Possible areas of spending during medical tourism include; health services, international airfare, accommodation, organized tours, shopping, food and beverages, entertainment, domestic transportation. Revenues from medical tourism can support further growth and development in the health sector.
- Health tourism is the use of nature for treating certain health conditions. One example would be the water springs distributed in Oman. This could be another source of income to support both tourism as well as health.
- Health and tourism safety is concerned with rules, regulations and activities concerned with keeping tourist areas safe and healthy, as well as the protection of both locals and tourists from epidemics, communicable diseases and other health hazards.

Social

The social sector provides support to the needy, especially to selected groups such as the elderly and the disabled. Ministry of Social Development and Non-Government Organizations (NGOs) are the main players in the social sector in Oman. NGOs are groups of formed for non-profit purposes. Some NGOs are formed to contribute to the health of selected groups, for example "Association of Early Intervention for Children with Special Needs" and "Oman Association for Disabled" while others such as "Oman Women Association" includes health-related activities among their activities. NGOs are one vehicle to involve the community or civil society in identifying public health problems and share in controlling them. NGOs are able to reach to remote areas and populations, advocate public health issues to a broad audience, and address sensitive issues in the community.

Ministry of Sports Affairs plays a significant role in youth development. Physical activity is important for the control of non-communicable diseases.

Areas related to health

- Organized involvement of the social sector in programs to control health problems among the elderly.
- Identification of the disabled and their health and social needs.
- Changing trends in health-related behaviors among the people, especially youth, the elderly and disabled.
- Organized involvement of NGOs in implementation of health programs and activities at country level.
- Youth activities to control risky behavior.
- Establishment of an environment that promotes physical activity.

Religious Affairs and Information

The media is a powerful tool for transferring knowledge to the people and changing behaviors. The people of Oman respond to advice from religious leaders. Ministry of Awqaf and Religious Affairs, Ministry of Information and Ministry of Transport and Communication would a significant role in providing health messages to the people of Oman.

Areas related to health

- Health education to control risky behaviors; mainly related to healthy eating, physical activity and avoiding smoking.
- The use of endowments "AlWaqf" as a possible source of health financing.

Other Sectors include Manpower, Finance and Legal Sectors

These sectors are supported by Ministry of Manpower, Ministry of Civil Services, Ministry of Finance, Central Bank, Maajlis A'Dawla (State Council), Maajlis A'Shura (Consultative Council), and Ministry of Legal Affairs. There is a need for collaborative work with these institutions to ensure sustainability of the health system.

Areas related to health

- Policies for retention of human resources for health.
- Development of health insurance plans for workers, both Expatriates and Omanis.
- Revision and approval of health plans.
- Endorsing laws and regulations for health and safety.

Visions for Intesectoral Partnership

The discussion for the six building blocks of the health system; described earlier, include vision and actions that would describe role of some sectors for achieving health of the people. The following are vision and action related directly to intersectoral collaboration.

Vision 1: Intersectoral Partnership is a Vehicle for Health Development

For intersectoral collaboration to work, it is vital that different sectors realize the importance of intersctoral collaboration and that it is a good way to address health problems. Ministry of Health should build the case for intersectoral collaboration since it is the main health care provider and is responsible for health policy development and implementation.

Actions:

- Build trust and strong working relationships among all sectors related to health. Understanding of the contribution of individual sectors to health will allow identification of gaps and overlaps and will help to define the type of collaboration for each sector and what collaboration would look like.

- Involve politicians in the move towards health and wellbeing.

- Emphasize the need to save resources through intersectoral collaboration, especially with scarce resources.

- Build public awareness of health and wellbeing and not just recovery from disease and restoration of health. The issue should be framed in a way that all sectors have a defined role.

Vision 2: Intersectoral and Population Health Approach Institutionalized

The health system faces several challenges that have been discussed in previous chapters. Since the health of the population is an outcome of the interaction of several factors, some of which cannot be controlled by the health sector alone, the challenge is to achieve and develop collaborating mechanisms across ministries and different levels of the Government. The geography, topography and population distribution differs among Governorates making health challenges different. Some Governorates in the Sultanate have believes and behaviors that affect health differently from other Governorates.

Actions:

- Established a "Health Council" that will be responsible for developing and enforcing policies, strategies and legislations to ensure that sectors work together to achieve the health of the people. The Health Council should also monitor the process and outcome of intersectoral activities and identify effective ones.

- Strengthen a specialized body within the health system to develop and supervise the implementation of collaborating mechanisms among ministries and Government levels.

- Consider the needs and circumstances of individual Governorates in collaborative strategies

- Create an environment for improving health by providing leadership and coordination among different sectors. This could be achieved through the establishment of a multisectoral taskforce or committee at the Government level to suggest and supervise actions to improve health in the respective governorate.

- Provide the public and other stakeholders with the information and tools they need to identify health status at Governorate level and design health-improving actions.

- Ensure funds to ensure initiatives from multisectoral committees and develop accountability mechanisms for these committees.

- Develop public health policies, health goals and frameworks specific for each Governorate that reflect the population health approach, balancing investments across the health system.

Vision 3: Health is the Responsibility of Everyone

Currently, oil and gas revenues represent about 84.7% of total Government revenues. Meanwhile, there are a number of ongoing megaprojects in different parts of the country such as in Sohar in North AlBatinah Governorate and AlDuqum in AlWusta Governorate, all of which may have an impact on the environment with a negative effect on the health of the people. Non-communicable diseases and injuries, which are the main threat to health in Oman, are essentially the result of un-healthy behaviors of individuals. Sectors as well as individuals need to be responsible for their own health as well as health of their community.

Actions:

- Develop and enforces policies and strategies to ensure that the public sector and the private sector in areas of industry, agriculture and mining provide a safe and healthy working environment and take into account their responsibilities for protecting the environment and ensure that they contribute to the overall well-being of the community.

- Adopt strategies to encourage all individuals to contribute to health developments by taking responsibility for their own health and well-being, actively seeking out the information they need to make informed health decisions, and participating in community activities that have an impact on health.

- Introduce and emphasize on healthy believes and behaviors in curriculum for undergraduate students.

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Appendix

Quality Care, Sustained Health

عناية راقية وصحة مستدامة

National Health Policy of the Sultanate of Oman

Under the dynamic leadership of His Majesty Sultan Qaboos, the Sultanate of Oman has achieved substantial progress in extending comprehensive health services to the people. In order to sustain and strengthen this development, the Ministry Health, hereby makes the following National Health Policy Statement:

1

It is reaffirmed that health is a state of complete physical, mental and social wellbeing and not merely the absence of disease or infirmity, and that be attainment of the highest possible level of health is a most important social goal whose realization requires action of many other social and economic sectors in addition to the health sector. Protection and promotion of the health of the people is essential also to sustain rapid economic and social development and to contribute to a better quality of life.

II

The Ministry of health shares with the people the responsibility for health, and in order to achieve this, will continue to strengthen health services. Ruther, it has accepted the target of attainment by people of Oman, by the year 2000, of a level of health which will permit them to lead a socially and economically productive life. Primary health care is the key to attain this target.

III

Administration of health services will be further decentralized to the wilayat level in conformity with the Royal Decree No. 6/91 issued in 1991, by which Oman was divided into regions and wilayats. Steps will be taken to establish a willayat-based health management system and thus promote better planning, management, supervision, community involvement and inter-sectoral coordination.

IV

All regions in Oman will formulate plans of action based on regional needs and national policies and strategies to launch and sustain Primary Health Care through the wilayat health system.

V

The people of wilayats will be encouraged to participate in planning, implementation and evaluation of health care. Organizational support and initiatives will facilitate such meaningful participation.

VI

The Ministry of Health recognizes that promotion and protection of health is not solely dependent on the health sector, but also on other sectors such as agriculture, social welfare, education, housing, public health, engineering, water, sanitation and environment, religious affairs and information which make a considerable contribution to the health of people. An institutional frame-work will be established to promote inter-sectoral coordination, particularly at wilayat and regional level.

VII

Taking note of the rapid economic and social development in the Sultanate and being concerned that this may lead to unhealthy life-styles leading to the emergence of new health problems such as obesity, cardiovascular disorders and diabetes, timely action will be taken to inform and educate the people so that they adopt a healthy life-style and food habits.

VIII

The Sultanate having reached a reasonably satisfactory state of health services development, steps will be initiated to plan and implement the eradication programmes of certain communicable diseases like leprosy, tuberculosis, poliomyelitis, neonatal tetanus and malaria.

IX

The environment plays an important role in influencing the health of the people, with several agencies directly or indirectly concerned with it. A coordination mechanism will be established in order to monitor and evaluate the environment on a continuous basis.

X

In order to assure the highest quality of health care for all, and at same time to make efficient utilization of the resources, the Ministry of Health will continue to upgrade the health institutions at wilayat, regional and national levels, and effectively link these through efficient referral chains.

XI

An Improved managerial process and tools will continue to be applied for strengthening health system management. The information and knowledge base will be enhanced to support health care planning, programming, implementation and evaluation. The health information system will be backed up by a nationwide computer network.

XII

Consistent with the national Policy on Omanization, already-initiated actions for Oman human resources development for health professions will be vigorously pursued by the Ministry of Health in cooperation wit the Ministries of Civil Services and Education and the Sultan Qaboos University. Strategies will be evolved for closer Omani and non-Omani cooperation among the employees for mutual enrichment, promotion of teamwork and interactive processes in health management, development of sound continuing education systems and objective performance appraisal systems.

Muscat, 12 November 1992

Primary Health Care Package

Elements of Primary Health Care:

1. Health education and awareness of local health problems.
2. Promotion of healthy and balanced nutrition, especially for mothers, pregnant women and children.
3. Environmental health, including food safety, promotion of sufficient and safe water supplies, basic sanitation, waste disposal and vector control.
4. Maternal health care, including: antenatal care, postnatal care, deliveries and birth spacing.
5. Child health care, including: growth monitoring, control of diarrheal diseases, acute respiratory infections, helmenthic infections and adopting the "Integrated Management of Childhood Illness (IMCI) strategy.
6. Immunization against childhood diseases and other selected infectious diseases
7. School health. *
8. Mental health. *
9. Eye health. *
10. Oral health. *
11. Prevention, control and treatment of common diseases and injuries.
12. Adequate supply and rational use of essential drugs.
13. Screening for non-communicable diseases (diabetes, hypertension, hypercholesterolemia, obesity, chronic renal diseases) in those aged above 40 years. *
14. Community participation.

* Elements added in Oman

List of indictors published annually by the NHSIS

1. Input indicators include:
   - Demographic indicators
     - Population size desegregated by sex, age, nationality and geographical distribution
     - Fertility Indicators
     - Mortality Indicator not desegregated according to sex nor geographical
   - Health services indicators
     - Number of health services desegregated by type (hospital / health centers), geographical distribution
     - Health services per population (hospital beds per population, health centers per population
   - Human resources indicators
     - Numbers of Human resources in health desegregated by category (physicians, Dentists, pharmacists, nurses, radiographers, …etc), place of work (hospital / health centers) and geographical distribution
     - Human resources in health per population desegregated by category (physicians, Dentists, pharmacists, nurses, radiographers, …etc), place of work (hospital / health centers) and geographical distribution
   - Economic indicators
     - Gross Domestic Product (GDP) at current prices
     - GDP per capita
     - Gross National Income (GNI)
     - GNI per capita
     - Total Government Expenditure
     - Total Expenditure by MOH desegregated by type, current and development and by location of budget
     - Expenditure on drugs and other consumables by location of budget
     - MOH Expenditure as % of Government Expenditure
     - MOH Expenditure per capita
2. Process indicators include:
   - Health services utilization indicators
     - Immunization coverage
     - Outpatient Departments utilization desegregated by type of health facility (hospital, health center), clinical specialty and geographical distribution
     - Inpatient Services Utilization (midnight census and discharge statistics, Deliveries)
     - ancillary services (lab, radiology, accidents and emergency)
3. Outcome and health status indicators:
   - Indicators reflecting performance and achievements of health domains identified in the five-year health development plan
   - Morbidity desegregated by major morbidity groups and geographical distribution

Working Papers

1. Primary health care
2. Secondary and tertiary care
3. Communicable diseases
4. Non-communicable diseases
5. Health care quality
6. Pharmaceutical sector
7. Health system financing and management
8. Private health sector
9. Medical products and technologies
10. Health promotion and intersectoral cooperation
11. Health profession education and education quality
12. Human resources for health
13. Nursing services
14. Information technology and health research

Strategic Studies

1. Primary Health Care
2. Secondary and tertiary health care
3. Non-communicable diseases
4. Communicable diseases
5. Quality
6. Geriatrics
7. Pharmaceutical Sector
8. Health research
9. Medical equipments
10. Health Institutions
11. Nutrition
12. Disability
13. Health profession education
14. Human resources for health
15. Health system finance
16. Governance and leadership
17. Maternal and child health
18. Occupational/environmental health
19. Health promotion
20. School health
21. Community based initiatives (CBI)
22. Private health sector
23. Health planning
24. Health information technology

Quality Care, Sustained Health

عناية راقية وصحة مستدامة