Health Vision 2050

Synopsis of Strategic Studies

Volume 1
May 2015

Compiled by
Undersecretariate of Planning Affairs
Ministry of Health
Sultanate of Oman
Synopsis of Strategic Studies
Synopsis Compilation Members

Health Vision 2050 Team

Dr Ali Taleb AlHinai, Undersecretary for Planning Affairs; Chairman
Dr Ahmed Mohamed AlQasmi, Director General of Planning and Studies
Dr Medhat K. ElSayed, Senior Consultant, Adviser Health Information and Epidemiology
Mr Mohamed Hussein Fahmy Bayoumi, Senior Health Information System Supervisor
Dr Adhra Hilal Al Mawali, Director of Studies and Research
Dr Halima Qalm AlHinai, Senior Consultant, Directorate General of Planning and Studies
Mr Said Humaid AlSaidi, Adviser, Studies and Management Development
Mr Mohamed Said AlAffifi, Adviser, Office of H.E. Undersecretary for Planning Affairs

Strategic Studies Review Team

Dr Nazar Abdelrahim Elfaki, Advisor, Human Resources for Health Planning
Dr Waleed Khamis AlNadabi, Director Monitoring and Evaluation
# Contents

<table>
<thead>
<tr>
<th>ITEM</th>
<th>Page No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>PREFACE</td>
<td>I</td>
</tr>
<tr>
<td>FOREWORD</td>
<td>III</td>
</tr>
<tr>
<td>INTRODUCTION TO SYNOPSIS OF STRATEGIC STUDIES</td>
<td>1</td>
</tr>
<tr>
<td>S1. HUMAN RESOURCES FOR HEALTH DEVELOPMENT</td>
<td>5</td>
</tr>
<tr>
<td>S2. PRIMARY HEALTH CARE</td>
<td>33</td>
</tr>
<tr>
<td>S3. NON-COMMUNICABLE DISEASES &amp; MENTAL HEALTH</td>
<td>81</td>
</tr>
<tr>
<td>S4. HEALTH PROMOTION</td>
<td>149</td>
</tr>
<tr>
<td>S5. THE NATIONAL NUTRITION</td>
<td>183</td>
</tr>
<tr>
<td>S6. ELDERLY CARE</td>
<td>219</td>
</tr>
<tr>
<td>S7. QUALITY AND PATIENT SAFETY</td>
<td>259</td>
</tr>
<tr>
<td>S8. MEDICAL EQUIPMENT AND HEALTH CARE TECHNOLOGIES</td>
<td>289</td>
</tr>
</tbody>
</table>
Synopsis of Strategic Studies
Preface

The “Health System” in the Sultanate of Oman, presented in Ministry of Health, has successfully launched its vision for the next 40 years in its “Health Vision 2050” main document. “Health Vision 2050” was developed over about one and half years prior to its launching and was based on several scientific activities and depended on extensive analysis of the health status performed by a number of highly qualified experts in the health field. Such analysis as well as long-term strategies were described in a number of strategic studies. Today I am introducing synopsis of eight of these studies compiled in one document labeled “Synopsis of Strategic Studies, Volume 1”. I hope I will present to you in the near future a second volume with a number of other synopses of different strategic studies.

The document I introduce today presents compendium of different healthcare purviews in Oman. The document delves into historical data pertaining to each relevant healthcare area in the country, situation analysis and future road maps. The document is considered the main tributary of the health vision 2050.

I wish to congratulate those who contributed to the development of these strategic studies and hope that the information they provided, together with “Health Vision 2050” main document and “Health Atlas”, help health planners and health mangers in developing the coming "Five-Year Health Development Plans”.

Dr Ahmed Mohamed AlSaidi
Minister of Health
Sultanate of Oman
Synopsis of Strategic Studies
Foreword

The Undersecretariat of Planning is pleased to present synopsis of the strategic studies that accompanied "Health Vision 2050" main document and the “Health Atlas”. The strategic studies were written by distinguished health experts, in which they critically analyzed the health status and the health system, each in relation to a specific health function. The “Health Vision 2050” was accompanied by 24 strategic studies. These strategic studies contain information and analysis that make them resources for all health workers. We have summarized these as synopsis to facilitate their use in health planning and health management. The synopsis of these 24 strategic studies will come in three volumes, each containing 8 strategic studies.

The health system in Oman has made remarkable improvements in the health status of the people of Oman. Health sector strived to ensure universal health coverage through an umbrella of health services distributed across the whole of Oman. Mainly the Government finances the health system; it spends about 81.1% of the total health expenditure. Health care is directly provided in facilities mainly owned and operated by the Government. The health system is currently facing a number of challenges that were described in the strategic studies. The studies showed that the population of Oman is aging, and is facing an epidemiological shift to non-communicable diseases. The health system is facing the escalating cost of health care and advancements of technology.

We aim to sustain achievements of our health system and to continue to provide a comprehensive range of services to the entire population and to ensure that standards of quality, equity and responsiveness are maintained. This could be achieved only through partnership and collaborative work of all stakeholders of the health system guided by evidence and information.

Dr Ali Talib AlHinai
Undersecretary for Planning Affairs,
Ministry of Health
Synopsis of Strategic Studies
Introduction
Introduction to Synopsis of Strategic Studies

The health system in the Sultanate of Oman had remarkably developed since 1970 and had brought achievements in different aspects of health with efficiency. The control of communicable diseases and the speedy reduction in mortality especially childhood mortality were recognized by a number of international organizations. The political commitment to health development, the economic developments, the tremendous spread of umbrella of health services to cover the whole country, in addition to the extensive developments in education, environment, and social sector had all brought the achievements, as they constitute, with others, the health system.

To sustain such achievements and further develop the health status, the health system has to face a number of emerging challenges. These include demographic changes, as the population is aging, epidemiological transition to non-communicable diseases, escalating health care costs, rareness of competent health care professions, technological advancements, and expectations of the people of Oman. These challenges had necessitated revising the health system in Oman.

“Health Vision 2050” is developed to visualize how the health system in Oman would look like in the future and until the year 2050. Predicting the future of health care delivery can be fraught with uncertainty and risk. It was, thus, necessary to analyze extensively the 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. Extensive efforts were made to analyze the status of the health system and the surrounding circumstance in which the health system functions. Ministries and organizations related to health including the Parliament and State Council prepared working papers and a number of national workshops were conducted to discuss and describe views on the current and probable future determinants of health outcomes. Working groups from national experts were formed; each developed a detailed strategic study or working paper in one of the domains of the health system in Oman discussing challenges and their own future prospective. An international conference “Oman Health Vision 2050” was sponsored by Ministry of Health in May 1-3, 2012 in which international experts gave their views and prospects in different areas related to health systems and health system reforms. Finally, the public was also consulted to give their expectations from the health system. The process of establishing a steering committee, the formation of the working groups, analyzing the health system, the preparatory and international workshops and until the finalization of the “Health Vision 2050” consumed more than two and half years.

The development process of “Health Vision 2050” had thus included the development of a number of working papers and 24 strategic studies in important areas of health and health system. “Health Vision 2050”, the working papers and the strategic studies include enormous information and analysis of health status and health system as well as actions for future improvements in health status and enhancing performance of health system. The development of “Health Vision 2050” also included the development of the “Health Atlas”. The “Health Atlas” contains information about population projections, the expected future requirements of health services, some of its important equipment as well as expected utilization of these health services in addition to the expected requirements of human resources for health.
The current volume compiles synopsis of 8 strategic studies; namely “Human Resources for Health”, “Primary Health Care”, “Health Care Quality”, “Non-Communicable Diseases”, “Health Promotion”, “Nutrition”, “Elderly Health Care” and “Medical Technology”. The information and analysis contained in these strategic studies are intended to complement the “Health Vision 2050” main document and the “Health Atlas” and will act as resource studies for developing the coming Five-Year Health Development Plans.
Synopsis 1

Human Resources for Health Development

Strategic Study
Human Resources for Health Development
Strategic Study

Task Force:

- H.E. Dr Ali Al Hinai, Undersecretary for Planning Affairs
- Dr. Ahmed Mohamed Al Qasmi
- Dr. Nazar Abdelrahim Mohamed Elfaki
- Mr. Mohamed Hussein Fahmy BAIoumy
- Mr. Osama Mohamed Badwi Elshafei

Contributors:

- Mr. Samy Abdel Hamed Galal
- Mr. Hamad Al Riyami
- Mrs. Rajaa Khalfan Al Hashami
- Mrs. Khitam Ibrahim Al Hinai
- Mrs. Zahra Sajwani

Acknowledgment:

- Health Vision 2050 Team
- Strategic Studies Review Team
- Mr. Hamood Al Kharusi
- Mr. Salim Al Flaiti
- Mr. Ahmed Al Abri
- Dr. Salim Al Touby
- Mr. Warith Rasool
- Mrs. Amal Al-Ghassani
- Mrs. Houda El Kindi
- Mrs. Bernard K Perry
Introduction

The human resources for health (HRH) strategic study is one among series of strategic studies (covering different aspects of the health system building blocks) performed by Ministry of Health and its partners to inform the "Health Vision 2050". It provides an extensive analysis of the situation of HRH in the Sultanate of Oman mainly drawn from the Ministry of Health annual health report 2012, HRH database as well as other sources of information. While analyzing the HRH current situation in Oman, the study follows the World Health Organization (WHO) HRH action framework which has six domains (policy, leadership, partnership, HRH management, finance, and education and training) as well as the health workers lifespan model which considers the worker perspective and also offers a system approach to monitoring the dynamics of the health labour market and the strategies of each stage of the HRH lifespan.

The Sultanate of Oman has achieved remarkable success in health development and universal health coverage through dramatic transformation in its health care system over a remarkably short span of time. Table 1 shows selected health indicators that reflect the progress made in health development. Oman is now recognized internationally as a model for other countries.

Table 1: Selected health indicators

<table>
<thead>
<tr>
<th>Indicator</th>
<th>Year 2012</th>
</tr>
</thead>
<tbody>
<tr>
<td>Life expectancy at birth (years)</td>
<td>76.2</td>
</tr>
<tr>
<td>Crude mortality rate per 1,000 population</td>
<td>3.2</td>
</tr>
<tr>
<td>Infant mortality rate per 1,000 live birth</td>
<td>9.5</td>
</tr>
<tr>
<td>Under-5 mortality rate per 1,000 live birth</td>
<td>11.5</td>
</tr>
<tr>
<td>Maternal mortality ratio per 100,000 live birth</td>
<td>17.8</td>
</tr>
</tbody>
</table>

Source: Annual health report 2012

However, the epidemiological shift and the dominance of non-communicable diseases, the lifestyle and behavioral changes, the global health threats such as pandemics, the environmental and climate change, and the high cost of health technology and services are considered as a challenge for the health system and to the public health practice as well as affecting the current and the future demands for health care service and consequently the types of health care providers i.e. the human resources for health. In addition, the globalization of the health labour market as well as new medical technologies and new models of care will add extra dimension to the need for HRH.
**HRH Situation in Oman**

As for the human resources for health, the study revealed enormous achievements as well as challenges. The HRH situation in Oman was unsatisfactory before the renaissance in the early 1970s. The Sultanate had only 13 physicians and a few nurses in 1970. Since then, the physician, nurse and most other professional categories in Oman have grown substantially as shown in table 2. This growth was necessitated by the expansion and the upgrading of the health care infrastructure.

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Doctors</td>
<td>0.2</td>
<td>1.8</td>
<td>5.1</td>
<td>6.9</td>
<td>9</td>
<td>11.8</td>
<td>13.6</td>
<td>16.7</td>
<td>18.1</td>
<td>18.0</td>
<td>19.5</td>
</tr>
<tr>
<td>- General Practitioners</td>
<td>0.2</td>
<td>1.2</td>
<td>n.a</td>
<td>5.4</td>
<td>6.5</td>
<td>8.2</td>
<td>9.0</td>
<td>10.9</td>
<td>10.7</td>
<td>10.6</td>
<td>11.4</td>
</tr>
<tr>
<td>- Specialists/Consultants</td>
<td>0</td>
<td>0.7</td>
<td>n.a</td>
<td>1.6</td>
<td>2.6</td>
<td>3.7</td>
<td>4.5</td>
<td>5.7</td>
<td>7.4</td>
<td>7.4</td>
<td>8.1</td>
</tr>
<tr>
<td>Dentists</td>
<td>0</td>
<td>0.1</td>
<td>0.2</td>
<td>0.4</td>
<td>0.5</td>
<td>0.7</td>
<td>1.1</td>
<td>1.8</td>
<td>2.0</td>
<td>2.1</td>
<td>2.2</td>
</tr>
<tr>
<td>Nurses</td>
<td>n.a</td>
<td>5.6</td>
<td>10.8</td>
<td>16.6</td>
<td>26</td>
<td>28.9</td>
<td>32.6</td>
<td>37.0</td>
<td>39.7</td>
<td>40.5</td>
<td>43.1</td>
</tr>
<tr>
<td>Pharmacists</td>
<td>n.a</td>
<td>0.1</td>
<td>0.5</td>
<td>1.4</td>
<td>1.6</td>
<td>1.7</td>
<td>2.1</td>
<td>3.0</td>
<td>3.9</td>
<td>3.9</td>
<td>4.6</td>
</tr>
<tr>
<td>Asst. Pharmacists</td>
<td>n.a</td>
<td>n.a</td>
<td>n.a</td>
<td>0.8</td>
<td>1.2</td>
<td>1.8</td>
<td>2.9</td>
<td>3.6</td>
<td>4.7</td>
<td>4.8</td>
<td>5.2</td>
</tr>
<tr>
<td>Physiotherapists</td>
<td>n.a</td>
<td>n.a</td>
<td>n.a</td>
<td>0.3</td>
<td>0.3</td>
<td>0.3</td>
<td>0.6</td>
<td>0.6</td>
<td>0.9</td>
<td>0.8</td>
<td>1.0</td>
</tr>
<tr>
<td>Radiographers</td>
<td>n.a</td>
<td>n.a</td>
<td>n.a</td>
<td>0.5</td>
<td>1</td>
<td>1.1</td>
<td>1.4</td>
<td>1.9</td>
<td>2.3</td>
<td>2.3</td>
<td>2.4</td>
</tr>
<tr>
<td>Laboratory Technicians</td>
<td>n.a</td>
<td>n.a</td>
<td>n.a</td>
<td>1.8</td>
<td>2.6</td>
<td>3.2</td>
<td>3.8</td>
<td>4.7</td>
<td>5.3</td>
<td>5.4</td>
<td>5.6</td>
</tr>
</tbody>
</table>

**Policy and Planning For HRH**

The government through MOH and other related ministries systematically planned this expansion through the five-year health development plans.

The 7th and 8th Five-Year HRH Development Plans (2006-2010 and 2011-2015) of the Ministry of Health intend to ensure that comprehensive healthcare of the highest quality is provided to the people of Oman by competent and committed health professionals with the right number and skill-mix equitably distributed to all MOH institutions.

---

1 n.a: not available
The planning for HRH development was supported by a powerful HRH information system and management database within MOH. Data and information on HRH were usually incorporated within the annual health statistical report of the MOH. Furthermore, the MOH established the National HRH Observatory in 2008 to further guide the future planning and deliberations of the HRH in Oman.

Over the years, an accumulated vast experience, competencies/technical expertise, professional knowledge and requisite skills in HRH planning, management, education and training have developed within the health sector and specifically the Ministry of Health as well as the government's visionary, dynamic and committed leadership and its recognition of the importance of human resources for health in health and socioeconomic development. The MOH works in collaboration with multiple stakeholders and partners in the advancement of HRH. The main key stakeholders and partners are Ministry of Higher Education, Sultan Qaboos University, Education Council, Ministry of Finance, Ministry of Civil Service, Ministry of Manpower, Diwan Medical Services, Armed Force Medical Services, Royal Oman Police Medical Services, Petroleum Oman Development Medical Services, Oman Medical Specialty Board, Private Sector, and International Agencies (including WHO).

**HRH Density**

HRH stock and its distribution across geographic boundaries is largely determined by the HRH flow in and out of the labor market and shaped by the production capacity of national medical and health training institutions, as well as the international labor market.

According to the MOH annual report 2012, the aggregated number of HRH was 42,833. Nurses (15,627), followed by allied health professions (10,705) and then doctors (7,055) represented the largest share of the health workforce. The technical, administrative and support staff constituted 16.3% of the total health workforce and 18.3% as for MOH.

The public sector constituted the main health labor market (81.8%) compared to the private sector (18.2%). MOH has 74% of the total health workforce and 90.5% in relation to the public health sector.

The densities for doctors (19.5) and nurses (43.1) per 10,000 population in Oman in 2012 were considered above the global average densities, the upper middle-income countries and the WHO Eastern Mediterranean Region (EMR), however they were below the average levels of high-income countries, the WHO regions for Europe and Americas as well as some Gulf Cooperation Council (GCC) countries as shown in table 3. They were also considered below the average of the Organization for Economic Co-operation and Development (OECD) countries (32 per 10,000 population for doctors and 88 per 10,000 population for nurses).
Table 3: Oman health workforce densities compared to other countries and regions (ratio per 10,000 population), 2012

<table>
<thead>
<tr>
<th>HRH categories per 10,000 population</th>
<th>Doctors</th>
<th>Nurse</th>
<th>Dentist</th>
<th>Pharmacist</th>
</tr>
</thead>
<tbody>
<tr>
<td>Global average</td>
<td>13.9</td>
<td>29</td>
<td>2.6</td>
<td>4.4</td>
</tr>
<tr>
<td>WHO/EMRO</td>
<td>10.8</td>
<td>15.9</td>
<td>1.9</td>
<td>5.2</td>
</tr>
<tr>
<td>WHO/EURO</td>
<td>33.3</td>
<td>84.2</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>WHO/PAHO</td>
<td>20.4</td>
<td>71.5</td>
<td>-</td>
<td>6.9</td>
</tr>
<tr>
<td>WHO/WPRO</td>
<td>15.2</td>
<td>19.5</td>
<td>-</td>
<td>4.4</td>
</tr>
<tr>
<td>High Income</td>
<td>27.1</td>
<td>72.4</td>
<td>5.9</td>
<td>10.8</td>
</tr>
<tr>
<td>Upper Middle Income</td>
<td>17.8</td>
<td>35.4</td>
<td>-</td>
<td>3.6</td>
</tr>
<tr>
<td>Oman</td>
<td>19.5</td>
<td>43.1</td>
<td>2.2</td>
<td>4.6</td>
</tr>
<tr>
<td>UAE</td>
<td>19.3</td>
<td>40.9</td>
<td>4.3</td>
<td>5.9</td>
</tr>
<tr>
<td>Bahrain</td>
<td>14.9</td>
<td>38.6</td>
<td>1.5</td>
<td>2.5</td>
</tr>
<tr>
<td>Qatar</td>
<td>27.6</td>
<td>73.7</td>
<td>5.8</td>
<td>12.6</td>
</tr>
<tr>
<td>KSA</td>
<td>9.4</td>
<td>21</td>
<td>2.3</td>
<td>0.6</td>
</tr>
<tr>
<td>Kuwait</td>
<td>17.9</td>
<td>45.5</td>
<td>3.5</td>
<td>3</td>
</tr>
</tbody>
</table>

The current numbers on stock reflect a period of significant evolution for all health cadres especially medical doctors and nurses from 1970 till 2012, which raced up particularly from the 1990s onwards. The number of doctors and nurses has doubled between 2000 and 2011, while the number of pharmacists and dentists increased nearly four folds during the same period.

The balance in doctor workforce between general practitioners and specialist/consultants has changed over the past few decades, with the number of specialist/consultants increasing much more. The ratio between general practitioners to specialists/consultants decreased from 2.5 in 1990 to 2.0 in 2000 and reached 1.4 in 2010, 2011 and 2012. In contrast, general practitioners made up only 30% of all doctors on average across OECD countries, i.e. there were more than two specialist for every generalist in 2011 as shown in figure 1.
Moreover, the number and the density of consultants working in MOH per 10,000 population was less compared to the specialists. In addition, the density of consultants and specialists was less compared to OECD countries. For instance, the number of Obstetrics & Gynecology consultants and specialists was 14.9 per 100,000 women compared to the OECD average of 27.3, while for Psychiatrists, it was 0.16 per 10,000 population compared to the OECD average of 1.56.

**Omanization of Health Workforce**

The government introduced the Omanization policy in the 1980s to promote the nationalization of its labor force. The policy has been actively implemented in the public sector and then followed by the private sector. Several professions have been predominantly Omanized thus decreasing the dependant on non-Omani.

The annual MOH health report 2012 showed that Omani constitutes 59% of the total health workforce, however the percentage varied between 71% in the MOH and 10% in the private sector. Furthermore, there was notable variation between the percentage of Omani health professions working in MOH and other government related sectors compared to those working in the private sector. Omani doctors constituted 36% in MOH and 45% in other government related sectors, while only 3% in the private sector. The same applied for dentists, pharmacists and nurses. There is a need for further in depth analysis as well as studies on health labor market dynamics to know the choices and preferences of Omani and non-Omani health professions between the public and private sector. The rate of Omanization in the MOH has increased for all types of HRH categories from 52% in 1990 to 71% in 2012. Omanization among doctors has increased four folds during the period 1990 – 2012 (from 9% to 36%), more than five
folds for nurses (from 12% to 66%), two folds for dentists (from 25% to 50%) and four folds for pharmacists (from 21% to 80%) as shown in figure 2.

![Percentage of Omani HRH categories in MOH](image)

**Figure 2: Percentage of selected Omani HRH categories in MOH.**

### HRH Age Distribution

The study revealed a young age health workforce in Oman. For instance, 56.7% of the doctors (Omani and non-Omani) in MOH were less than 40 years of age and 17% were 50 years of age and over as shown in table 4.

**Table 4: The age distribution of doctors in MOH 2012.**

<table>
<thead>
<tr>
<th>Age groups</th>
<th>Omani</th>
<th>Non-Omani</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No.</td>
<td>%</td>
<td>No.</td>
</tr>
<tr>
<td>20 &lt; 30</td>
<td>752</td>
<td>42.3%</td>
<td>171</td>
</tr>
<tr>
<td>30 &lt; 40</td>
<td>743</td>
<td>41.8%</td>
<td>1,144</td>
</tr>
<tr>
<td>40 &lt; 50</td>
<td>213</td>
<td>12.0%</td>
<td>1,083</td>
</tr>
<tr>
<td>50 &lt; 60</td>
<td>54</td>
<td>3.0%</td>
<td>676</td>
</tr>
<tr>
<td>60 &amp; above</td>
<td>17</td>
<td>1.0%</td>
<td>98</td>
</tr>
<tr>
<td>Total</td>
<td>1,779</td>
<td>100%</td>
<td>3,172</td>
</tr>
</tbody>
</table>
While 81% of the nurses (Omani and non-Omani) were less than 40 years and 4.2% were more than 50 years of age as shown in table 5.

Table 5: Age distribution of nurses in MOH 2012-2013.

<table>
<thead>
<tr>
<th>Age groups</th>
<th>Omani</th>
<th></th>
<th>Non-Omani</th>
<th></th>
<th>Total</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No.</td>
<td>%</td>
<td>No.</td>
<td>%</td>
<td>No.</td>
<td>%</td>
</tr>
<tr>
<td>20 &lt; 30</td>
<td>3615</td>
<td>42%</td>
<td>1427</td>
<td>27%</td>
<td>5042</td>
<td>37%</td>
</tr>
<tr>
<td>30 &lt; 40</td>
<td>3929</td>
<td>46%</td>
<td>2110</td>
<td>40.5%</td>
<td>6039</td>
<td>44%</td>
</tr>
<tr>
<td>40 &lt; 50</td>
<td>893</td>
<td>11%</td>
<td>1121</td>
<td>22%</td>
<td>2014</td>
<td>15%</td>
</tr>
<tr>
<td>50 &lt; 60</td>
<td>97</td>
<td>1%</td>
<td>507</td>
<td>10%</td>
<td>604</td>
<td>4%</td>
</tr>
<tr>
<td>60 &amp; above</td>
<td>4</td>
<td>&lt; 0.1%</td>
<td>26</td>
<td>0.5%</td>
<td>30</td>
<td>0.2%</td>
</tr>
<tr>
<td>Total</td>
<td>8538</td>
<td>100%</td>
<td>5191</td>
<td>100%</td>
<td>13729</td>
<td>100%</td>
</tr>
</tbody>
</table>

In addition, Omani health professions were younger than the non-Omani. As for doctors, 84.1% of the Omani doctors in MOH were less than 40 years compared to 41.5% of the non-Omani doctors of the same age group, while only 4% of the Omani doctors were above 50 years of age compared to 24.4% of the non-Omani doctors of the same age group as illustrated in figure 3.

Figure 3: Age structure of Omani and non-Omani doctors in MOH 2012.
The same goes for nurses whereby 88% of the Omani nurses were less than 40 years compared to 68% of the non-Omani nurses of the same age group, while only 1.1% of the Omani nurses were above 50 years of age compared to 10.5% of the non-Omani nurses of the same age group as illustrated in figure 4.

In comparison with OECD countries, only 10.1% of the doctors working in MOH in Oman were over 55 years of age, while on average across OECD countries nearly one-third of all doctors were over 55 years of age in 2011 as seen in figure 5.

**HRH and gender**

The MOH annual health report 2012 showed the dominance of female health workforce in the MOH (60.3%). In addition, some health professions were remarkably dominated by females e.g. nurses and pharmacists, while others were male-dominated e.g. health administrators, specialist and consultants.
HRH distribution

The overall distribution of HRH in Oman showed some variations between public and private sectors which has its implication on the HRH geographical distribution and indicators. The high concentration of the health workforce in Muscat governorate (the capital) was mainly due to heavily presence of private and quasi-governmental health facilities compared to the other governorates in addition to the existence of the tertiary level hospitals. Evidence suggests that higher-level cadres such as Omani consultants and specialists doctors preferred to work in Muscat due to better living conditions, population density, training opportunities and income.

As for the HRH working in MOH, there were skill-mix and geographical imbalances in terms of densities of certain health categories per 10,000 population between and within the governorates. Some of these imbalances were attributed to the population densities as well as the type of health institutions available. The statistics showed that 42% of the total doctors and 34% of the total nurses in MOH worked at primary health care level. This reflected the high commitment of MOH to sustain the universal coverage and access to health care services.

In addition to the skill-mix and geographical imbalances, the study revealed variations in the volume of work among the health professions in the governorates. As an example, the average caesarean sections and gynecological operations performed by an obstetric & gynecologist per month varies from 4.2 in one governorate to 12.7 in another governorate. For ENT surgeon, the average operations varies from 2 to 17 per month between governorates. While for orthopedic surgeon, the average operations varies from 3.2 to 15.6 per month between governorates.

Figure 5: Percentage of MOH (Oman) doctors aged 55 years and over compared to OECD countries, 2012.
HRH MANAGEMENT

MOH has a structured recruitment system with clear procedures, however still the system experienced bureaucratic delays and administrative obstacles within the MOH. This is evident in the average recruitment time for hiring expatriate health professions (from 4-8 months). Deployment and transfer of HRH is centralized in the MOH. The number and type of HRH are determined in accordance with the needs of the health services based on established criteria taking into consideration the location and catchment area, density of the population and the type of services to be delivered. The guidelines (including norms and standards) for HRH deployment at primary, secondary and tertiary level institutions are currently under revision by the Ministry of Health.

MOH data in 2012-13 showed that 631 workers dropped out from the service. Resignation was by far the most common reason (64%), while 11% due to contract termination, 8% retirement, 6% transfer, 5% death, and 6% due to other reasons as shown in figure 6. Out of the 631 exits, 299 were Omani (47%) compared to 332 non-Omani (53%).

Figure 6: HRH who exit or transit from the MOH services in 2013.
HRH FINANCE

Financing for HRH is concerned with the generation or obtaining, allocating and disbursing adequate funding to attract health workers and allow them to perform at all levels of health care. The MOH annual health report of 2012 revealed that HRH absorbed a considerable share of the MOH budget. The total spending on HRH was 74% of the MOH recurrent health expenditure in 2012 compared to 61% in 2000 as illustrated in figure 7.

<table>
<thead>
<tr>
<th>Year</th>
<th>MOH recurrent expenditure on HRH out of the total MOH recurrent expenditure</th>
</tr>
</thead>
<tbody>
<tr>
<td>2000</td>
<td>61%</td>
</tr>
<tr>
<td>2005</td>
<td>67%</td>
</tr>
<tr>
<td>2010</td>
<td>70%</td>
</tr>
<tr>
<td>2011</td>
<td>70%</td>
</tr>
<tr>
<td>2012</td>
<td>74%</td>
</tr>
</tbody>
</table>

Figure 7: The recurrent expenditure on HRH as of the total MOH health expenditure.

HRH EDUCATION AND TRAINING

To keep pace with the development of the health care infrastructure and minimize dependence on imported manpower, Oman felt the need to accelerate human resources development and began to coordinate its efforts to train medical and allied health professions locally and abroad.

Locally, the MOH first major institution was the Institute of Health Sciences (IHS) that was established in 1982. In 1991, regional nursing institutes were established in different regions in order to ensure equitable opportunities for admission to all students across the Sultanate, to facilitate regional development, and to ensure proper distribution of nurses in different health regions. In addition, MOH also set up new institutes for education in other allied professions namely the Oman Institute of Public Health (1991), the
Oman Institute for Assistant Pharmacists (1991) and the Oman Institute of Medical Record Technology (2002).

Medical and health education began in Sultan Qaboos University (SQU) in 1986, while postgraduate medical education commenced in 1994 with the establishment of the Oman Medical Specialty Board (OMSB). The Royal Decree in April 2006, stipulated the required objectives to be achieved by the Board, which were:

- Prepare, rehabilitate, upgrade and develop professional performance and enrich the scientific thought of doctors.
- Contribute to the goals of human resources development in the medical field.
- Establish and develop relations with local, regional and international medical bodies.
- Obtain international accreditation for its training programs.

The Board has spearheaded the development of postgraduate residency programs with the active support of the Ministry of Health, SQU, Royal Oman Police Medical Services and the Armed Forces Medical Services. The total doctors enrolled since 2005 were 777 as shown in table 6. The private sector is contributing to HRH education and production through the various universities and colleges established in the recent years.

Table 6: The total doctors enrolled in OMSB since 2005.

<table>
<thead>
<tr>
<th>Year</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>2005</td>
<td>69</td>
</tr>
<tr>
<td>2006</td>
<td>86</td>
</tr>
<tr>
<td>2007</td>
<td>80</td>
</tr>
<tr>
<td>2008</td>
<td>67</td>
</tr>
<tr>
<td>2009</td>
<td>71</td>
</tr>
<tr>
<td>2010</td>
<td>103</td>
</tr>
<tr>
<td>2011</td>
<td>150</td>
</tr>
<tr>
<td>2012</td>
<td>151</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>777</strong></td>
</tr>
</tbody>
</table>

Whereas the physical, technical, and organizational capacity of the medical and health training institutions largely determine their capacity to produce qualified HRH, the applicant's preferences and working conditions determines the supply side behaviour of HRH. The statistics of the Ministry of Higher Education showed that engineering, business administration, and information technology in Oman had the highest numbers of accepted students compared to those in medicine and health (account only 5.5%) as shown in table 7. In addition, males to females students' ratio in medicine and health was nearly 1:5.

Although the annual production of health professions in Oman has increased considerably over the past years, it is still below the health labor market demand (defined as the funding available to hire health workers). According to the "Health Vision 2050" the ratio of doctors per 10,000 population needs to be increased from 19.5 to 28, from 43.1 to 65 for nurses, from 2.2 to 5 for dentists and from 4.6 to 5.4 for pharmacists (table 8) in order to meet the health system needs and to be in line with comparable international benchmarks (e.g. OECD countries). This signifies the need to increase the current production rates of the national training institutes as well as continue hiring non-Omani health workers to fill the current and future health services requirements.
Table 7: Students accepted for undergraduate studies for the academic year 2011-2012.

<table>
<thead>
<tr>
<th>Major</th>
<th>%</th>
<th>Total</th>
<th>Female</th>
<th>Male</th>
</tr>
</thead>
<tbody>
<tr>
<td>Engineering</td>
<td>30.2%</td>
<td>8,449</td>
<td>3,141</td>
<td>5,308</td>
</tr>
<tr>
<td>Business Administration</td>
<td>24.1%</td>
<td>6,731</td>
<td>4,113</td>
<td>2,618</td>
</tr>
<tr>
<td>Information Technology</td>
<td>22%</td>
<td>6,147</td>
<td>3,854</td>
<td>2,293</td>
</tr>
<tr>
<td>Social Studies/Art</td>
<td>3.8%</td>
<td>1,051</td>
<td>739</td>
<td>312</td>
</tr>
<tr>
<td>Medicine and Health</td>
<td>5.5%</td>
<td>1,531</td>
<td>1,189</td>
<td>342</td>
</tr>
<tr>
<td>Science</td>
<td>7.2%</td>
<td>2,022</td>
<td>977</td>
<td>1,045</td>
</tr>
<tr>
<td>Sharyi’a and Law</td>
<td>1.2%</td>
<td>349</td>
<td>171</td>
<td>178</td>
</tr>
<tr>
<td>Agriculture &amp; Marine &amp; Vat</td>
<td>2.1%</td>
<td>581</td>
<td>330</td>
<td>251</td>
</tr>
<tr>
<td>Education</td>
<td>1.2%</td>
<td>345</td>
<td>181</td>
<td>164</td>
</tr>
<tr>
<td>Design</td>
<td>2.2%</td>
<td>613</td>
<td>557</td>
<td>56</td>
</tr>
<tr>
<td>Electronics</td>
<td>0%</td>
<td>5</td>
<td>4</td>
<td>1</td>
</tr>
<tr>
<td>Foundation Year</td>
<td>0.5%</td>
<td>127</td>
<td>83</td>
<td>44</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>100%</td>
<td>27,951</td>
<td>15,339</td>
<td>12,612</td>
</tr>
</tbody>
</table>

Table 8: Current and projected HRH to population ratio (per 10,000 population).

<table>
<thead>
<tr>
<th>Category</th>
<th>Current (2012) Ratio per 10,000</th>
<th>Numbers</th>
<th>Projected 2050 Ratio per 10,000</th>
<th>Numbers</th>
<th>Initial boost (number to be added 2012–2020)</th>
<th>Numbers</th>
<th>Numbers to be added in the period 2021–2050</th>
<th>Annual average of requirements 2021–2050</th>
</tr>
</thead>
<tbody>
<tr>
<td>Physicians</td>
<td>19.5</td>
<td>7,055</td>
<td>28</td>
<td>19,736</td>
<td>5,740</td>
<td>9,109</td>
<td>304</td>
<td></td>
</tr>
<tr>
<td>Dentists</td>
<td>2.2</td>
<td>805</td>
<td>5</td>
<td>3,524</td>
<td>1,416</td>
<td>1,455</td>
<td>49</td>
<td></td>
</tr>
<tr>
<td>Pharmacists</td>
<td>4.6</td>
<td>1,657</td>
<td>5.4</td>
<td>3,806</td>
<td>532</td>
<td>1,423</td>
<td>48</td>
<td></td>
</tr>
<tr>
<td>Nurses</td>
<td>43.1</td>
<td>15,627</td>
<td>65</td>
<td>45,816</td>
<td>12,863</td>
<td>24,187</td>
<td>807</td>
<td></td>
</tr>
</tbody>
</table>

MOH gave special attention to continuous professional development and in-service training of the health workers. A total of 2,644 training workshops and conferences were held in 2012, of which 2,299 were accredited. The total number of participants was 27,281. In addition, 185 health professions completed their scholarships in 2012. The budget allocated for in-service training and HRH professional capacity building increased remarkably from 526,909 Omani Rials in 2000 to 3,347,885 Omani Rials in 2012 (one Omani Rial = 2.58 US $) as shown in figure 8.
In spite of this investment, however the expenditure on educating and training the health workers comprised only 1.1% of the MOH expenditure on HRH and 0.8% of the total MOH expenditure in 2012. In the OECD countries, only 2% of the total health expenditure is spent on the recurrent cost of educating health workers. In 2010, The Lancet Commission on education of health professionals for the 21st century estimated the global spending in education and training of health professionals was less than 2% of total health expenditure. The Commission described this level of investment as "not only insufficient but unwise, putting the remaining 98% at risk".

The Sultanate recognized the need for health professional associations and councils in order to provide forums for professional exchange and the promotion of professionalism in various health professions. Thus several professional bodies were established e.g. Oman Medical Association (OMA), Oman Physiotherapy & Rehabilitation Association and Oman Association of Radiographers. Also several societies in the various medical specialties, dentistry and other allied health professions have also come up. The societies conducted many professional meetings, continuing professional development and continuing medical educational activities.
HRH CHALLENGES

Despite impressive HRH development gains in Oman over the last few decades, the challenges facing the health workforce are still evident. The epidemiological shift and the dominance of non-communicable diseases, the lifestyle and behavioural changes, the global health threats such as pandemics, the environmental and climate change are adding a new and difficult dimension to public health practice. The prevention and control of many of these challenges requires skilled, motivated and equitably distributed HRH as they are at the forefront of the health system as well as partnerships with the private sector and other health care providers and multisectoral actions with related government sectors and institutions.

The Omanization of the health workforce is still far to reach its targets in some categories of health professions with the current pace of HRH production, thus the dependence on non-Omani health workforce will continue for a while. This will add further challenge to their management as most are coming from a wide range of occupational backgrounds as well as trained and worked in a variety of institutional settings.

The MOH and the other government related sectors and partners needs to work collectively to address the HRH challenges in line with the overarching priorities and demands of the health sector through scaling-up the HRH production in particular for doctors, nursing and allied health professions (considering the right skill mix and gender balance) to meet the health system needs (sustain universal health coverage with quality care) and ensure equitable geographic distribution intra and inter-governorates; adopting extensive advocacy policy to make health profession more attractive in the general education and ensure adequate pool of applicants; optimizing the education and training of HRH through educational review and reform involving production policies, curricular reform and capacity building for educational institutions; maintaining an effective HRH coordination among all stakeholders for appropriate HRH policies, planning and professional regulation mechanisms; building the institutional capacity for HRH both at central and governorate levels, including the necessity to enhance leadership and management capabilities; institutionalizing the continuous professional development to enhance careers for all categories of health professions; introducing an innovative HRH management system including supervision, performance appraisal mechanisms that lead to increasing HRH motivation and performance; tackling the inefficiencies in the rational deployment and retention of health workers within governorates and distant areas; and addressing the research priorities in areas pertinent to HRH (both quantitative and qualitative studies).
HRH VISION 2050

This strategic study concluded with the Vision for HRH which is:

"to have the best talented, motivated and competent health professionals who deliver the optimum level of care to the citizens in Oman".

While the Mission is "to provide sound leadership and direction in the development and planning of human resources for health by ensuring that the health sector has the right number of health workers with the requisite competencies and motivation for the efficient and effective accomplishment of national health targets and goals".

The Goal of the study is "to produce, attract and deploy an adequate, talented and well-distributed health workforce with the appropriate skill-mix and experience, possessing the best professional standards and competencies needed to deliver quality health services to the citizens in Oman".

In order to achieve the intended goal and consequently the vision, six major objectives are developed and for each objective, couple of strategies were identified.

**Objective 1:** Strengthen capacities for HRH policy-stewardship, planning, monitoring and evaluation.

**Strategies:**

a. Building MOH and stakeholders' capacity on HRH strategic planning and streamlining the policy formation and development processes.

b. Positioning HRH among the top priorities for MOH and fostering the leadership role of MOH in issues pertinent to HRH development.

c. Developing relevant leadership and policy development programmes for health managers at all levels based on frequent comprehensive needs assessment.

d. Establishing clearly delineated areas of HRH planning and managerial authority, responsibility and accountability at different levels of management.

e. Scrutinizing HRH policies on frequent basis and identifying gaps requiring policy formulation according to the evolution.

f. Developing appropriate workforce planning projections models that rationalize and align supply of health workforce to the priorities of the health system and population demands both for the long and medium term.

g. Applying innovative monitoring and evaluation (M&E) frameworks and strengthening the M&E functions at all levels.

**Objective 2:** Maintain the use of the knowledge, information and technology for evidence-based HRH decisions.

**Strategies:**

a. Escalating the national HRH observatory for health workforce intelligence, dissemination of evidences and networking.
b. Undertaking consultations and research to gather relevant information/data on key HRH policy issues.

c. Promoting, coordinating and monitoring the researches and studies that address key HRH challenges (e.g. HRH motivation and preferences, health labor market dynamics, feminization of health workforce, retention, task-shifting, etc.) and ensuring their utilization.

d. Building the capacity of HRH managers to generate and produce policy briefs for informed decisions.

Objective 3: Foster sustainable partnerships and strengthen the coordination mechanisms among HRH stakeholders including professional associations and community.

Strategies:

a. Utilizing the Health Council as a platform to improve and boost the HRH coordination among various stakeholders and partners.

b. Updating the mapping of the HRH stakeholders and beneficiaries (positions, interest, influence and power) on frequent basis and assess the feasibility of gaining sufficient support to effectively ratify and implement the appropriate HRH policies, strategies and intervention packages.

c. Continuous empowerment of the health professional associations and societies to play their pivotal role in HRH advancement.

d. Fostering networking and collaboration with recognized HRH collaborating centers and institutes.

e. Positioning Oman as an international center-of-excellence in HRH development arena.

Objective 4: Strengthen the capacity of medical and health training institutions to ensure constant supply of adequate, relevant, well-mixed and competent health workforce that meets the health system requirements.

Strategies:

a. Expanding the physical and technical capacities of medical and health training institutes to produce balance health professions that meets the health system needs and population demands.

b. Encouraging the private sector to invest more in pre-service education to accelerate the achievement of the Omanization of the workforce targets.

c. Consolidating the regulatory mechanisms and accreditation systems to assure the use of acceptable quality national and international standards for training institutions and programs.

d. Applying the best effective and innovative strategies for health professional education, including transformative scale up with adopted social accountability principles.

e. Continuous assessment of health professions education institutions to ensure the best enabling learning environment and education outcomes.

f. Further developing the capacity of national postgraduate training and residency programs and foster partnership and collaboration with international reputable training and research institutes.
g. Adopting and maintaining instrumental accreditation mechanisms (e.g. licensing and relicensing) for health professions to ensure their fit-for-purpose.

**Objective 5:** Ensure continuous update of knowledge, skills and attitude of health workforce to deliver quality health care.

**Strategies:**

a. Sustaining national capacity to deliver and monitor quality in-service training through Continuous Professional Development (CPD) to update knowledge, skills and attitude of health workforce.

b. Continuous assessment of health professions training needs and ensure the matching with their professional development.

c. Continuous improvement and update of health professions' career structures, pathways and competencies to support and harmonize HRH development in line with service needs.

d. Embracing innovative mentoring and coaching mechanisms to yield the maximum in-service training outputs.

e. Applying innovative monitoring and evaluation (M&E) systems to ensure better CPD outcomes and impact.

**Objective 6:** Apply the best practices of HRH management that promote equitable distribution, attraction and retention of the right quality and quantity of HRH to ensure universal access to quality health services.

**Strategies:**

a. Enhancing HR proactive leadership and management capacity as well as accountability functions at all levels to oversee and steer strategic direction of HRH management.

b. Adopting innovative policies supported by legal and ethical frameworks to ensure equitable distribution and retention of HRH.

c. Updating the HRH recruitment and deployment mechanisms and plans in line with approved staffing norms and standards, health service needs and system priorities.

d. Institutionalizing evidence-based performance incentive packages that recognize hard work and service provided by HRH especially in low-density populated distant locations.

e. Embracing an innovative supportive supervisory system to improve health workforce performance, productivity and motivation.

f. Continuous advocacy to ensure adequate financing for HRH management and development.
THE WAY FORWARD

The perused strategies observed several issues e.g. reducing the inequities, feasibility and sustainability, producing the best value for money, mainstreaming and integration with other components of the health system and coordination. The successful implementation of the strategies depends on the cooperation and commitment of all stakeholders, partners and beneficiaries within and outside the health sector. It is anticipated that all stakeholders will demonstrate high level and practical commitment to the implementation of the above strategies, which will be measurable in terms of adherence to five-year national health development plans; and prompt allocation, disbursement and utilization of available funding and resource requirements. Below are some Key prerequisites for successful implementation of the strategies:

- Government and stakeholders' greater attention and support (technical, financial, etc.) will continue to strengthen the strategic and operational HRH functions and systems at all levels.
- The economic performance and national socio-economic growth and development will continue to improve.
- The per capita expenditure on health will continue to increase and thereby enabling the health sector to continue providing quality health care.
- The Ministry of Health and its partners have the technical and financial resources required to successfully execute the future HRH strategic plans.
- The commitment of the partners and stakeholder towards joint integrated planning, collaboration and actions for effective service delivery
- The alignment and adherence of the pre-service training programmes and production capacity to the health system needs and demands.
- The availability of adequate resources to improve the terms and conditions of service for health personnel and provide special incentives to motivate, attract and retain HRH.

As for the Ministry of Health, the following major activities are recommended to be encompassed in the five-year national HRH plans starting from the 9th five-year plan (2016 – 2020). They cover the following areas:

i. HRH Leadership and Coordination
ii. HRH Policies
iii. HRH Planning
iv. HRH Information System
v. HRH Monitoring and Evaluation
vi. HRH Research
vii. HRH Continuous Professional Development
viii. HRH management

This is followed by determining the required number of HRH categories for the health facilities based on the new classification and categorization of the health facilities.
**HRH Leadership and Coordination:**
The evolving Health Council will serve as a real platform for better coordinated and harmonized actions in HRH development. In addition, MOH leadership and capacity need to be further strengthened to foster effective partnership with all relevant stakeholders and partners to ensure streamlined and integrated HRH policy, strategies and interventions. This can be achieved through the following:

- Strengthening the Directorate General of HRH Development to perform its functions and duties according to the new organizational structure.
- Updating the mapping of the HRH stakeholders and beneficiaries (positions, interest, influence and power) on frequent basis and assess the feasibility of gaining sufficient support to effectively ratify and implement the appropriate HRH policies, strategies and intervention packages.
- Drawing clearly delineated roles and responsibilities for all stakeholders and partners in issues pertinent to HRH development.
- Continuous empowerment of the health professional associations and societies to play their pivotal role in HRH advancement.
- Developing relevant leadership and policy development programmes for health managers at all levels based on frequent comprehensive needs assessment.
- Fostering networking and collaboration with recognized HRH collaborating centers and institutes.
- Positioning Oman as an international center of excellence in HRH development arena.

**HRH Policies:**
- Scrutinizing HRH policies on frequent basis and identifying gaps requiring policy formulation according to the evolution.
- Building the capacity of HRH managers to generate and produce policy briefs for informed decisions.

**HRH Planning:**
- Institutionalizing HRH planning and needs-based models (e.g. workload indicator of staffing needs tool "WISN") at facility level which will assist in identifying the workload and performance issues, the appropriate staffing required to run quality health services as well as ensuring better distribution of health workers.
- Developing national standards and benchmarks for HRH categories which will assist in better planning and ensuring equitable distribution of HRH.

**HRH Information System:**
Escalating the national HRH observatory for health workforce intelligence, dissemination of evidences and networking through the following:

- Frequent update of HRH Profile for each governorate to indicate the status of HRH in terms of number, distribution, profession, gender, age and nationality. The GIS and digital mapping will be used to display the information. The governorates HRH operational plans, follow-up, monitoring and evaluation will be based on the HRH profiles.
- Revising the current HRH data and indicators and ensuring that all the required HRH data are captured in the health information system.
Synopsis of Strategic Studies

- Regular update of the website and ensuring instant HRH data and information are displayed.
- Issuing regular snap-shots on HRH situation

**HRH Monitoring and Evaluation:**
Having a powerful, innovative and effective M&E system is vital (both at strategic and operational levels), thus the following are needed:
- The M&E core indicators to be reviewed and updated in order to ensure their link to health system outcome.
- The HRH managers at national and governorate levels to be encouraged to gather, analyze, generate timely information, submitting reports and getting feedback to solve problems related to human resources on timely manner and explore new solutions to overcome the anticipated obstacles.
- Undertaking frequent performance assessments to assess the progress made in implementing the HRH strategies.
- Lessons learned and the best practices to be captured and documented as well as to be shared with relevant stakeholders and partners both locally and internationally.

**HRH Researches:**
- To undertaking researches and studies that address key HRH challenges (e.g. HRH motivation and preferences, health labor market dynamics, feminization of health workforce, retention, task-shifting, etc.) and ensuring their utilization.

**HRH Continuous Professional Development:**
Continuous professional development (CPD) is fundamental to all health professionals in order to practise appropriately throughout their professional life. CPD improves the health professionals knowledge, skills, and attitude used to ensure that they retain their capacity to practice safely, effectively and legally within their evolving scope of practice.
To deliver the highest quality of health promotion and patient care, the content of CPD must be directed towards enhancing roles and competencies (both clinical skills and theoretical knowledge), and organisation of work (team building and leadership), communication, medical ethics, teaching, research and administration. Thus, the following are needed:
- Sustaining the national capacity to deliver and monitor quality in-service training through Continuous Professional Development (CPD) to update knowledge, skills and attitude of health workforce.
- Continuous assessment of health professions training needs and ensure the matching with their professional development.
- Continuous update of training materials, curricula and teaching methodologies.
- Continuous improvement and update of health professions' career structures, pathways and competencies to support and harmonize HRH development in line with service needs.
- Embracing innovative mentoring and coaching mechanisms to yield the maximum in-service training outputs.
- Applying innovative monitoring and evaluation (M&E) systems to ensure better CPD outcomes and impact.
- Adopting and maintaining instrumental accreditation mechanisms (e.g. licensing and relicensing) for health professions to ensure their fit-for-purpose.

**HRH management:**
- Improving the recruitment and deployment mechanisms.
- Modifying the existing individual appraisal tool to ensure that the performance is linked to institution's objectives as well as the staff development.
- Inventing an incentive packages that recognize hard work and service provided by HRH especially in low-density populated distant locations.
- Promote staff rotation to increase motivation and decrease the burn-out.
REFERENCES

3. National Center for Statistics and Information (NCSI), Sultanate of Oman, 2012
5. Annual health report 2012, Ministry of Health, the Sultanate of Oman.
Synopsis 2

Primary Health Care
Strategic Study
Primary Health Care
Strategic Study

Task Force:

- Dr. Salem Al-Saqri
- Dr. Aisha Al-Shehhi
- Dr. Ahmed Al-Busaidi
- Dr. Zahir Al-Anqoudi
- Dr. Manal Al-Dhanki
- Dr. Ahmed Al-Wahaib
- Mrs. Moza Al Madhani

Contributors:

- Dr. Said Al Lamki
- Dr. Salim Al-Saqri
- Dr. Ahmed Al-Wahaibi
- Dr. Saleh Al-Hinai
- Dr. Fatima Al-Ajmi
- Dr. Thamra Al-Ghafri
- Dr. Yaqoub Al-Magheri
- Ms. Hilda Rasquinha

Acknowledgment:

- Health Vision 2050 Team
- Strategic Studies Review Team
- Dr. Badria Al-Rashdi
- Dr. Ahmed Al-Busaidi
- Dr. Said Al-Mazrui
- Dr. Huda Al-Lawati
- Dr. Tahira Juma
Introduction

During the past 40 years, Oman witnessed remarkable developments in many aspects. One of the most striking aspects is the health care development. In the early 1970s, the Sultanate of Oman had only a handful of health professionals and healthcare facilities. People had to travel up to four days just to reach a hospital, where hundreds of patients would already be waiting in line to see one of the few (expatriate) doctors. All this changed in less than a generation. Oman invested consistently in a national health service and sustained that investment over time. Its crude death rate, Infant Mortality Rate (IMR), mean singulate age at first marriage, fertility rates and rate of natural increase have all registered significant declines since Renaissance, with concomitant rise in life expectancy (74 years). Oman has successfully controlled and eradicated major communicable diseases, and is recognized as a country with successful health development achieved in just 3 decades. A health transition is evident with reduced shares of morbidity and mortality due to communicable diseases and larger shares due to non-communicable diseases related to lifestyle and ageing.

Prior to 1970, Oman’s health services were extremely limited with only few physicians and nurses, two hospitals both in Muscat (with 12 beds) and few clinics in the interior. The 1971-80 decade represents phase I of the Oman Health System Infrastructure Development. During this decade and with the establishment of the Ministry of Health (MoH), few governmental hospitals and some health centers were built. His Majesty the Sultan, granted health care as a fundamental right of the citizens, and promised free health services. In 1978, the Sultanate of Oman committed itself to PHC as a main path to reach Health for All by 2000. The period from 1981 to 1990 was characterized by the continued expansion of the hospital network and health centers. It may be described as Oman’s Health System Infrastructure Development (Phase II). This phase also witnessed the introduction of certain health programs like the Expanded Program of Immunization and Disease Surveillance System. In addition, in 1986 the College of Medicine and hospital of the Sultan Qaboos University Hospital were opened. One year later, in 1987 the Royal hospital with modern tertiary care was opened to further strengthen the health care delivery system. The 1991-2000 decade can be described as the Phase III of the Health Infrastructure Development. It was characterized by modernization, organizational strengthening through decentralization, and human resources production. Oman’s health care system entered the consolidation phase with the advent of the 21st Century.

Post-2000 to date may be described as Infrastructure Development Phase IV or the Consolidation Phase. It is characterized by further strengthening of PHC through expansion of primary health care network (health centers and extended health centers), further development of super-specialty health care as well as a series of organizational and managerial reforms and refinements. The Continuous Quality Improvement (CQI) movement, initiated earlier for primary health care has extended to hospitals as well.

Ministry of Health (MoH) is the country’s main agency responsible for the health sector. It develops policies and plans, and implements these in coordination with all constituents of the health sector. The public sector runs 90% of the hospitals and 98% of hospital beds, and employs most doctors and nurses. MoH is also the principal provider of preventive, promotive and rehabilitative services. Drug control, bulk procurement and distribution of drugs are managed by MoH. It runs educational institutions for
nurses and allied professionals, and collaborates with SQU and OMSB for undergraduate and postgraduate medical education. Health services provided by MoH are supplemented by other government hospitals/clinics. The private hospitals and clinics which are licensed by MoH, available mostly in the big cities; to provide mainly primary care and some aspects of specialty care.

Oman is administratively divided into 11 Governorates (Muscat, Dhofar, Musandam, Buraimi, North Al Batinah, South Al Batinah, Ad Dhahirah, Ad Dakhliyah, North Ash Sharqiyah, South Ash Sharqiyah and Al Wusta). These Governorates are further subdivided into Wilayats (61 in all). See Figure 1.

![Diagram of Sultanate of Oman](image)

Figure 1: Diagrammatic presentation of the Sultanate of Oman Showing Ten health Governorates

The population size of Oman increased from 1.6 million in 1995 to reach 3.6 in 2012 (see Figure 2). According to the Annual Health Report 2012, the total population of Oman is 3.62 in 2012 of which 1.5 million are expatriates and 2.09 million are Omani (see Figure 3). The Omani population is a relatively young population. About 33.7% of the Omani population is below 15 years of age, half the population is below the age of 21 years, and only 6.1% are 60 years and above. The sex ratio among the Omani population is almost 1:1.
With regard to distribution of the population within governorates, as might be expected the Capital Muscat holds almost 32% of the population with a density of 296 individual per square meter. On the other hand, the population density is less than 1 in Al Wusta Governorates holding 1% of the total population (see Figure 4).
A rapidly growing number of Omanis are leaving arable land and labor-intensive jobs and moving to the capital city of Muscat to work in less strenuous office-based or industrial jobs. These changing trends in urbanization (i.e., the number of people living in urban areas) and employment lead inevitably to lifestyle changes that expose the population to increased biological and behavioral risk factors.

The health care in Oman is delivered through levels of care. It includes hospitals (secondary and tertiary) and primary health care institutes. The hospitals are further classified into: Governorate Hospital (GH), Wilayat Hospital (WH) and Local Hospital (LH). The GH provides secondary and tertiary care to inhabitants of the health governorate and act as the referral hospital for critical cases from other hospitals and health centers of the governorate. GH of the Muscat Governorate acts as national referral hospitals for critical cases from other governorates. These are the Royal hospital, Khawla hospital, AnNahdah hospital and AlMassra hospital. The WH provides secondary care to inhabitants of the Governorates to support the Governorate Hospitals. The LHs are hospitals with a small number of beds, provide primary health care services to the people in the specified catchment area of the hospital, and render basic inpatient care if necessary.
Similarly, the health centers are further classified into: Health Center (HC), Health Centre with Beds (HCB) and Extended Health Centre (EHC). The HC is typically serving a local population of about 10-15 thousand population, with a health team comprising doctors, nurses and support staff, and on-site diagnostic facilities and pharmacy. The health center with beds is a health center with small number of attached beds (2-4 beds) mainly for maternity care and observation, and some may operate with less staffing and reduced facilities due to the size of the catchment area population. This makes health care more accessible to populations who would otherwise have to travel long distances to visit a health center. The Extended health centers provide outpatient access to specialist clinics in polyclinic setting in certain basic specialties (such as obstetrics & gynecology, pediatrics, ophthalmology, ENT and family medicine) as an alternative to referral to hospital outpatient departments. Specialized care is accessed through referral from health centers. The Health Centers and EHCs do not provide any inpatient care services.
The total number of facilities has progressively increased over time, from 2 small hospitals and few dispensaries at the beginning of 1970s to 65 hospitals and 242 health centers by 2012.

Out of the total, MoH holds 49 hospital and 192 health centers according to 2012 statistics. Likewise, the total number of beds dramatically increased from 12 beds in 1970 and reached 5977 in 2012 out of which 4659 belong to MoH.
Despite this impressive increase, it must be noted that the hospitals beds belonging per ten thousand population reached its maximum of 24.3 bed for every ten thousand population in 1990. However, since then the ratio continued declining to reach 16.5 beds for every ten thousand population in 2012.

The distribution of health facilities and hospital beds varies among governorates. For example, number of population for every bed reached as low as 222 in Musandam Governorate and as high as 1,332 in North Batinah Governorate.
In Oman, the PHC is considered as the first point of contact between the individuals and the healthcare system; so it acts as the liaison between the community and the secondary and tertiary levels of health care. (figure 5).

Being very keen to assure availability and accessibility of service for all people, the Ministry of Health adopted in the successive five-year plans, a strategy of increasing number of health centers and polyclinics so as to achieve the target of one health center for each 10,000 population. The total number of MoH doctors working at primary health centers increased from 1274 doctors in 2007 and reached 2073 in 2012. Similarly, the number of nurses reached 4104 in 2012 from being 2584 in 2007.

![Figure 2: Total number of doctors and nurses in PHC institutions (MoH)](image)

However, the distribution of PHC doctors and nurses within governorates varies greatly. For example, in 2012 the number of doctors per 10000 population is only 3.5 in Muscat and up to 16.2 in Musandam Governorate.
The current rate of family physician is 0.3/10,000 population (PHC annual report of the 8th five year plan), which is lower than the recommended policy of the Ministry of Health (2/10000 family physicians based on GCC ministers qarar, Kuwait 2007).

The rate of the nurses is 12.21 per 10000 populations (PHC annual report of the 8th five-year plan), which is low compared to the Europe standards for nurses 65 per 10000.

Table 1: rate of facilities and the rate of primary health care workforce during 2012

<table>
<thead>
<tr>
<th>Indicators</th>
<th>Situation 2012</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rate of health centers per 10000 populations.</td>
<td>0.63</td>
</tr>
<tr>
<td>Rate of PHC doctors per 10000 population</td>
<td>5.09</td>
</tr>
<tr>
<td>Rate of family physician per 10000 population</td>
<td>0.30</td>
</tr>
<tr>
<td>Rate of PHC nurses per 10000 population</td>
<td>12.21</td>
</tr>
<tr>
<td>Rate of PHC dentists per 10000 population</td>
<td>0.52</td>
</tr>
<tr>
<td>Rate of PHC assistants pharmacists per 10000 population</td>
<td>2.43</td>
</tr>
<tr>
<td>Rate of PHC lab. Technicians per 10000 populations.</td>
<td>2.01</td>
</tr>
<tr>
<td>Rate of PHC radiographers per 10000 population</td>
<td>0.84</td>
</tr>
<tr>
<td>Rate of PHC dietitians per 10000 population</td>
<td>0.33</td>
</tr>
<tr>
<td>Rate of PHC health educators per 10000 population</td>
<td>0.40</td>
</tr>
</tbody>
</table>

The expansion of health services was associated with an increase in the utilization of these services both at hospital level and at PHC level. The total number of visits to all MOH institutions rapidly increased from 8.60 million during 1990 and reached 13.34 million visits during 2012. However, PHC institutions receive 73.0% of all visits to the MOH institutes in Oman. Out of the 13.34 million total visits, HC/EHC received 9.74 million visits during 2012 compared with 2.97 million visits during 1990.
These services required administrative and medical supplies expenses in form of medicals lab items and other routine medical supplies.

The administrative non-medical supplies cost reached 448,234,950 R.O in 2012. The PHC have utilized only 40% of the total administrative budget compared to the secondary and tertiary care institutes. In fact, the administrative expenditure varies according to the population and to the geographical distribution of each governorate.

The PHC in the Sultanate, through its widespread network, provides a number of services that has contributed greatly to the health successes and achievements made during last decades. The type of services and clinics provided in PHC centers are listed in the table below.

Table 2: List of Clinics available at PHC institutions

<table>
<thead>
<tr>
<th>General clinics</th>
<th>IMCI CLINIC</th>
<th>Radiology (in some institutes)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Diabetic clinic</td>
<td>EPI clinic</td>
<td>Health education</td>
</tr>
<tr>
<td>Hypertension clinic</td>
<td>Elderly care clinic</td>
<td>Specialty clinics (Poly Clinics only)</td>
</tr>
<tr>
<td>Asthma Clinic</td>
<td>Pre-marital counseling clinic</td>
<td>Psychiatry (Poly Clinics only)</td>
</tr>
<tr>
<td>Screening clinic</td>
<td>Congenital screening and counseling clinic</td>
<td>General internal medicine (Poly Clinics only)</td>
</tr>
<tr>
<td>ANC and postnatal care</td>
<td>Dental services,</td>
<td>Ophthalmology</td>
</tr>
<tr>
<td>Infertility clinic</td>
<td>Mental care services</td>
<td>Ear, Nose and Throat clinic (ENT)</td>
</tr>
<tr>
<td>Delivery services in local hospitals</td>
<td>Laboratory services</td>
<td></td>
</tr>
</tbody>
</table>

Figure 4: Number of Outpatient visits (Hospitals and Health centers) during 1990-2012
In addition to these clinics, a number of health programs were established at different stages of PHC development.

<table>
<thead>
<tr>
<th>Name of the health program</th>
<th>Year of start</th>
</tr>
</thead>
<tbody>
<tr>
<td>Expanded program of immunization</td>
<td>1981</td>
</tr>
<tr>
<td>Maternal and child health programs ; Ante natal , Post natal</td>
<td>1987</td>
</tr>
<tr>
<td>Birth spacing</td>
<td>1994</td>
</tr>
<tr>
<td>Preconception</td>
<td>2003</td>
</tr>
<tr>
<td>Infertility</td>
<td>2001</td>
</tr>
<tr>
<td>National Malaria eradication program</td>
<td>1991</td>
</tr>
<tr>
<td>National AIDS program</td>
<td>1985</td>
</tr>
<tr>
<td>Infection Prevention &amp; Control Program (IP&amp;C)</td>
<td>2008</td>
</tr>
<tr>
<td>Tuberculosis control program</td>
<td>1981</td>
</tr>
<tr>
<td>Prevention blindness program (trachoma control).</td>
<td>1982</td>
</tr>
<tr>
<td>IMCI program</td>
<td>2000</td>
</tr>
<tr>
<td>Community Based initiative program</td>
<td>2006</td>
</tr>
<tr>
<td>School health program</td>
<td>1991</td>
</tr>
</tbody>
</table>

The Health indicators related to the above listed programs have dramatically improved over the past decades and reached to a status that has even exceeded many developed countries. For example, the crude death rate per 1000 population dropped from 13.3 in 1980 to 3.2 in 2012.

Figure 5: Crude death rate during period from 1980 to 2012

Oman was selected as a best performing country in reducing under-five mortality by at least 80%, by regions, 1975–2006a (Figure 10). The WHO report 2008: primary health care (*Now More Than Ever*).
The infant mortality rate per 1000 live birth witnessed a dramatic drop from 118 in 1970 and reached 9.5 in 2012. The rate of still birth per 1000 births has declined from 16.6 in 1980 and reached 8.3 by 2012.
As it might be expected, with the increasing expansion of PHC services the number of first visits to antenatal services increased from 8,175 in 1980 and reached 78,934 in 2012. Similarly, the number of visits to post-natal visits reached more than 68 thousands in 2012 from being as low as 3,403 in 1980. The proportion of registered pregnant women who are anemic dropped from more than 35% in 2000 and reached 25% by 2012.

Figure 9: Proportion of registered pregnant women who are anemic

Likewise, the nutrition status in the Sultanate witnessed remarkable improvements over the years. The total number of Protein Energy Malnutrition (PEM) among children below 5 years of age dropped from 35,604 cases in 1995 with a rate of 128 PEM cases per 1000 and reached 1,478 cases in 2012 with a rate of 4.6.

The improvements made in the prevalence of stunting, underweight and wasting in children below 5 year of age are shown in the figure below. The prevalence of underweight was reduced from 21.4% in 1991 to 8.6% in 2009 and similar drop was noticed in the prevalence of stunting during the same period.
Figure 12: prevalence of stunting, underweight and wasting in children under age 5

By 1991, a specific and sensitive Disease Surveillance System started operating and covering all diseases covered by the Extended Program on Immunization (EPI). The EPI aims to maintain high immunization coverage and reduce the rates of communicable diseases especially among children. As a result, remarkable decline in the incidence of these diseases was achieved between the period from 1981-2010. Oman has remained polio free for the last 15 years. Only one case of neonatal tetanus (NNT) was reported since 1992 and it was reported in 1995. Zero status of Diphtheria has been maintained since 1993-2012.

Efforts of MOH to control diarrheal diseases in children aged less than 5 years resulted in reduced morbidity and mortality. The total number of diarrheal episodes was reduced from 138,178 (497 episode per 1000 child) below 5 years) in 1995 to 81,926 (254 episode per 1000 child) in 2012. In addition, a noticeable decline was documented in the rate of Acute Respiratory Infections (ARI) among children below 5 years from 2,531 in 1995 to 1,219 in 2012.
The National Tuberculosis Control Program (NTCP) began functioning in Oman in 1981. Since then, several developments took place. The BCG vaccination was introduced in 1981 followed by the introduction of multidrug resistant TB in 1982. The AFB culture and sensitivity test was available since 1984 and the first TB manual was published in 1988. In 1996, the DOTS strategy (Directly Observed Therapy, Short Course) was started where patients were requested to take anti-TB medications under supervision by health care workers. Screening for TB cases was started along with the early implementation of the program and was further expanded in 2005 to screen and follow up house hold
contacts. With these developments, the incidence of TB (all forms) in Oman has declined among Omani citizens from 90.98 per 10,000 population in 1981 to 11.1 in 2012.

Figure 15: Incidence rate of TB since 1981 to 2012 among Omanis

Another area of success in the prevention and control of communicable disease is the Leprosy Control which was initiated during the 4th five year health plan 1991-1995. Leprosy is not any more considered a public health problem. Only 7 cases of leprosy were detected in 2012 and only 3 were Omani with an incidence rate of 0.14 per 100,000 Omani population.

The AIDS control program was established in 1987. The number of registered AIDS cases was less than 20 during 1980s. However, these numbers shoot up in 2012 and reached 127 registered cases with predominance in males. The rate of Sexually Transmitted Infections reached 126.6 per 100,000 Omani population by 2012, 0.9 for Syphilis and 3.2 for Gonorrhea.
Malaria has been one of the major health problems in Oman. In 1991, the National Malaria Eradication Program (NMEP) was launched in Ash Sharqiyyah (North and South) Governorates as a pilot project. The main objectives of the program were to stop local transmission and eliminate the reservoir of infected cases. The applied strategies were vector control, mainly larviciding, and early case detection and prompt (radical) treatment. The program was further extended to other governorates after successful achievements made. The goal was to reach an annual parasite incidence of 1/10,000 population by 2000. In 1994, a remarkable drop in number of malaria cases was noticed after which cases were classified epidemiologically. This classification helped implementing more appropriate and focused strategies like distribution of prophylactic drugs for the travelers, screening passengers arriving from Africa, and private institutions were involved to help detect cases coming from Indian subcontinent. During the period from 2004 until 2007, the transmission of malaria was interrupted. However, a number of outbreaks were documented since then. One outbreak in 2007, another outbreak in 2008, three outbreaks in 2010, four outbreaks in 2011 and three outbreaks in 2012 were registered.
Despite the remarkable achievements made in the area of communicable diseases, the health system in the Sultanate of Oman, like other countries worldwide, is challenged by burden of diseases related to lifestyle like diabetes, cardiovascular diseases, hypertension and obesity. Studies have shown that the prevalence of diabetes mellitus in Oman has increased from 9.75% in 1991, further increased to 11.6 in 2000, and reached 12.3% in 2008.
Figure 18: diagram presentation of the Outpatient morbidity in MoH institutions according to disease group (per 1000 population) in thousands: 1996-2012

Table 4: Outpatient morbidity in MoH institutions according to disease group (per 1000 population) in thousands

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Communicable diseases</td>
<td>11.901</td>
<td>5.76</td>
<td>6.064</td>
<td>6.301</td>
<td>5.938</td>
<td>6.745</td>
</tr>
<tr>
<td>Injuries and poisoning</td>
<td>3.259</td>
<td>1.262</td>
<td>1.015</td>
<td>0.797</td>
<td>0.679</td>
<td>0.917</td>
</tr>
<tr>
<td>Maternal causes</td>
<td>0.299</td>
<td>0.403</td>
<td>0.351</td>
<td>0.785</td>
<td>0.702</td>
<td>0.939</td>
</tr>
<tr>
<td>Perinatal causes</td>
<td>0.851</td>
<td>1.48</td>
<td>1.569</td>
<td>2.169</td>
<td>1.507</td>
<td>1.735</td>
</tr>
</tbody>
</table>

The Non-communicable diseases represented more than 45% of the total outpatient morbidity and more than 38% of the inpatient morbidity.
Figure 19: Outpatient morbidity in MoH institutions by disease group during 2012

Figure 20: Inpatient morbidity in MoH institutions by disease group during 2012
The following figure shows the ten leading causes for MoH Inpatient discharge morbidity during 2012.

Figure 21: Ten leading causes for MoH Inpatient discharge morbidity during 2012
Challenges

It can be seen from the above figures and tables that Oman has witnessed remarkable achievements over the last decades represented in the reduction of mortality, increase life expectancy and eradication of many communicable diseases. However, these achievements are threatened by a number of challenges that must be overcome or at least minimized in order to make another breakthrough or at least sustain the already made health gains.

One major challenge facing the health system in the Sultanate of Oman is the epidemiological shift from communicable disease to non-communicable disease (NCD). The emergence of NCD is considered a major public health problem not only in Oman but in other developed countries. NCDs are considered a challenge because of two main reasons. First, these NCD are commonly lifelong diseases. In other words, NCD is not like other communicable disease that can be eradicated with a vaccine or antibiotics. Rather, it needs lifelong follow-up and cure. It can be imagined therefore, the huge cost associated with the management of NCD. Second, the prevalence of NCD depends on the life-style of individuals. The three main risk factors or behaviors associated with NCDs are smoking, insufficient physical activity and unhealthy diet. Although not impossible, changing the behaviors of individuals is one of the most difficult things to do especially with the emerging technologies and globalization. In Oman, 10.7% of adult males smoke daily (any tobacco form) according to the National Health Survey (NHS) conducted in 2000. This percentage increased to 14.3% in 2008 (Oman World Health Survey (OWHS)). With regard to physical activity, the Oman World Health Survey showed that only 63% of the adult population attains the WHO recommended level of physical activity (150 minutes of moderate intensity physical activity through the week). The nutritional status of Omani population is not satisfactory. It was found that 24.1% of Omani adults are obese, 31.5% are overweight, 5.7% are underweight and 27.5% are anemic. In addition, only 26% have reported that they eat sufficient fruits and vegetables. The fact that the prevalence of risk factors is high in Oman is further complicated by the fact that many diabetic (52%) and hypertensive (75%) patients are not aware that they have the disease. These facts show that NCD are real challenges facing the health system in Oman.

Road traffic accidents represent another threatening health problem. Almost 3.3% of the population have been exposed to road traffic accidents. Apart from the 2010 census showing that there are 1.5 disability cases in ever 1000 population, little is known about the disabilities associated with these accidents. In addition to the economic impact on the Sultanate, this rate represents a huge burden to the health facilities especially the lifelong disabilities.
Currently, the Omani population may be considered as young population. However, this status might not last forever. It is projected that Omani population aged 60 and above will represent 13.1% in 2050 compared with 6.1% in 2012. Therefore, aging population is another challenged that need to be considered when developing the long term vision for PHC services.
Despite the remarkable achievements made by the Sultanate in controlling the communicable disease, Oman like other countries is threatened by global threats of emerging new communicable diseases like SARS, Bird and Swine Influenza. Since PHC services are the main entry point for the majority of patients, they need to consolidated and continuously equipped to fight such threats.

The following table summarizes the SWOT analysis of the current PHC.

<table>
<thead>
<tr>
<th>Strengths</th>
<th>Weakness</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Wide network of PHC centers</td>
<td>• Limited number of family physicians.</td>
</tr>
<tr>
<td>• Good health indicators</td>
<td>• Absence of mandatory in-service training for GPs &amp; other staff</td>
</tr>
<tr>
<td>• Support of stakeholders</td>
<td>• No specific budget for PHC</td>
</tr>
<tr>
<td>• Accredited OMSB training program</td>
<td>• Short approved drug list</td>
</tr>
<tr>
<td>• Good number of clinical and SOP guidelines</td>
<td>• Limited space in current structure</td>
</tr>
<tr>
<td>• Ambitious and hardworking young family physicians.</td>
<td>• Outdate of many of the clinical guidelines</td>
</tr>
<tr>
<td>• International recognition</td>
<td>• Incomplete appointment system</td>
</tr>
<tr>
<td>• Support from the other governmental sectors and stakeholder.</td>
<td>• No special clinic/care for people with disability</td>
</tr>
<tr>
<td>• International recognition</td>
<td>• No prober implementation and utilization of accreditation system at all health care sectors.</td>
</tr>
<tr>
<td>• Increasing number of health care professionals.</td>
<td>• Increasing cost for health care and budget constrain.</td>
</tr>
<tr>
<td>• Health vision 2050</td>
<td>• Increasing demands for family physicians in neighboring countries</td>
</tr>
<tr>
<td></td>
<td>• Public trust with upcoming tertiary based medical city.</td>
</tr>
</tbody>
</table>
Visions

Over last 40 years, Oman has worked hard to improve the health care services, especially the primary health care, and has achieved within a short span of time, a well-established health care system both in terms of structure and health care provision, recognized internationally (WHO report 2000).

A high quality, high performing health system needs a strong, integrated primary health care system at its centre. Health systems with strong and effective primary health care can achieve better health outcomes at a lower cost, than health systems that are more focused on acute and specialist care.

The sultanate of Oman has secured from the outset that building a strong, responsive and cost-effective primary health care system is essential if we are to maintain a healthier population and ease the burden on hospitals. By supporting health promotion and education, early diagnosis and treatment and chronic condition management, primary health care contributes to reducing the risk of conditions progressing to the point where more intensive and expensive interventions may be required.

A strong primary health care system is crucial in ensuring that individuals and communities can get the health care they need, whenever and wherever they need it. Specialist care including community based care will be among the PHC packages in addition to long-term care.

Despite that, a lot of changes need to be added to improve and develop the primary care to meet the expectations of the community in the twenty first century.

The Vision

- A world leader in PHC
- Maintain a high quality of primary care
- Recognized Internationally.

For this, the PHC system should aim at having the following actions in line with the current international standards:
- Provide high quality, high technology and affordable medical care.
- Improve the infrastructure and building capacity and specialty.
- Improve patient centered care with integrated primary health system.
- Have a skilled and professional workforce who is caring, competent, compassionate and trustworthy.
- Increasing the focus on health promotion and prevention, screening and early intervention.

The general aims are:
- Provide accessible and accountable primary health care services for all.
- Reduce the need for unnecessary hospital presentations and prevent illness.
- Put the people at the centre of the care.
- Improve workforce at PHC.
- Improve the management of chronic diseases.
By doing so, Omanis will be able to easily access the health care when and where they need it. In addition, fewer people should need to use hospital emergency departments or go into hospital as they will receive most of the requisite healthcare at PHC level. Primary health care services will focus on better health for all segments of population.
The primary health care system need to be reformed to be more responsive to the evolving population demand as well as the health system needs including the burden of diseases.

The characteristic of the system will:

- Address the rapid urbanization and ageing population
- Create space for civil society participation and empowerment
- Secure the health of communities (through participation and negotiation)
- Adopt a comprehensive and integrated approach (aligning priority health programs with PHC)
- Ensure responsiveness, effectiveness, quality care and safety
- Strengthen referral mechanisms and linkage with 2ry and 3ry care
- Innovative community-based health management information system
- Ensure primary-care team as a hub of coordination (reliable and responsive)
- Have a rapid response capacity

**Future plans to improve the PHC services**

Over coming years, the health service will be built on a foundation of integrated community-shaped, generalist health care services. This will require a greater number and diversity of skilled, family medicine professionals, able to care for individuals in their homes and communities. It will require investment, not just in people but also in premises, to provide high quality services, education and training and to enable family physicians to spend more time with those patients who have complex needs. The future health services will see more person-centered systems of care and less division between primary, secondary care and social care organizations. By making these changes, healthcare teams will be able to work in more flexible and effective ways to meet the needs of tomorrow’s patients and ensure a better future for health care in Oman.

While most Omanis will receive primary health care through their GP/family physician, primary health care providers can also include nurses (including general practice nurses, community nurses and nurse practitioners), allied health professionals, midwives, pharmacists, dentists, and podiatrist.

The types of services delivered under primary health care are broad ranging and include: health promotion, prevention and screening, early intervention, treatment and management.

In term of prevention and health promotion, our primary care will continue to target the health and lifestyle conditions, like: sexual health, drug and alcohol services, oral health, cardiovascular disease, asthma, hypertension, obesity, diabetes, mental health and cancer.
So, it is envisaged that in future the following services will be provided at the PHC

- More Health promotion and preventive.
- Better NCD care and management.
- Better Women, child and adolescent health.
- Better Emergency services.
- Community out-reach services.

Towards more effective patient centered care

Patient-centered care actively supports and empowers the individual in their own self-care and monitoring. In addition, it recognizes and values the individual’s role in decision making about their health care.

Referred to as patient- or person-centered care, this approach requires health professionals to consider the patient as an individual within a social network – where his/her experiences, preferences, values and needs are taken into account in the planning and delivery of their health care.

Adequate health centers in term of space and function

The current structure of the primary health care institutes (health centers) is not suitable. Each health center hardly has 5-6 small consultation rooms with inadequate diagnostic facilities/complementary services.

The consultation rooms should have enough space and basic modern equipment for initial assessment. Separate rooms should be available for diabetes, asthma, national screening, pre-marital counseling, congenital blood disorders, people with disability, adolescent and elderly care, women and men health, counseling and education and so on.

It is also recommended having a special consultation room for out-patients pediatrics clinics which is decorated specially to make children calm and comfortable. The corridors also should be decorated nicely with health education materials and leaflets. Every clinic should have a suggestion box in order to assess client’s satisfaction and further needs.
In term of hospitals, MOH adopted new strategies to expand and improve the health care services (secondary and tertiary) in order to meet community needs (further details will be mentioned in secondary & tertiary document), hence:

It is very importantly that every region/governorate should have a regional hospital with availability of all sub specialties including a rehabilitation center. Patients to be referred to for only highly specialized tests or very specialized tertiary care.

**Improve Clinical services as needed**

The following table suggests what clinical services future health centers would provide and staff responsible to run them:

<table>
<thead>
<tr>
<th>Staff</th>
<th>Functions of PHC</th>
</tr>
</thead>
<tbody>
<tr>
<td>A-Clinical services :</td>
<td></td>
</tr>
<tr>
<td>1-Out patients services : -</td>
<td></td>
</tr>
<tr>
<td>Family Physician (FP)</td>
<td>Ante natal clinic</td>
</tr>
<tr>
<td>FP</td>
<td>Diabetes Mellitus clinic</td>
</tr>
<tr>
<td>FP</td>
<td>hypertension clinic</td>
</tr>
<tr>
<td>FP/Nurse practitioner</td>
<td>Expanded program of immunization</td>
</tr>
<tr>
<td>FP / Nurse practitioner</td>
<td>Birth spacing</td>
</tr>
<tr>
<td>FP / Nurse practitioner</td>
<td>Post Natai Care</td>
</tr>
<tr>
<td>FP / Nurse practitioner</td>
<td>Geriatric clinic</td>
</tr>
<tr>
<td>FP / Nurse practitioner</td>
<td>Asthma clinic</td>
</tr>
<tr>
<td>FP / Nurse practitioner</td>
<td>Chronic disease</td>
</tr>
<tr>
<td>FP / Nurse practitioner</td>
<td>Metabolic (dyslipidemia, obesity ..etc )</td>
</tr>
<tr>
<td>2 dentist and 2 dental hygienist</td>
<td>Dental services (screening and management )</td>
</tr>
<tr>
<td>FP / Nurse practitioner</td>
<td>School health</td>
</tr>
<tr>
<td>FP / Nurse practitioner</td>
<td>Acute medicine Room</td>
</tr>
<tr>
<td>FP / Nurse practitioner</td>
<td>Mental health clinic</td>
</tr>
<tr>
<td>FP / Nurse practitioner</td>
<td>Disability clinic</td>
</tr>
<tr>
<td>FP / Nurse practitioner</td>
<td>Substance abuse clinic</td>
</tr>
<tr>
<td>FP / Nurse practitioner</td>
<td>Infection Disease Clinic (HIV, Tb, Malaria, STI, etc...)</td>
</tr>
<tr>
<td>Position</td>
<td>Services</td>
</tr>
<tr>
<td>--------------------------------</td>
<td>-----------------------------------------------</td>
</tr>
<tr>
<td><strong>Adolescent health clinic</strong></td>
<td>FP / Nurse practitioner</td>
</tr>
<tr>
<td><strong>Medical checkup (Pre-employment, sport) clinic</strong></td>
<td>FP / Nurse practitioner</td>
</tr>
<tr>
<td><strong>Minor surgery, Skin biopsy, suturing</strong></td>
<td>FP</td>
</tr>
<tr>
<td><strong>Endoscopy, proctoscopy</strong></td>
<td>FP / Nurse practitioner</td>
</tr>
<tr>
<td><strong>Walk in clinic</strong></td>
<td>FP / Nurse practitioner</td>
</tr>
<tr>
<td><strong>Day Care</strong></td>
<td>FP / Nurse practitioner</td>
</tr>
<tr>
<td><strong>Occupational health</strong></td>
<td>FP / Nurse practitioner</td>
</tr>
<tr>
<td><strong>Preventive/Promotive clinic (Travel, well being, National screening)</strong></td>
<td>FP / Nurse practitioner</td>
</tr>
<tr>
<td><strong>Palliative care clinic</strong></td>
<td>FP / Nurse practitioner</td>
</tr>
</tbody>
</table>

**Supporting services**

<table>
<thead>
<tr>
<th>Position</th>
<th>Services</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Pharmacist</strong></td>
<td>Pharmacy services</td>
</tr>
<tr>
<td><strong>Radiology Services</strong></td>
<td>Radiology Services (USG, GENERAL AND OBS, X-RAY)</td>
</tr>
<tr>
<td><strong>Lab technician</strong></td>
<td>Labs services</td>
</tr>
<tr>
<td><strong>Health educator</strong></td>
<td>Health education</td>
</tr>
<tr>
<td><strong>Nutritionist</strong></td>
<td>Nutrition</td>
</tr>
<tr>
<td><strong>DRIVERS</strong></td>
<td>Transport and ambulance</td>
</tr>
<tr>
<td><strong>Medical Record services</strong></td>
<td>FM</td>
</tr>
<tr>
<td><strong>2-In Patient Services</strong></td>
<td>FM</td>
</tr>
<tr>
<td><strong>Day Care</strong></td>
<td>FM / Nurse practitioner</td>
</tr>
<tr>
<td><strong>Delivery Suite</strong></td>
<td>FM Gynecologist / anesthetists</td>
</tr>
<tr>
<td><strong>Operation theatre</strong></td>
<td>FM Gynecologist / anesthetists</td>
</tr>
<tr>
<td><strong>Anesthesia</strong></td>
<td>FM</td>
</tr>
</tbody>
</table>

**B- Community Services**

<table>
<thead>
<tr>
<th>Position</th>
<th>Services</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>FM / Nurse practitioner</strong></td>
<td>Home visits</td>
</tr>
<tr>
<td><strong>Health promotion team</strong></td>
<td>Health promotion</td>
</tr>
<tr>
<td><strong>Volunteers</strong></td>
<td>Community support group</td>
</tr>
</tbody>
</table>

**C – Information and health technology :**

<table>
<thead>
<tr>
<th>Position</th>
<th>Services</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Programmer</strong></td>
<td>E-Health</td>
</tr>
<tr>
<td><strong>Health services coordinator (nurse practitioner)</strong></td>
<td>Patient communication</td>
</tr>
<tr>
<td><strong>Programmer</strong></td>
<td>Telemedicine</td>
</tr>
<tr>
<td><strong>Health care coordinator</strong></td>
<td>Phone based software linked services</td>
</tr>
<tr>
<td><strong>Practice manager, programmer</strong></td>
<td>Electronic Audit System and report, Quality Management</td>
</tr>
</tbody>
</table>

**D- Health management :**

<table>
<thead>
<tr>
<th>Position</th>
<th>Services</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Clerk</strong></td>
<td>Administration</td>
</tr>
<tr>
<td><strong>Clerk</strong></td>
<td>Financing</td>
</tr>
</tbody>
</table>
Adequate Skilled Human Resources

Calculated according to the workload indicators of staffing need (WISN) and as per the current experience of our PHC staff for 10000 population.

The WISN method is a human resource management tool. It provides the health managers a systematic way to make staffing decisions in order to manage their valuable human resources well.

WISN method:

- Workload in the facility (service statistics)/standard workload (for one staff) = staffing requirement.
- Accordingly, the needed staff is as follow:
  - Specialized family physicians (MRCGP-Arab Board, PHD) average 10/HC
  - Qualified (sub specialized by doing fellowship) family physicians in further specialized health care (diabetologist, ophthalmologist, psychologists and mental health care specialists, researchers, anesthetist, health care managers, etc.
  - Skilled/qualified nurses :20/HC
  - Nurse practitioners :5/HC
  - Other allied health care staff like lab technician: 5/HC
  - Pharmacists and assistant pharmacists: 4/HC, x-ray and imaging technicians: 2-3/HC, health educator 2, dietician 3, medical orderly 5 etc.
  - Medical records :5/HC,
  - Public relation 3/HC
  - Medical coordinator: 1/HC.
Needed equipment at PHC: (Need/HC/10,000 population), calculated according to population need (10,000/catchment area) and to current experience and available equipment at PHC.

- No. of ECG machines = 3
- No. of nebulizers = 3
- No. of defibrillator= 2
- No. of hematology. Analyzer= 1
- No. of biochemistry. Analyzer= 1
- No. of stationary x-ray= 1
- No. of portable x-ray= 1
- No. of U/S general= 2
- No. of U/S ANC= 2
- No. of sigmoidoscope= 2
- No. of colonscope= 2
- No. of cardiac monitors= 8
- No. of portable ventilators= 2
- No. of slit-lamp= 2
- No. of retinal camera= 1
- No. of ambulance= 2

With all above specialized categories, the patient should have all types of services at PHC including diagnostic ultrasound, endoscopy, sigmoidoscopy and colonoscopy, all types of initial procedures and minor operations. Further care would be provided by the visiting specialist (consultant) from regional hospital in order to facilitate and continue patient care. Also an easy way of communication should be available between PHC specialist and hospital specialists in order to improve patient care and follow up.

Each OPD should have 1-2 defibrillators, urea breath test machine, spirometer, and all needed equipment for Diabetes Mellitus and Asthma clinics and other clinics as per indication and as mentioned above.

The required numbers of health centers and major medical equipment have been calculated based on population size for each Wilayat and projected to year 2050 based on national growth rate. Electronic excel file containing all information is available in the annexure.

**Improve training and education at PHC**

The Royal College of General Practice (RCGP) believes that: for general practice to play its critical role in caring for patients in the future it is important that,

- There are enough GPs
- These doctors have sufficient time, both in and outside the consultation, to provide the interventions needed
- They receive sufficient training to develop the capabilities required to deliver the high quality services that patients, carers and their families rightly expect.
So, training and education is a must in each primary care institute, and accordingly the following would be required to be carried out:

- Each health center should provide a continuous education (CPD) for the staff which should include: journal clubs, peer review, lectures, cases presentations, morning or afternoon meetings to discuss random cases, etc.
- Annual BLS and ACLS courses
- Availability of e-library.
- Regional conferences/workshops
- Annual evaluation of staff CPD credits should be carried out by each institute in-charge and to be reported to higher training and education authority (regional-central DGET).
- The promotion, annual allowance or incentives should depend on staff credits, in addition to other responsibilities beside clinical duties like in-charging programs, teaching activities, research activities, etc.
- Certified diploma for GP who did not enter any residency program.

The CPD activities and training should be directly connected to central accreditation system.

**Improve care of people with disability at PHC**

People with disabilities have the same health needs (preventive and curative) as non-disabled people. They also may experience a narrower margin of health, both because of poverty and social exclusion, and also because they may be vulnerable to secondary conditions, such as pressure sores or urinary tract infections. Evidence suggests that people with disabilities face barriers in accessing the health and rehabilitation services they need in many settings.

PHC will open the way into community life for people experiencing disability, by removing the barriers to their participation.

The following actions are proposed towards a non-disabling society:

- Encourage and educate for a non-disability society.
- Ensure rights for people experiencing disability.
- Provide the best education.
- Provide opportunities for employment and economic development.
- Foster an aware and responsive public service.
- Improve health services to people experiencing disability.
- Enable children and youth experiencing disability to lead full and active lives.
- Improve quality of life for women experiencing disability.
- Value families, and care givers

**Strengthen Preventive services**

The future PHC will not only cover curative part but it will also play an important role in preventive medicine. There will be a plenty of fields that primary care will work on as prevention is concerned, following are some examples:

- Reduce smoking
➢ Improve nutrition
➢ Increase the level of physical activity
➢ Reduce incidence and harm caused by road traffic accidents (RTA).
➢ Minimize harm caused by alcohol, illicit and other drug use to both individuals and the community
➢ Reduce the incidence and impact of cardiovascular disease
➢ Reduce the incidence and impact of chronic diseases especially diabetes
➢ Reduce the incidence and impact of cancer
➢ Improve oral health
➢ Improve the health status of people with severe mental illness
➢ Ensure access to appropriate child health care services including well child and family health care, and immunization.

So, primary health care system will include services that improve, maintain and restore people’s health.

Improving health involves health promotion, education, counseling and helping people to adopt healthy lifestyles. In these activities primary health care practitioners and primary health organizations need to work closely with providers of public health services. There are also many challenges at the one-to-one level that will require primary health care practitioners to be skilled at the various techniques for identifying and helping people change behavior that threatens their health.

Maintaining health and independence involves preventing the onset and progression of disease and disability. Primary health care practitioners and primary health organizations will need to focus on appropriate screening, opportunistic education, interventions to help change damaging behaviors, early detection and careful management and support for people with ongoing conditions (including specific disease management approaches).

Restoring health and independence also covers a wide set of services. Primary health care must include ready access to first-level advice and treatment for people when they are unwell or concerned about their health.

With the right mix of services, practitioners and supporting investigations and therapies, over 90 percent of new problems can be successfully dealt with at the primary level. Services must include appropriate use of any pharmaceuticals, diagnostic testing and other referred services needed to provide primary level care.

Many health concerns and problems can and should be managed by individuals themselves. This requires ready access to information to support self and family care and to further help when appropriate. Primary health care practitioners need to be open to make good use of new sources of health advice such as telephone help lines and the Internet, increasing nursing involvement, improved technology for patients to be safely managed in the community, and community rehabilitation services.

Primary health organizations (PHC department-MOH, DGHAs at regions, etc) will all be required to provide a defined set of services including population services to improve health, screening and
preventive services; support for people with chronic health problems; and information, assessment and treatment for any episodes of ill health.

**Improve Appointment system to fulfill needs**

Appointment system is crucial and important in order to organize and improve care of individuals and community. At present, appointment system is well established and successful at most of chronic disease clinics specially diabetes mellitus clinic. Also, the idea of 2-3 teams available at each health center to follow up chronic diseases like diabetes mellitus and hypertension, etc, is a successful experience started in Oman few years back and is improving and enhancing continuity of care.

**Creative and innovative referral system**

Primary health care centers shall stay the first entry point for providing health services to all Omani people. These health centers will be connected electronically and administratively to the nearest higher level of care (a tertiary care level hospital) regardless to which governorate that hospital belongs. To ensure continuity, safety and accessibility, there will be no mandate to link the center to governorate's hospital but the mandate will be the nearest hospital. Therefore, patients will be referred from a PHC to a more advance care in a more convenient, effective and satisfactory manner. In addition, all health centers will be linked electronically to all hospitals to avoid duplications and wastage of resources. The electronic link will further ensure that care is continued wherever the patient will be and back referrals are safely and efficiently practiced. The following diagram shows the flow chart for patient's access and referral to different levels of health care institutions.

**Create an information system on research**

Research should be carried out on regular basis according to need and plans in co-ordination with the regional and central research committee. It should be part of the 5 year research plan for each governorate/Wilayat PHC. Every governorate should assign a research committee.

The research committee should consist of medical and community representative like some of doctors, clinical researcher, nurses, community health workers, epidemiologist, Head of health affairs, and members representing the community like for example school headmasters, Omani women association members, municipality, etc.
Role of family physicians

The future family physicians would be required to provide continuity of care to patients with a range of complex needs, especially those with long-term conditions and those near the start and end of life. The structures through which this care will be provided would need to be tailored by practices and practitioners, in response to local circumstances. Models could include the development of small multidisciplinary units made up of a range of professionals with different skills, such as the GP, nurse, healthcare assistant, social care worker and patient advocate, attached to practices and providing continuity to an identified group of patients. Micro-teams could also include practitioners from other specialties, such as mental health, pediatrics and medicine.

These ‘micro-teams’ would provide extended clinical reviews and support, enabling greater shared decision-making with patients and care givers, as well as improved continuity of care.

Family medicine would need to be utilized in a better way at the PHC. The current walk in and appointment system is not the optimal and ideal care we dream of, in order to meet the huge changes of chronic disease patterns, and patients expectations. It will require starting a new service in which the families whether sick or in a good health would need to be registered and followed up by a specific family physician. These changes will definitely need enough qualified family physicians and would need the support and recommendation of MOH.

In addition, the consultation needs to be redesigned in order to take into account the challenges of consulting with patients with multiple morbidities, so that these patients would have more effective care to meet their specific health care needs. The model on which GPs are currently trained, delivering aliquots of 10-minute slots for all patients, is outdated. There is a growing evidence base demonstrating how longer appointment duration correlates with greater consultation quality; for some patients with simple needs, 10 minutes may be adequate, but others patients with co-morbidities and complexities, may need longer consultations.

Family physicians of the future will therefore have to offer flexible lengths of appointments, determined by need. For patients with multi-morbidity or complex health needs, lengthening the consultation will allow the needs of the patient to be adequately discussed and enable enhanced communication between the patient, their care givers and different healthcare providers. The need for flexibility of consultation time and approach applies to all members of the multidisciplinary team. Team members will, therefore, need to adapt their working day to offer fewer but longer routine appointments for review of patients with complex needs, including those identified through risk-stratification methods as being in need of more detailed case management. There is a need to work on updating PHC guidelines. Future decisions (both administrative and clinical decisions) or plans for PHC would be then be required to be taken in consultation with those family physicians who are involved in patient care and follow up and not just by the higher authorities or departmental bodies.

Continuity of care is one of the essential principles in family medicine. It plays an important role in the achievement of the optimal management of patient's disease and preventing illness in the healthy ones. In addition, it strengthens the relationship between the family physicians and family members which leads to

## Primary Health Care

more compliance and trust on the health system. Continuity of care necessitates that all families in the community be followed up by one family physician or his/her team.

In order to achieve the concept of "One family physician for every family" the health center doctors and nurses would need to be divided in teams that would include:

- Two senior specialists’ senior consultants / consultant family physicians (the most senior one will be the head of the team and patient will be registered on his/her name.)
- Two Sr. Specialist / Specialist family physicians.
- One medical office / resident.
- One nurse practitioner.
- One nurse.

The above team would be responsible for caring 5000 population in the catchment area. The care would be comprehensive care including prevention and treatment of chronic diseases, ante natal and postnatal care, immunizations, home visits, phone consults, walk in treatment, including the control of chronic diseases (e.g diabetes, hypertension, asthma, etc).

The team would be responsible and accountable for the health status of the individuals cared for by them.

Doctors and nurses in the health center would be divided into a team/ or teams depending on population size they are serving. After that, people would be asked to register with the team nearest to them. Public would need to be oriented about the new system where they have to take appointment for all non-urgent consults and one junior doctor/ nurse practitioner will be allocated for walk in illness, and he would be required to work under a senior family physician cover.
Family physician residency and training programs

In order to provide high quality of care, adequate number of skilled health care providers is required in the primary health care institutions. Only the trained family physician should be allowed to see patients as in all the developed countries. This would ensure that the patient receives the most appropriate care which would result in the reduction of morbidity and mortality in addition to proper utilization of the referral system to secondary and tertiary health care.

Currently there are around 1800 GPs at primary care level, out of which only 110 (~ 6%) are family physicians. This FP has graduated from OMSB, which takes only 15-20 candidates per year because of its limited training centers. This means that it will take hundreds of years to meet the field demand! In order to supply the adequate number of family physicians to work in the PHC, the Ministry of Health needs to consider taking the following steps:

a. Work with OMSB to increase the intake of the applicants to the specialty by upgrading some of the health center to be training center. Two potential cities (Nizwa and Sohar) have been identified to start parallel program in family medicine.

b. Recruit family physicians instead of untrained GPs to work in PHC.

c. Send all Omanis MD graduates who have been accepted in residency training program in family medicine, in one of the 5 English speaking developed countries (USA, Canada, UK, Australia, New Zealand).

In addition, family medicine graduates should be encouraged to pursue a fellowship programs in sub specialties required by the service. A task force consisting of experienced family physicians has been formed by his Excellency the Undersecretary for Planning in order to study the fellowships programs required for primary health care. The team has finished its work and the list is enclosed in the annexure.
The pathway for new MD graduates who would like to join family medicine and current Omanis GPs would be cleared for all, as per flow chart below so as to eventually have only trained Family Physicians working in the PHC’s. Those who would like to join family medicine but could not manage to get a seat for residency program either locally or abroad, would be offered accredited local diploma training in PH.

As part of quality assurance, all PHC doctors will undergo revalidation assessment every 5 years that will include written exam, submission of CME portfolio and valid certificate for BLS, ACLS and PLAS.
Improve the infrastructure

**Way forward, The triangle of health system:**

The building design of health care institutes would require having special consideration in order to observe the international standards of health care system. In order to achieve this, a team that constitutes technical people from both the engineering and the health departments (engineers and clinicians) would require working hand in hand in making the first draft of the design for the structure. The team would be required to study the lapses and challenges of the current PHC structures, in addition to studying the need of the community for the next 4 decades.
After the first draft has been finalized by the expert panel, it should then be sent for further revision and feedback to some of DGs of the governorates and some representatives from people working in the PHC including:

*This may include, but may not be limited to the following:*

- Adequate number of consultation rooms.
- Appropriate room size.
- Considering the Omani’s culture (e.g. separating male and female waiting areas).
- Ventilation system and patient flow encounter that insure infection control precaution.
- Possibility of future expansion.
- Readiness for training purpose.
Equipment

Medical and non-medical equipment are very essential to run the daily work at the primary health centers. The equipment must be in standby 24/7 and immediate back up plan must be ready in all PHC institutes in case of breakdowns.

The following steps are suggested to avoid any lapses in this regard:

1. Contract must be made with highly qualified brand companies.
2. Regional store should have adequate stock for replacing equipment requiring repair.
3. Condemned equipment should not be used for patient care and must be replaced immediately.

Decentralization of the purchase must be there to allow the governorates to buy all necessary equipment directly from local budget. Training of health care providers regarding the use of new medical equipment should be carried out before installing any new machines or devices. This will ensure safe and proper utilization of the medical equipment. Medical equipment required per health center have been calculated according to population size in separate excel sheet. For further details please refer to the medical equipment strategic paper.
Main Strategies:

The primary health care system will continue to improve its services throughout following implemented strategies and actions.

- Provide high quality, safe, evidence-based primary care services that meet the needs of the community.
- Ensure person-centred health care and integrated primary care services.
- Ensure a skilled workforce of caring, competent, compassionate and trustworthy health care professionals who are accessible and well supported.
- Ensure the safety and quality of primary care through the provision of excellent practices and infrastructure that meet current and future community needs.
- Ensure universal health coverage and equity of access to primary health care with a special focus on meeting the health care needs of disadvantaged groups of people.
- Ensure a strong continuing focus on health promotion, disease prevention, screening and early intervention, management of non-communicable diseases and comorbidities.

By implementing these strategies, the PHC is expected to meet the consumer needs and improve and strengthen the health care standards and indicators.

Strategy - 1

- Provide high quality, high technology and affordable medical care.

Actions:
- Ensure available audit system at each region/institute with regular internal and external assessment and follow up.
- Regular assessment of patient’s satisfaction of the health care provided.
- Ensure available measurable health care indicators (details should be mention in the 5 year plan-PHC)
- Ensure available equipments for diagnosis and management purpose.

Strategy - 2

- Improve patient centered care with integrated primary health system.

Actions:
- Develop a partnership or a joint committee between PHC providers and community representative in order to improve, plan and assess communications and health services.
- Ensure available multi-diplinary team that provide needed care at same setting or place (a comprehensive care).
- Improve access for people who experience difficulty accessing primary health care, including people living in rural and remote areas, people with additional or specialised health care needs such as the elderly, people with disability, migrants or refugees and people with lower socio-economic status.
Strategy 3
➢ Have a skilled and professional workforce who is caring, competent, compassionate and trustworthy.
  
  Actions:
  - Provide adequate number of family physicians/trained GP at each Health centre (as per catchment area).
  - Ensure available adequate number of para-medical and other allied PHC staff.
  - Activate the system of credit hours (CPD or training) for each medical or professional at PHC and link it to the system of promotions and bonus.
  - Start revalidation process for all GPs in PHC

Strategy- 4
➢ Improve the current infrastructure and building capacity and specialty.
  Building of a new PHC/HC will mandatorily need to have the following criteria according to the adopted strategy and plan of MOH.
  
  Actions:
  - One health center per 10,000 population
  - Adequate consultation rooms (20 rooms or more)/HC
  - Available administration rooms
  - Fully equipped emergency rooms
  - Adequate triage and treatment rooms
  - Adequate counseling rooms
  - Available fully equipped diagnostic rooms (laboratory, imaging, etc)
  - Available multipurpose hall for meeting, regional conferences and other activities
  - Available training/education/staff development rooms
  - Rooms for minor procedures and minor operation theatre.
  - Rooms for counseling and health education
  - Other complementary areas, nursery, playground for children, mosque, cafeteria, public
  - Establish a mean of tele-communication

Strategy- 5
➢ Improve access to PHC and reduce inequity with more focus on disabled and elderly).
  
  Actions:
  - All patients/consumers should be able to reach the PHC institute within 20 minutes
  - Ensure available quantity and quality health care for disabled and elderly
  - Continue to provide PHC services to all citizen regardless of nationality especially children and chronic diseases.
  - Ensure the equitable distribution of PHC services among all governorates
  - New structure to be built based on elderly and disable friendly designs.

Strategy- 6
➢ Increasing the focus on health promotion and prevention, screening and early intervention.
There is a range of factors that contribute to a person’s health and wellbeing. Many of these factors lie outside the health system. For example:

- Education and employment are major determinants of the opportunity for families and individuals to maximize their health and wellbeing.
- Transport and road infrastructure can be a significant factor on the ability to access essential health care services.
- Suitable housing, access to clean water and fresh food are essential to maintaining good health.
- A person’s literacy levels as well as their socio-economic position impacts on how well they can interact with the health system. Accordingly, all these factors should be tackled.

Actions:

- Include health promotion and healthy lifestyle as a core need within the school curriculum for students.
- Improve screening programs for chronic diseases, for example make it as a pre request to get a job with renewal as indicated by PHC.
- Recruit more community and practice nurses in order to provide health promotion and screening at home or work settings.
Synopsis 3

Non-Communicable Diseases & Mental Health

Strategic Study
Non-Communicable Diseases & Mental Health
Strategic Study

Task Force:

- Dr Noor Al-Busaidi
- Dr Sulaiman Al-Shereiqi
- Dr. Ahmed Said Al-Busaidi
- Dr Samiya Al-Ghanami
- Dr Kadhim Jaffer Sulaiman
- Dr Zahid Al-Mandhari
- Dr Zaher Al-Anqoudi
- Dr Ahmed Al-Wahaibi
- Ms. Siham Al-Maskari
- Dr Bassim Al-Bahrani
- Dr Taha Al-Lawati
- Dr Murtadha Al-Qubtan
- Dr Abdullatif Al-Raisi
- Dr Nasra Al-Habsi
- Dr Rajiv Khandikar

Acknowledgment:

- Health Vision 2050 Team
- Strategic Studies Review Team
Non-Communicable Diseases & Mental Health

Introduction

Non-communicable diseases (NCDs), including cardiovascular diseases, diabetes, chronic respiratory diseases and cancer are responsible for the majority of preventable deaths in the world today. Their increasing burden is viewed as a real barrier in achieving the global health system development goals if not tackled in a timely and proper manner.

There are major co-morbidities between these physical diseases and mental disorders. Together, these diseases cause unnecessary suffering and lead to long-term ill health and disability, thus depriving millions of the opportunity to enjoy a productive life and healthy, active ageing. While the causes are multi-faceted and complex, the major physical NCDs can largely be prevented by addressing the common risk factors of tobacco use, unhealthy diet, harmful use of alcohol and physical inactivity. If these risks were eliminated, up to three-quarters of heart disease, stroke and type 2 diabetes and 40% of cancer would be prevented or delayed. However, mental illness is also a risk factor for NCDs. The presence of mental illness increases the chance that an individual will suffer from one or more NCDs and be less likely to seek help and adhere to treatment.

While many of the levers for prevention are outside the control of the health sector, there is much that health workers and communities (with the right knowledge and skills) can contribute to the prevention of NCDs in their own lives as well as among patients, families and communities. Promoting healthy behaviors and lifestyles can also help to close the gap in health inequalities, and reduce the burden of avoidable ill health.

Global Burden of NCDs (an overview)

NCDs make the largest contribution to mortality both globally and in the majority of low- and middle-income countries (LMICs). They are the world’s #1 killer, bringing hardship to rich and poor nations alike. Worldwide, 36 million out of 57 million global deaths were due to NCDs (representing 63% of global deaths), including more than 14 million people who die too young between the ages of 30 and 70. Low and middle-income countries already bear 86% of the burden of these premature deaths, resulting in cumulative economic losses of US$7 trillion over the next 15 years and millions of people trapped in poverty.

Eight millions people below the age of 60 die each year in LMICs from preventable causes, which include tobacco use, unhealthy diets, alcohol consumption, and physical inactivity. Lack of access to affordable medicines and health care services are also major causes of these preventable deaths.

According to WHO’s projections, the total annual number of deaths from non-communicable diseases will increase to 55 million by 2030 if “business as usual” continues. They will be the leading global cause of disability as well. This rapidly changing health and disease profile has serious implications and will strangle economic development. NCDs have a severe impact on individuals, communities and countries.
The magnitude and rapid spread of NCDs means that countries are heading for a sick future unless serious actions and measures taken now.

The Four Main NCDs:

Cardiovascular disease (CVD), which includes heart disease and stroke, is the number one cause of death globally. An estimated 17.3 million people died from CVD in 2008, affecting men and women almost equally, and representing 30% of all global deaths. Of the total CVD deaths, an estimated 7.3 million were due to coronary heart disease and 6.2 million were due to stroke. Annual CVD deaths are projected to rise to 23.3 million by 2030 (mainly from heart attacks and strokes) if current trends are allowed to continue. The leading risk factor for CVD is high blood pressure, with one in three adults being affected. CVD expenditures vary from country to country, but most countries spend 8-22% of their health budget on CVD.

Most CVD can be prevented by addressing risk factors such as tobacco use, unhealthy diet and obesity, physical inactivity, high blood pressure, diabetes and raised lipids. At least 80% of premature deaths from heart disease and stroke could be avoided through healthy diets, regular physical activity, and avoiding tobacco use. There are also a number of underlying determinants of CVDs, also called "the causes of the causes". These are a reflection of the major forces driving social, economic and cultural change – globalization, urbanization, and population ageing. Other determinants of CVD include poverty, stress and hereditary factors. Policies that create conducive environments for making healthy choices affordable and available are essential for motivating people to adopt and sustain healthy behaviours.

Cardiovascular diseases (CVDs) key facts:

- CVDs are the number one cause of death globally: more people die annually from CVDs than from any other cause.
- An estimated 17.3 million people died from CVDs in 2008, representing 30% of all global deaths. Of these deaths, an estimated 7.3 million were due to coronary heart disease and 6.2 million were due to stroke.
- Low- and middle-income countries are disproportionately affected: over 80% of CVD deaths take place in low- and middle-income countries and occur almost equally in men and women.
- The number of people who die from CVDs, mainly from heart disease and stroke, will increase to reach 23.3 million by 2030.
- CVDs are projected to remain the single leading cause of death.
- Most cardiovascular diseases can be prevented by addressing risk factors such as tobacco use, unhealthy diet and obesity, physical inactivity, high blood pressure, diabetes and raised lipids.
**Diabetes** is one of the most common NCDs globally. It is the fourth or fifth leading cause of death in most high-income countries and there is substantial evidence that it is epidemic in many economically developing and newly industrialized countries. 382 million people had diabetes in 2013, and without effective prevention and management programmes this number is expected to rise to 592 million by 2035.

Diabetes creates an economic burden at the personal, national, and global level. In 2013, 10.8% of global health spending was directed at diabetes, and at the national level, the majority of countries dedicate between 5% and 18% of health spending to diabetes. Global health expenditure for diabetes was 548 billion USD in 2013, and this amount is projected to increase to 627 billion USD by 2035.

**Diabetes key facts:**
- More than 80% of diabetes deaths occur in low- and middle-income countries.
- WHO projects that diabetes will be the 7th leading cause of death in 2030.
- 50% of people with diabetes die of cardiovascular disease (primarily heart disease and stroke).
- Diabetes is among the leading causes of kidney failure.
- The overall risk of dying among people with diabetes is at least double the risk of their peers without diabetes.
- Healthy diet, regular physical activity, maintaining a normal body weight and avoiding tobacco use can prevent or delay the onset of type 2 diabetes.

**Cancer** figure among the leading causes of death worldwide, accounting for 8.2 million deaths in 2012. Deaths from cancer worldwide are projected to continue rising, with an estimated 13.1 million deaths in 2030. It is anticipated that cancer will become the leading cause of death ahead of ischemic heart disease and stroke in 2030.

A joint report by the American Cancer Society and Livestrong identified the total economic burden of premature death and disability due to cancer to be 895 billion USD in 2008. This was 1.5% of the world’s GDP in 2008 (did not include the direct costs of medical treatments for cancer).

More than 30% of cancers are preventable through modification of behavior and lifestyles. In addition to the risk factors of unhealthy diet, tobacco use, physical inactivity and harmful use of alcohol, reduction in exposure to cancer-related infections such as HPV (cervical cancer), HBV (liver cancer) and helicobacter pylori (stomach cancer), as well as environmental and occupational exposure to carcinogens are the focus areas of cancer prevention.

Many of the most common high-impact cancers – breast, cervical, oral and colorectal cancers lend themselves to affordable and accessible early detection through screening, with high potential for recovery if diagnosed at an early stage and appropriate treatment is provided. Treatment involves a series of interventions, including psychosocial support, surgery, radiotherapy, and chemotherapy aimed at curing the disease or prolonging life considerably while improving the patients’ quality of life. Palliative
care, including access to pain relief is an urgent humanitarian need worldwide for children and adults with advanced cancers. Current estimates suggest that at least 2.9 million cancer and HIV/AIDS patients suffer the terminal phase of their disease with no pain relief. At the 67th WHA in May 2014, a ground-breaking resolution was adopted to drive national action to reduce barriers to the accessibility and availability of palliative care.

<table>
<thead>
<tr>
<th>Cancer key facts</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lung, liver, stomach, colorectal and breast cancers cause the most cancer deaths each year:</td>
</tr>
<tr>
<td>- lung (1.59 million deaths)</td>
</tr>
<tr>
<td>- liver (745,000 deaths)</td>
</tr>
<tr>
<td>- stomach (723,000 deaths)</td>
</tr>
<tr>
<td>- colorectal (694,000 deaths)</td>
</tr>
<tr>
<td>- breast (521,000 deaths)</td>
</tr>
<tr>
<td>- oesophageal cancer (400,000 deaths)</td>
</tr>
<tr>
<td>- About 30% of cancer deaths are due to the five leading behavioral and dietary risks:</td>
</tr>
<tr>
<td>- high body mass index</td>
</tr>
<tr>
<td>- low fruit and vegetable intake</td>
</tr>
<tr>
<td>- lack of physical activity</td>
</tr>
<tr>
<td>- tobacco use</td>
</tr>
<tr>
<td>- alcohol use</td>
</tr>
<tr>
<td>Tobacco use is the most important risk factor for cancer causing over 20% of global cancer deaths and about 70% of global lung cancer deaths.</td>
</tr>
<tr>
<td>Cancer causing viral infections such as HBV/HCV and HPV are responsible for up to 20% of cancer deaths in low- and middle-income countries.</td>
</tr>
<tr>
<td>More than 60% of world’s total new annual cases occur in Africa, Asia and Central and South America. These regions account for 70% of the world’s cancer deaths.</td>
</tr>
<tr>
<td>It is expected that annual cancer cases will rise from 14 million in 2012 to 22 within the next two decades.</td>
</tr>
</tbody>
</table>

*Chronic respiratory diseases* are currently under-recognized, under-diagnosed, under-treated and insufficiently prevented. They include asthma and respiratory allergies, chronic obstructive pulmonary disease (COPD), occupational lung diseases, sleep apnea syndrome and pulmonary hypertension. 64 million people suffer from chronic obstructive pulmonary diseases (COPD). COPD caused more than 3 million deaths in 2005. The number of COPD deaths is expected to increase by more than 30% in the next 10 years; and WHO projects it will be the 3rd leading cause of death worldwide by 2030. The major risk factors for lung disease are well known (e.g. tobacco control, occupational health, indoor and outdoor air quality, diet and nutrition, and early life). Mitigation of these risks can prevent or reduce the impact of lung disease.
Chronic obstructive pulmonary disease (COPD) key facts:
- An estimated 64 million people have COPD worldwide in 2004.
- More than 3 million people died of COPD in 2005, which is equal to 5% of all deaths globally that year.
- Almost 90% of COPD deaths occur in low- and middle-income countries.
- The primary cause of COPD is tobacco smoke (through tobacco use or second-hand smoke).
- The disease now affects men and women almost equally.
- COPD is not curable, but treatment can slow the progress of the disease.
- Total deaths from COPD are projected to increase by more than 30% in the next 10 years without interventions to cut risks, particularly exposure to tobacco smoke.

Asthma key facts:
- WHO estimates that 235 million people currently suffer from asthma.
- Asthma is the most common noncommunicable disease among children.
- Asthma is a public health problem not just for high-income countries; it occurs in all countries regardless of the level of development.
- Most asthma-related deaths occur in low- and lower-middle income countries.
- Asthma is under-diagnosed and under-treated. It creates substantial burden to individuals and families and often restricts individuals’ activities for a lifetime.
- The strongest risk factors for developing asthma are inhaled substances and particles that may provoke allergic reactions or irritate the airways.
- Appropriate management of asthma can enable people to enjoy a good quality of life.
### Summary of the four main NCDs key facts

<table>
<thead>
<tr>
<th>Disease</th>
<th>Magnitude</th>
<th>Risk factor/s</th>
<th>Economic burden</th>
<th>Future projections</th>
</tr>
</thead>
</table>
| **Cardiovascular disease (CVD)**                  | - Number one leading cause of death  
- An estimated 17.3 million people died from CVDs in 2008                                                                                           | - high blood pressure  
- tobacco use  
- unhealthy diet and obesity  
- physical inactivity  
- diabetes  
- raised lipids                                                                 | - Most countries spend 8-22% of their health budget on CVD                                             | - The number of people who die from CVDs will reach 23.3 million by 2030                               |
| **Diabetes**                                      | - Fourth or fifth leading cause of death in most high-income countries  
- 382 million people had diabetes in 2013                                                                                                           | - tobacco use  
- unhealthy diet and obesity  
- physical inactivity                                                                                                                                  | - Majority of countries dedicate between 5% and 18% of health spending to diabetes                      | - WHO projects that diabetes will be the 7th leading cause of death in 2030                             |
| **Cancer**                                        | - 8.2 million deaths in 2012  
- An estimated 64 million people have COPD worldwide in 2004.  
- More than 3 million people died of COPD in 2005, which is equal to 5% of all deaths globally that year.  
- 235 million people currently suffer from asthma                                                                                                   | - high body mass index  
- low fruit and vegetable intake  
- lack of physical activity  
- tobacco use  
- alcohol use  
- exposure to cancer-related infections such as HPV (cervical cancer), HBV (liver cancer) and helicobacter pylori (stomach cancer)  
- environmental and occupational exposure to carcinogens                                                                                      | - Total economic burden of premature death and disability due to cancer to be 895 billion USD in 2008. This was 1.5% of the world’s GDP in 2008 | - Estimated 13.1 million deaths in 2030.  
- It is anticipated that cancer will become the leading cause of death ahead of ischemic heart disease and stroke in 2030 |
| **Chronic obstructive pulmonary disease (COPD)**   | - An estimated 64 million people have COPD worldwide in 2004.  
- More than 3 million people died of COPD in 2005, which is equal to 5% of all deaths globally that year.  
- 235 million people currently suffer from asthma                                                                                                   | - exposure to tobacco smoke  
- air pollution                                                                                                                                     | - Total deaths from COPD are projected to increase by more than 30% in the next 10 years             | - WHO projects it will be the 3rd leading cause of death worldwide by 2030                             |
Global movement to tackle NCDs:

NCDs are now well-studied and understood, and this gives countries an immediate advantage to take action. The Moscow Declaration on NCDs, endorsed by Ministers of Health in May 2011, and the UN Political Declaration on NCDs (annex 1), endorsed by Heads of State and Government in September 2011, recognized the vast body of knowledge and experience regarding the preventability of NCDs and immense opportunities for global action to control them. Governments committed themselves in the UN Political Declaration on NCDs to establish and strengthen, by 2013, multisectoral national policies and plans for the prevention and control of NCDs, and consider the development of national targets and indicators based on national situations.

To realize these commitments, the World Health Assembly endorsed the WHO Global Action Plan for the Prevention and Control of NCDs 2013-2020 in May 2013 (annex 2). The Global Action Plan provides the countries, international partners and WHO with a road map and menu of policy options which, when implemented collectively between 2013 and 2020, will contribute to progress on 9 global NCD targets to be attained in 2025, including a 25% relative reduction in premature mortality from NCDs by 2025. In the Eastern Mediterranean Region (EMR), the WHO/EMRO Regional Framework for Action to Implement the United Nations Political Declaration on NCDs and the Gulf Plan for the Control of NCDs 2014-2025 were among the main endeavors.

Situation of NCDs in Oman

Dramatic improvements have occurred in people’s health and life expectancy over the last four decades in Oman. Much of this health gain has been due to improved standards of living, i.e. better nutrition, housing, sanitation and education, as well as increase in wealth and employment, access to health care, and the prevention of communicable diseases. At the same time, however, this socio economic development and prosperity, has led to a corresponding increase in the incidence of NCDs.

The emergence of non-communicable diseases is reflected in increased out-patient visits and in-patient admission to health institutions. The WHO report in 2010 on country profiles estimated that NCDs account for nearly 83% of total deaths in Oman as shown in figure 1.
The annual health report 2012 also estimated that NCDs especially cardiovascular diseases accounts for the biggest proportion of hospital out-patients and inpatients visits. Figures 2 & 3 show inpatient and outpatient morbidities of NCDs (discharges) as compared to other morbidities in 2012, while figure 4 shows inpatient morbidity by selected NCDs (as %) from 1990 till 2012.
Out-patient morbidity 2012

- Communicable Diseases, 33.5%
- Non Communicable Diseases, 45.2%
- Maternal Causes, 1.0%
- Non Curative Services, 15.6%
- Injuries & Poisoning, 4.6%
- Perinatal Causes, 0.1%

Figure 3: Out-patient morbidity in MOH institutions 2012.

Inpatient morbidity by selected NDC disease (as %)

- CVD
- Cancer
- Respiratory diseases
- Endocrine and metabolic disorders
- Mental disorders
- Injuries and poisoning

Figure 4: Inpatient morbidity by selected NCDs in MOH institutions (as %) from 1990 till 2012.
Cardiovascular Diseases:

The annual health report 2012 estimated that cardiovascular diseases come first among the leading causes of hospital reported deaths. Table 1 represents the MOH hospital deaths according to disease category from 2010 - 2012.

Table 1: MOH hospital deaths according to disease category from 2010 - 2012.

<table>
<thead>
<tr>
<th>Causes of Death (disease categories)</th>
<th>Percentage (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>2010</td>
</tr>
<tr>
<td>Cardiovascular diseases</td>
<td>29.4</td>
</tr>
<tr>
<td>Infectious and parasitic diseases</td>
<td>16.1</td>
</tr>
<tr>
<td>Neoplasms</td>
<td>10.6</td>
</tr>
<tr>
<td>Respiratory system diseases</td>
<td>8.6</td>
</tr>
<tr>
<td>Conditions originating in the perinatal period</td>
<td>7.6</td>
</tr>
<tr>
<td>Injuries and poisoning</td>
<td>7.4</td>
</tr>
<tr>
<td>Congenital anomalies, deformations &amp; chromosomal abnormalities</td>
<td>4.9</td>
</tr>
<tr>
<td>Symptoms, signs and ill-defined conditions</td>
<td>4.3</td>
</tr>
<tr>
<td>Diseases of the digestive system</td>
<td>3.3</td>
</tr>
<tr>
<td>Diseases of the genitourinary system</td>
<td>2.4</td>
</tr>
<tr>
<td>Disorders of the endocrine, nutritional, metabolic &amp; immunity</td>
<td>2.2</td>
</tr>
<tr>
<td>Diseases of the nervous system</td>
<td>1.8</td>
</tr>
<tr>
<td>Diseases of the skin &amp; subcutaneous tissue</td>
<td>0.5</td>
</tr>
<tr>
<td>Disease of blood &amp; blood forming organs</td>
<td>0.4</td>
</tr>
<tr>
<td>Diseases of the musculoskeletal system &amp; connective tissue</td>
<td>0.3</td>
</tr>
<tr>
<td>Contact with health services for other reasons</td>
<td>0.3</td>
</tr>
<tr>
<td>Mental &amp; behavioral disorders</td>
<td>0.1</td>
</tr>
<tr>
<td>Pregnancy, child birth and the puerperium</td>
<td>0.1</td>
</tr>
<tr>
<td>Diseases of the eye &amp; adnexa</td>
<td>0.0</td>
</tr>
<tr>
<td>Diseases of the ear &amp; mastoid process</td>
<td>0.0</td>
</tr>
</tbody>
</table>

Hypertension prevalence increased from 27% in 1995 to 33% in 2000 to 40.3% in 2008. This pattern of increasing disease prevalence is accompanied by observed increase in common risk factors. Obesity for
example has increased from 20.5% in 2000 to 24.1% in 2008. In addition, hypercholesterolemia, LDL and HDL dyslipidemia, and central obesity are present in a slightly over third of the adult Omani population.

**Diabetes:**

Studies have shown that the prevalence of diabetes in Oman is increasing. The national health survey of diabetes which was conducted in 1991 showed that the prevalence was 9.75%, while the survey in 2000 showed increase in the prevalence to 11.6% among adults over 20 years of age. The health survey in 2008 revealed an increase to 12.3%. Table 2 shows the number of new diabetic cases registered from 2005 – 2012 according to MOH annual health reports.

Table 2: Number of new diabetic cases registered from 2005 – 2012

<table>
<thead>
<tr>
<th>Year</th>
<th>Male Omani</th>
<th>Male Non-Omani</th>
<th>Female Omani</th>
<th>Female Non-Omani</th>
<th>Total number of cases</th>
</tr>
</thead>
<tbody>
<tr>
<td>2005</td>
<td>2,106</td>
<td>113</td>
<td>2,577</td>
<td>66</td>
<td>4,862</td>
</tr>
<tr>
<td>2006</td>
<td>2,277</td>
<td>108</td>
<td>2,718</td>
<td>64</td>
<td>5,167</td>
</tr>
<tr>
<td>2007</td>
<td>2,464</td>
<td>95</td>
<td>2,881</td>
<td>42</td>
<td>5,482</td>
</tr>
<tr>
<td>2008</td>
<td>2,485</td>
<td>100</td>
<td>2,751</td>
<td>57</td>
<td>5,393</td>
</tr>
<tr>
<td>2009</td>
<td>2,445</td>
<td>119</td>
<td>2,778</td>
<td>71</td>
<td>5,413</td>
</tr>
<tr>
<td>2010</td>
<td>2,370</td>
<td>149</td>
<td>3,000</td>
<td>55</td>
<td>5,574</td>
</tr>
<tr>
<td>2011</td>
<td>2,321</td>
<td>108</td>
<td>2,512</td>
<td>65</td>
<td>5,006</td>
</tr>
<tr>
<td>2012</td>
<td>2,258</td>
<td>132</td>
<td>2,379</td>
<td>63</td>
<td>4,832</td>
</tr>
</tbody>
</table>

Table 3 shows the new diabetic cases registered in 2012 (total of 4,832 cases) by age, gender and nationality (according to the annual health report 2012). The majority of cases (97.6%) were in the age group > 20 years of age. More than 52% of Omani diabetics below 20 years of age are males. This percentage was 48.6% for those above the age of 20 years.

The Ministry of Health has 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 serious complication. The proportion of lower limb amputation as a complication of diabetes out of all amputations increased from 53.2% in 2001 to 57.7% in 2012. The ratio of diabetic retinopathy cases to total diabetic patients registered also increased from 4.3% in 2000 to 5% in 2012 and about 52.7% of cases received laser therapy for diabetic retinopathy in 2012, which was lower than the 70% who received therapy in 2010.
The diabetes services were under careful study to reform its delivery system. The existing model is designed to offer integrated diabetes care within primary health care system. The program recruited diabetologists in all governorates to steer the screening services and to provide model of excellent care. However, the system was burdened by increasing number of uncontrolled patients, lack of sufficient training for general practitioners and shortage and limitations of medications and laboratory investigation supply. The care is currently offered from over 200 health institutions with variable degree of quality.

**Cancer:**

In the past few years, cancer remained the third leading cause of in-patient mortality in Oman with nearly one thousand new cases were diagnosed every year indicting its rising burden. The Oman National Cancer Registry (ONCR) was established in 1985 as a hospital based registry and only cases treated in tertiary hospitals were registered. In 1996, with the establishment of the a section for NCDs Surveillance and Control, the cancer registry was transferred and started functioning under the Department of Communicable Diseases Surveillance and Control and in August 2003 restructured into the Department of NCDs under the Directorate General of Health Affairs.

In the year 2001 cancer notification was made mandatory through a Ministerial Decision (4/2001). The Registry gathers information from all Ministry of Health hospitals, Sultan Qaboos University Hospital, Armed Forces Hospital, Royal Oman Police Hospital as well The Diwan of Royal Court and the “Treatment Abroad Committee”. Data also are received from Tuwm Hospital which is the UAE bordering Oman (since some Omani patients visit this hospital). Furthermore data are collected data from the major private hospital in Muscat. Patient diagnosed abroad are trace through Outpatient Register at the Royal Hospital and subsequently data are extracted from their case notes. As a result of continued inclusion of more and more sources of information on cancer, almost all cases of cancer among Omani are being registered.

In November 2004 the National Oncology Center in the Royal Hospital in Muscat, was established and thus patient care has been strengthened since all modalities of treatment (surgery, chemotherapy and radiotherapy) are now available in Oman. The quality of the registry was commended by an external evaluator from the International Agency for Research on Cancer (IARC) in 2001. Following this evaluation, the Omani cancer data were included in the publication of the IARC titled “Cancer incidence in five continents”.

Table 3: New diabetic cases registered in 2012 by age, gender and nationality

<table>
<thead>
<tr>
<th>Age</th>
<th>Omani</th>
<th>Non-Omani</th>
<th>Total number of cases</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Male</td>
<td>Female</td>
<td>Male</td>
<td>Female</td>
</tr>
<tr>
<td>&lt; 20 years</td>
<td>57</td>
<td>52</td>
<td>4</td>
<td>2</td>
</tr>
<tr>
<td>&gt; 20 years</td>
<td>2,201</td>
<td>2,327</td>
<td>128</td>
<td>61</td>
</tr>
<tr>
<td>Total</td>
<td>2,258</td>
<td>2,379</td>
<td>132</td>
<td>63</td>
</tr>
</tbody>
</table>
The total number of cancer cases registered in 2011 was 1,289, of these 1,187 (92.1%) were among Omani and 102 (7.9%) were non-Omani. Out of the total cases among Omani (1,187), the males accounted for 594 cases (50.1%), while the females accounted for 593 cases (49.9%) as shown in table 4. About 7.3% of the cases were reported in children below 15 years of age. The median age at diagnosis was 53 years. This was higher in males (59 years) compared to females (49 years).

Table 4: The total number of cancer cases registered in 2011 among Omani by gender.

<table>
<thead>
<tr>
<th>Gender</th>
<th>Number of cases</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>594</td>
<td>50.1%</td>
</tr>
<tr>
<td>Female</td>
<td>593</td>
<td>49.9%</td>
</tr>
<tr>
<td>Total</td>
<td>1,187</td>
<td>100%</td>
</tr>
</tbody>
</table>

Table 5 and figure 5 show the frequency of cancers among Omani since 1999 (according to the MOH cancer incidence report 2011). The frequency is rising among both males and females.

Table 5: The frequency of cancer among Omani from 1999 – 2012.

<table>
<thead>
<tr>
<th>Gender</th>
<th>Year</th>
<th>1999</th>
<th>2000</th>
<th>2001</th>
<th>2002</th>
<th>2003</th>
<th>2004</th>
<th>2005</th>
<th>2006</th>
<th>2007</th>
<th>2008</th>
<th>2009</th>
<th>2010</th>
<th>2011</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td></td>
<td>477</td>
<td>470</td>
<td>509</td>
<td>444</td>
<td>464</td>
<td>498</td>
<td>501</td>
<td>426</td>
<td>460</td>
<td>440</td>
<td>497</td>
<td>454</td>
<td>594</td>
</tr>
<tr>
<td>Female</td>
<td></td>
<td>413</td>
<td>436</td>
<td>425</td>
<td>387</td>
<td>417</td>
<td>442</td>
<td>439</td>
<td>461</td>
<td>448</td>
<td>480</td>
<td>467</td>
<td>502</td>
<td>593</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>890</td>
<td>906</td>
<td>934</td>
<td>831</td>
<td>881</td>
<td>940</td>
<td>940</td>
<td>887</td>
<td>908</td>
<td>920</td>
<td>964</td>
<td>956</td>
<td>1,187</td>
</tr>
</tbody>
</table>

Figure 5: The frequency of cancer among Omani by gender from 1999 – 2012.
The highest incidence of cancer in 2011 was in Dhofar Governorate (75.1 per 100,000 population), followed by Muscat (73.4 per 100,000), Musandam (54.4 per 100,000), while the lowest incidence was in Al Wusta (38.9 per 100,000).

The ten most common cancer among Omani (both males and female) in 2011 are shown in figure 6.

![Figure 6: Ten most common cancer among Omani (males & females) in 2011.](image)

* includes 6 cases of male breast cancer

In terms of gender, leukemia and prostate were the top two cancers among males, while breast and thyroid were the top two cancers among females as shown in table 6.

Table 6: Most common cancer among Omani males & females in 2011.

<table>
<thead>
<tr>
<th>Cancer</th>
<th>Male</th>
<th>Female</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Frequency</td>
<td>%</td>
</tr>
<tr>
<td>Leukemia</td>
<td>58</td>
<td>9.8</td>
</tr>
<tr>
<td>Prostate</td>
<td>57</td>
<td>9.6</td>
</tr>
<tr>
<td>Colorectal</td>
<td>53</td>
<td>8.9</td>
</tr>
<tr>
<td>Non-Hodgkin Lymphoma</td>
<td>51</td>
<td>8.6</td>
</tr>
<tr>
<td>Stomach</td>
<td>49</td>
<td>8.2</td>
</tr>
<tr>
<td>Trachea, Bronchus, Lung</td>
<td>39</td>
<td>6.6</td>
</tr>
<tr>
<td>Bladder</td>
<td>29</td>
<td>4.9</td>
</tr>
<tr>
<td>Liver</td>
<td>24</td>
<td>4.0</td>
</tr>
<tr>
<td>Other Skin</td>
<td>21</td>
<td>3.5</td>
</tr>
<tr>
<td>Hodgkin Lymphoma</td>
<td>20</td>
<td>3.4</td>
</tr>
</tbody>
</table>
Table 7 shows the most common cancer among nationals of the GCC states (1998 – 2007). Breast cancer remained the top cancer among females in all GCC countries followed by thyroid (in four countries) and colorectal (in two countries).

Table 7: Most common cancer among nationals of the GCC states (1998 – 2007).

<table>
<thead>
<tr>
<th>Male</th>
<th>Oman</th>
<th>UAE</th>
<th>Bahrain</th>
<th>KSA</th>
<th>Qatar</th>
<th>Kuwait</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stomach</td>
<td>Lung</td>
<td>Lung</td>
<td>Non-Hodgkin Lymphoma</td>
<td>Lung</td>
<td>Colorectal</td>
<td></td>
</tr>
<tr>
<td>Non-Hodgkin Lymphoma</td>
<td>Colorectal</td>
<td>Colorectal</td>
<td>Colorectal</td>
<td>Colorectal</td>
<td>Non-Hodgkin Lymphoma</td>
<td></td>
</tr>
<tr>
<td>Leukemia</td>
<td>Non-Hodgkin Lymphoma</td>
<td>Prostate</td>
<td>Liver</td>
<td>Liver</td>
<td>Lung</td>
<td></td>
</tr>
<tr>
<td>Prostate</td>
<td>Prostate</td>
<td>Bladder</td>
<td>Leukemia</td>
<td>Leukemia</td>
<td>Leukemia</td>
<td></td>
</tr>
<tr>
<td>Lung</td>
<td>Leukemia</td>
<td>Leukemia</td>
<td>Lung</td>
<td>Bladder</td>
<td>Prostate</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Female</th>
<th>Oman</th>
<th>UAE</th>
<th>Bahrain</th>
<th>KSA</th>
<th>Qatar</th>
<th>Kuwait</th>
</tr>
</thead>
<tbody>
<tr>
<td>Breast</td>
<td>Breast</td>
<td>Breast</td>
<td>Breast</td>
<td>Breast</td>
<td>Breast</td>
<td>Breast</td>
</tr>
<tr>
<td>Thyroid</td>
<td>Thyroid</td>
<td>Colorectal</td>
<td>Thyroid</td>
<td>Thyroid</td>
<td>Colorectal</td>
<td></td>
</tr>
<tr>
<td>Cervix Uteri</td>
<td>Leukemia</td>
<td>Lung</td>
<td>Colorectal</td>
<td>Colorectal</td>
<td>Thyroid</td>
<td></td>
</tr>
<tr>
<td>Leukemia</td>
<td>Colorectal</td>
<td>Thyroid</td>
<td>Non-Hodgkin Lymphoma</td>
<td>Non-Hodgkin Lymphoma</td>
<td>Non-Hodgkin Lymphoma</td>
<td></td>
</tr>
<tr>
<td>Stomach</td>
<td>Cervix Uteri</td>
<td>Ovary</td>
<td>Leukemia</td>
<td>Corpus Uteri</td>
<td>Leukemia</td>
<td></td>
</tr>
</tbody>
</table>

**Chronic Respiratory Diseases:**

Chronic respiratory diseases are very common, and account for significant morbidity and mortality. They comprise a wide range of conditions affecting both the upper and lower respiratory tracts in adults and children, and are often categorized into acute and chronic (but these may overlap).

The annual MOH health reports 2010, 2011 and 2012 revealed that respiratory diseases were the fourth leading cause of hospital reported deaths.

Management of respiratory diseases is provided as integral part of the health care in all levels of the health care. Although there are indicators of significant advances in the control of many respiratory disorders, however it is also perceived that the available respiratory care services are inadequate.
Chronic renal diseases

Chronic renal diseases were among the most prevalent non-communicable diseases in Oman. By the end of 2012 there were 1,221 patients with renal failure receiving renal dialysis in MOH hospitals, representing 33.7 per 100,000 population compared to 470 patients in 2000 with a prevalence of 19.6 per 100,000 as shown in table 8. In spite the annual increase in prevalence (and the number of patients receiving dialysis), the mean number of sessions per patient witnessed minor change.

Table 8: Patients with renal failure receiving renal dialysis in MOH hospitals from 2000 – 2012.

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of patients</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>receiving renal</td>
<td>470</td>
<td>618</td>
<td>609</td>
<td>680</td>
<td>737</td>
<td>872</td>
<td>946</td>
<td>1,072</td>
<td>1,221</td>
</tr>
<tr>
<td>dialysis</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total number of beds</td>
<td>108</td>
<td>148</td>
<td>140</td>
<td>140</td>
<td>169</td>
<td>179</td>
<td>184</td>
<td>196</td>
<td>202</td>
</tr>
<tr>
<td>Total number of</td>
<td>60,017</td>
<td>82,354</td>
<td>84,016</td>
<td>85,555</td>
<td>98,391</td>
<td>111,544</td>
<td>122,677</td>
<td>40,698</td>
<td>153,722</td>
</tr>
<tr>
<td>sessions</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mean number of</td>
<td>10.9</td>
<td>11.2</td>
<td>11.1</td>
<td>11.2</td>
<td>11.5</td>
<td>11.3</td>
<td>11.8</td>
<td>11.4</td>
<td>11.4</td>
</tr>
<tr>
<td>sessions per patient</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Prevalence per</td>
<td>19.6</td>
<td>24.6</td>
<td>23.6</td>
<td>24.8</td>
<td>25.7</td>
<td>27.5</td>
<td>29.2</td>
<td>30.5</td>
<td>33.7</td>
</tr>
<tr>
<td>100,000 population</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

NCDs Risk Factors:

Tobacco

Tobacco use is the single most preventable cause of death in the world today. It is the only legal consumer product that can harm everyone exposed to it. Currently, the World Health Organization attributes one in ten deaths in adults (5 million deaths each year worldwide) to tobacco. If current smoking patterns continue, it will cause about 10 million deaths by the year 2020.

As of March 2005, 59 countries have ratified the WHO Framework Convention on Tobacco Control (FCTC). The Sultanate of Oman has also ratified the FCTC on 9 March 2005. Since after the ratification, there have been progressive works in the direction of adopting new policies as compared to the limited awareness and health education activities that were being provided before it. The prevalence of cigarette smoking among adults in Oman is not very high as shown in table 9 and occurs mainly in expatriate men. The pattern of smoking among the growing youth generation is also changing. Two global youth tobacco
Use surveys in 2003 and 2007 showed decreased pattern in prevalence of current smoking of cigarettes and water-pipe smoking. However, new ways of tobacco use are emerging among this age group and perhaps the results of the last survey in 2010—which is not yet available—will reveal more details about the pattern of tobacco use in this age category.

- Tobacco key facts:
  - Tobacco kills up to half of its users.
  - Tobacco caused 100 million deaths in the 20th century. If current trends continue, it may cause one billion deaths in the 21st century.
  - Tobacco kills nearly 6 million people each year. More than five million of those deaths are the result of direct tobacco use while more than 600,000 are the result of non-smokers being exposed to second-hand smoke.
  - Unless urgent action is taken, the annual death toll could rise to more than eight million by 2030.
  - Nearly 80% of the world's one billion smokers live in low- and middle-income countries.

Table 9: Cigarette smoking among adults in Oman

<table>
<thead>
<tr>
<th>Cigarette smoking</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prevalence of current smokers in males over 15 years of age (1995)</td>
<td>15%</td>
</tr>
<tr>
<td>Prevalence among adults over 18 years of age (2008)</td>
<td>14.3%</td>
</tr>
<tr>
<td>Daily current smoking among Omani males and females (2008)</td>
<td>5.8%</td>
</tr>
</tbody>
</table>

The tobacco program supervision has been reformed in 2010 and is now supervised by a national committee chaired by the Undersecretary for Health Affairs. Some of tobacco activities are collaborative with other GCC countries and coordinated through the GCC plan for the control of tobacco.

Physical inactivity:

Physical inactivity is related (directly and indirectly) to the other leading risk factors for NCDs such as high blood pressure, high cholesterol and high glucose levels; and, to the recent striking increases in childhood and adult obesity, not only in developed countries but also in many developing countries.
Physical inactivity key facts:

- Physical inactivity is the fourth leading risk factor for death worldwide.
- Approximately 3.2 million people die each year due to physical inactivity.
- Physical inactivity is a key risk factor NCDs.
- Physical inactivity is the main cause for approximately:
  - 21–25% of breast and colon cancers; 27% of diabetes and 30% of ischaemic heart disease.
- Physical activity has significant health benefits and contributes to prevent NCDs.
- Globally, one in three adults is not active enough.
- Policies to address physical inactivity are operational in 56% of WHO Member States.
- WHO Member States have agreed to reduce physical inactivity by 10% by 2025.
  
WHO recommends: for children and adolescents: 60 minutes of moderate to vigorous intensity activity per day; for adults (18+): 150 minutes of moderate-intensity activity per week.

The major findings of the studies conducted by MOH in Oman related to physical activity are shown in table 10.

### Table 10: Results of studies conducted in Oman related to physical activity.

<table>
<thead>
<tr>
<th>Study</th>
<th>Findings</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oman World Health Survey 2008</td>
<td>- 37% of adults were not doing any physical activity</td>
</tr>
<tr>
<td>Global School-based Student Health Survey (Oman in 2005)</td>
<td>- 23% of secondary school students were physically active for at least 60 minutes daily</td>
</tr>
<tr>
<td></td>
<td>- 13.5% of female students reported this level of physical activity</td>
</tr>
<tr>
<td></td>
<td>- One in five students (22.4%) reported that they had walked for at least half an hour on five days or more in the previous week.</td>
</tr>
<tr>
<td>A KAPB survey on lifestyle among students in universities, colleges and other higher education institutes (MOH, Oman, 2008)</td>
<td>- 50% of college students were having low level of physical activity as per the three physical activity levels proposed by the international physical activity questionnaire (IPAQ)</td>
</tr>
<tr>
<td>Local study in Sur city 2006</td>
<td>- 17.7% of the adult population (24% of men and 12.8% of women) engaged in moderate physical activity during leisure time five or more days a week.</td>
</tr>
<tr>
<td>Pre-interventional study (Nizwa 2001)</td>
<td>- Level of physical activity at leisure time was 38.9%</td>
</tr>
<tr>
<td>Post-interventional study (Nizwa 2010)</td>
<td>- Level of physical activity at leisure time was 71.3%</td>
</tr>
</tbody>
</table>

1 Annex 3: Summary of the global recommendations on physical activity
Unhealthy diet

The unhealthy diet is a known risk factor for ill health. It is also epidemiologically related to the development of NCDs. The unhealthy diet problem is composed of many aspects including the attitude, the knowledge and the practices of eating. The major NCDs were shown to be associated with unhealthy dietary habits and raised body mass index which translates into overweight or obesity.

**Obesity key facts:**
- Worldwide obesity has nearly doubled since 1980.
- The WHO definition is:
  - a BMI greater than or equal to 25 is overweight
  - a BMI greater than or equal to 30 is obesity.
- In 2008, more than 1.4 billion adults, 20 and older, were overweight. Of these over 200 million men and nearly 300 million women were obese.
- 35% of adults aged 20 and over were overweight in 2008, and 11% were obese.
- 65% of the world’s population live in countries where overweight and obesity kills more people than underweight.
- More than 40 million children under the age of 5 were overweight or obese in 2012.
- Obesity is preventable.

In Oman, the public health approach focused on provision of correct messages on healthy diet including the healthy food plate composition, the daily calorie needs, the types of fat, the reduction of salt in the diet, etc. Table 11 shows the studies conducted by MOH in Oman and the findings related to unhealthy diet and obesity.

Table 11: Results of studies conducted in Oman related to unhealthy diet.

<table>
<thead>
<tr>
<th>Study</th>
<th>Findings</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oman World Health Survey 2008</td>
<td>Prevalence of central obesity was 37.4% (for men are 19.7% and 53.5% from women)</td>
</tr>
<tr>
<td>Technical report Omani Food Based Dietary Guidelines (OFBDG), 2009</td>
<td>Waist-hip ration (an NCD risk indicator) increased to 49.1% compared with 42.6% in 1992.</td>
</tr>
<tr>
<td>Annual health examination for schoolchildren grades 1, 7, and 10.</td>
<td>Subtle rising trend in obesity is observed for older age groups which increased by 30% in the years 2006-2007 compared to 2004.</td>
</tr>
<tr>
<td>A KAPB survey on lifestyle among students in universities, colleges</td>
<td>Knowledge about importance of breakfast, eating vegetables and fruits was high while behavior was very low.</td>
</tr>
<tr>
<td>and other higher education institutes (MOH, Oman, 2008)</td>
<td>- 45% of the sample mentioned eating fast food 3-7 days during the week prior to the study</td>
</tr>
<tr>
<td></td>
<td>- 66% ate fast food 1-2 times per day.</td>
</tr>
</tbody>
</table>
Alcohol

Consumption of alcohol is assessed among other NCDs risk factors, however and apart from standard health education message to abstain from alcohol, there is absence of any intervention plan at the primary health care. The extent of the problem is not fully understood. Nevertheless, the program for mental health has some data on alcohol intoxication and alcohol detoxification therapy for cases admitted to hospitals.

NCDs and Human Resources for Health

Medical professionals

The annual health report 2012 revealed wide variations in the number and distribution of the MOH medical professionals (involved in the management of NCDs) between governorates as shown in table 12 (excluding those who work at MOH headquarters).

Table 12: number and distribution of MOH medical professionals involved in the management of NCDs) by governorates in 2012

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>General Practitioners</td>
<td>42</td>
<td>155</td>
<td>181</td>
<td>180</td>
<td>328</td>
<td>438</td>
<td>380</td>
<td>75</td>
<td>63</td>
<td>220</td>
<td>684</td>
<td>66</td>
<td>76</td>
<td>2,888</td>
</tr>
<tr>
<td>Internal medicine specialists/consultants</td>
<td>0</td>
<td>13</td>
<td>13</td>
<td>23</td>
<td>18</td>
<td>18</td>
<td>29</td>
<td>5</td>
<td>6</td>
<td>12</td>
<td>36</td>
<td>7</td>
<td>20</td>
<td>200</td>
</tr>
<tr>
<td>Cardiologists</td>
<td>0</td>
<td>2</td>
<td>1</td>
<td>0</td>
<td>2</td>
<td>2</td>
<td>1</td>
<td>2</td>
<td>10</td>
<td>0</td>
<td>0</td>
<td>17</td>
<td>17</td>
<td>37</td>
</tr>
<tr>
<td>Chest physicians</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>4</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>Diabetologists</td>
<td>0</td>
<td>1</td>
<td>1</td>
<td>2</td>
<td>1</td>
<td>3</td>
<td>3</td>
<td>0</td>
<td>1</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>15</td>
</tr>
<tr>
<td>Oncologists</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>27</td>
<td>28</td>
<td>28</td>
</tr>
</tbody>
</table>

The density of MOH medical professionals who are involved in the management of NCDs (per 10,000 population) revealed shortage as shown in table 13.

Table 13: Density of MOH medical professionals involved in the management of NCDs in 2012

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>General Practitioners</td>
<td>42</td>
<td>155</td>
<td>181</td>
<td>180</td>
<td>328</td>
<td>438</td>
<td>380</td>
<td>75</td>
<td>63</td>
<td>220</td>
<td>684</td>
<td>66</td>
<td>76</td>
<td>2,888</td>
</tr>
<tr>
<td>Internal medicine specialists/consultants</td>
<td>0</td>
<td>13</td>
<td>13</td>
<td>23</td>
<td>18</td>
<td>18</td>
<td>29</td>
<td>5</td>
<td>6</td>
<td>12</td>
<td>36</td>
<td>7</td>
<td>20</td>
<td>200</td>
</tr>
<tr>
<td>Cardiologists</td>
<td>0</td>
<td>2</td>
<td>1</td>
<td>0</td>
<td>2</td>
<td>2</td>
<td>1</td>
<td>2</td>
<td>10</td>
<td>0</td>
<td>0</td>
<td>17</td>
<td>17</td>
<td>37</td>
</tr>
<tr>
<td>Chest physicians</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>4</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>Diabetologists</td>
<td>0</td>
<td>1</td>
<td>1</td>
<td>2</td>
<td>1</td>
<td>3</td>
<td>3</td>
<td>0</td>
<td>1</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>15</td>
</tr>
<tr>
<td>Oncologists</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>27</td>
<td>28</td>
<td>28</td>
</tr>
</tbody>
</table>

The density of MOH medical professionals who are involved in the management of NCDs (per 10,000 population) revealed shortage as shown in table 13.
Physiotherapists

There were 348 physiotherapists in Oman in 2012 (compared to 50 in 1990 and 150 in 2000) with a density of one physiotherapist 1 per 10,000 population compared to 0.3 in 1990 and 0.6 in 2000. The MOH had 62.9% (219) of the total physiotherapists, the non-MOH government sector had 10.3% (36), while the private sector had 26.7% (93). The density of physiotherapist working in MOH per 10,000 population was 0.6.

Out of the 219 physiotherapists working in MOH, 151 were Omani (69%) and 68 were non-Omani (31%) as shown in table 14.

Table 14: Physiotherapists working in MOH by gender and nationality, 2012.

<table>
<thead>
<tr>
<th>Category</th>
<th>Omani</th>
<th>Female</th>
<th>Total</th>
<th>Non-Omani</th>
<th>Male</th>
<th>Female</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Physiotherapists</td>
<td>58</td>
<td>93</td>
<td>151</td>
<td>33</td>
<td>35</td>
<td>68</td>
<td></td>
</tr>
</tbody>
</table>

The distribution of physiotherapists working in MOH per governorate is shown in table 15 (excluding those who work at MOH headquarters).

Table 15: Physiotherapists working in MOH by governorate, 2012.

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Physiotherapists</td>
<td>0</td>
<td>7</td>
<td>13</td>
<td>13</td>
<td>10</td>
<td>24</td>
<td>17</td>
<td>7</td>
<td>6</td>
<td>14</td>
<td>14</td>
<td>65</td>
<td>24</td>
<td>214</td>
<td></td>
</tr>
</tbody>
</table>
**Nutritionists**

There were 191 nutritionists working in MOH in 2012 (with a density of 0.5 nutritionist per 10,000 population) and one medical doctor specialized in nutrition. Out of the 191 nutritionists 190 were Omani and one non-Omani as shown in table 16.

<table>
<thead>
<tr>
<th>Category</th>
<th>Omani Male</th>
<th>Omani Female</th>
<th>Total</th>
<th>Non-Omani Male</th>
<th>Non-Omani Female</th>
<th>Total</th>
<th>Grand Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nutritionists</td>
<td>26</td>
<td>164</td>
<td>190</td>
<td>1</td>
<td>0</td>
<td>1</td>
<td>191</td>
</tr>
</tbody>
</table>

**MENTAL HEALTH**

Mental disorders often are considered to be comorbid with other common NCDs due to potential bidirectional causality, however they can be experienced in isolation. They are also often chronic in nature. In 2010, the estimated global cost of dementia was 604 billion USD, or about 1% of the world’s GDP. At the national level, country GDP percentages dedicated to dementia ranged from 0.24% in low-income countries to 1.24% in high-income countries.

Risk factors for mental disorders include genetics, older age, tobacco use, harmful alcohol use, unhealthy diet, and physical inactivity. Environmental exposures, such as pollution, and injuries also place individuals at risk.

**Mental health key facts:**
- Mental health is an integral part of health; indeed, there is no health without mental health.
- Mental health is more than the absence of mental disorders.
- Mental health is determined by socioeconomic, biological and environmental factors.
- Cost-effective public health and intersectoral strategies and interventions exist to promote, protect and restore mental health.

Mental health received special care in Oman since 1975 that’s where the first mental health outpatient services started in Al Rahma hospital. In 1977, two inpatient units were opened, one for men and one for women. Then, in 1983, Ibn Sina hospital was opened that delivered specialized tertiary care in psychiatry and the reference hospital for all regions. To reduce burden of inpatient from Ibn Sina hospital, integration of mental health in the PHC setting was an important endeavor started in 2009 and still ongoing.

Currently, Al Masarrha hospital is replacing Ibn Sina hospital and it was opened in 2012. It has 245 beds, specialized services, emphasis on rehabilitation and staff training. This hospital will provide the highest international standards of psychiatric care to the patients in Oman. All psychotropic drugs are free to all
Omani people. The primary psychiatric care is provided through all the primary health centers. Secondary psychiatric care is provided through outpatient psychiatric clinics in all the regional hospitals and extended health centers.

There are three committees related to mental health. The 1st committee is the National Committee of Narcotics and Psychotropic substance that has been established in 2000. The 2nd committee is the national consultative committee for mental health which was established in 2007. The 3rd committee is for improving therapeutic services of mental health that was formed in 2012.

A study of depressive symptoms among adolescent secondary school Omani students using the general health questionnaire (GHQ-12) and the 27–items child depression inventory (CDI) was carried in 2004-2005. The results showed that 14% of the adolescents involved in the survey had at least one sign of depression from the signs used in the questionnaire. The following prevalence rates for different mental illness were found in this survey: 9% of adolescents with anxiety disorders, 4.3% with mood disorders, 3.5% with impulsive control disorder, 3% with major depressive disorder, 1% with bipolar disorder. Around 3.6% had suicidal thought some times in their lifetime. These mental disorders were classified as severe, moderate and mild attack. Around 22.4% of adolescents had severe mental illness, 44.9% with moderate attack and 32.7% with mild attack of mental illness.

The national elderly survey 2008 targeted elderly people in the community showed 3.7% of elderly face emotional and affection problems.

Total number visits recorded in psychiatry clinics in MOH institutions in all governorates during year 2012 was 88,981 visits. Among this total number, the total new cases with mental illness were 17,378 cases (20% of total visits). The highest percentage of the new cases was seen in North Al Batinah governorate (54%) followed by Muscat (17%), while the lowest percentage was recorded in Dhofar (0.43%) and Musandam (1.59%). The inpatient morbidity according to mental & behavioral diseases in all regions during 2012 (calculated per 10,000 population) was seen as highest in Musansem (15%) & Muscat (8%), while the lowest rate in South Batinah (1%), North Batinah (1%) and Al Dhahira (2%) as shown in table 17.

57.8% of the new cases were among the age group 20 – 44 years of age, while 28% were among the age group 45 years and above. The overall male to female ratio was 1:1, however it was found that the male to female ratio was highest among children below 11 years old (males was 2 times higher than females).
Table 17: Mental health morbidity rates in psychiatric clinics at MOH institutions per governorates in 2012.

<table>
<thead>
<tr>
<th>Governorates</th>
<th>Total Visits in psychiatric clinics at MOH institutions</th>
<th>New cases with mental illness out of the total visits to the psychiatric clinics</th>
<th>Rate per 10,000 population</th>
<th>% of new case with mental illness in relation with total new visits</th>
<th># of in-patient morbidity according to mental &amp; behavioral disease (per 10,000 pop.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adh Dhahirah</td>
<td>3,401</td>
<td>364</td>
<td>197</td>
<td>21</td>
<td>2.09</td>
</tr>
<tr>
<td>North Ash Sharqiyah</td>
<td>8,648</td>
<td>1,211</td>
<td>388</td>
<td>54</td>
<td>6.97</td>
</tr>
<tr>
<td>South Ash Sharqiyah</td>
<td>8,642</td>
<td>1,113</td>
<td>352</td>
<td>45</td>
<td>6.40</td>
</tr>
<tr>
<td>South Al Batinah</td>
<td>8,739</td>
<td>1,037</td>
<td>268</td>
<td>32</td>
<td>5.97</td>
</tr>
<tr>
<td>North Al Batinah</td>
<td>24,269</td>
<td>9,433</td>
<td>399</td>
<td>155</td>
<td>54.28</td>
</tr>
<tr>
<td>Ad Dakhliyah</td>
<td>6,427</td>
<td>442</td>
<td>173</td>
<td>12</td>
<td>2.54</td>
</tr>
<tr>
<td>Al Buraimi</td>
<td>2,930</td>
<td>448</td>
<td>318</td>
<td>49</td>
<td>2.58</td>
</tr>
<tr>
<td>Musandam</td>
<td>2,407</td>
<td>276</td>
<td>696</td>
<td>80</td>
<td>1.59</td>
</tr>
<tr>
<td>Dhofar</td>
<td>10,073</td>
<td>75</td>
<td>283</td>
<td>2</td>
<td>0.43</td>
</tr>
<tr>
<td>Muscat</td>
<td>13,445</td>
<td>2,979</td>
<td>116</td>
<td>26</td>
<td>17.14</td>
</tr>
<tr>
<td>Al Wusta*</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Total</td>
<td>88,981</td>
<td>17,378</td>
<td>246</td>
<td>48</td>
<td>100%</td>
</tr>
</tbody>
</table>

* no services

Total number visits recorded in psychiatry clinics in MOH institutions has increased from 2010 to 2012 as well as the number of new cases as shown in table 18.

Table 18: Total number visits recorded in psychiatry clinics in MOH institutions (2010 – 2012)

<table>
<thead>
<tr>
<th>Governorates</th>
<th>2010</th>
<th>2011</th>
<th>2012</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Total visits</td>
<td>Number of new cases</td>
<td>Total visits</td>
</tr>
<tr>
<td>Adh Dhahirah</td>
<td>3,627</td>
<td>499</td>
<td>2,847</td>
</tr>
<tr>
<td>North Ash Sharqiyah</td>
<td>9,176</td>
<td>1,267</td>
<td>9,616</td>
</tr>
<tr>
<td>South Ash Sharqiyah</td>
<td>10,362</td>
<td>1,124</td>
<td>10,204</td>
</tr>
<tr>
<td>South Al Batinah</td>
<td>7,445</td>
<td>939</td>
<td>10,152</td>
</tr>
<tr>
<td>North Al Batinah</td>
<td>21,185</td>
<td>2,522</td>
<td>21,365</td>
</tr>
<tr>
<td>Ad Dakhliyah</td>
<td>5,939</td>
<td>749</td>
<td>6,588</td>
</tr>
<tr>
<td>Al Buraimi</td>
<td>1,424</td>
<td>437</td>
<td>1,930</td>
</tr>
<tr>
<td>Musandam</td>
<td>1,696</td>
<td>169</td>
<td>2,029</td>
</tr>
<tr>
<td>Dhofar</td>
<td>8,675</td>
<td>63</td>
<td>9,812</td>
</tr>
<tr>
<td>Muscat</td>
<td>3,109</td>
<td>611</td>
<td>4,016</td>
</tr>
<tr>
<td>Al Wusta*</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Total</td>
<td>72,638</td>
<td>8,380</td>
<td>78,559</td>
</tr>
</tbody>
</table>

* no services
In 2012, there were 58 psychiatrists in MOH (of whom 24.1% were Omani) compared to 17 psychiatrists in 2000 (all non-Omani). They were distributed unevenly among the governorates. This is obvious from the density of psychiatrists per 10,000 population ranging from 0.05 in Ad Dakhliyah governorate to 0.58 in Musandam governorate (Al Wusta governorate had no psychiatrist) as shown in table 19. As for the psychiatric nurses, there were 450 nurses in 2012 (of whom 43.8 were Omani), while in 2000 there were no psychiatric nurse. They were distributed unevenly among the governorates whereby 89% of them were located in Muscat due to existence of the referral hospital.

The average density of psychiatrists in MOH was 0.16 psychiatrists per 10,000 population which is below the OECD average (1.56 psychiatrist per 10,000 population) as shown in figure 7. While the average density of psychiatric nurses per 10,000 population in MOH was 1.24 which is below the OECD average (5 psychiatric nurses per 10,000 population).

Table 19: Density and distribution of psychiatric professionals per governorate, MOH 2012.

| Indicators                  | Governorates | Al Wusta | Adh Dhahirah | Shargiyah | North Ash | South Ash | Al Batinah | South Al Batinah | North Ad Dakhliyah | Ad Dakhliyah | AL Buraymi | Musandam | Dhofar | Muscat | Total | % Omani |
|-----------------------------|--------------|----------|--------------|-----------|-----------|-----------|------------|-----------------|-------------------|-------------|------------|-----------|--------|--------|-------|---------|---------|
| Psychiatrists               |              | 0        | 2            | 2         | 3         | 3         | 4          | 2               | 1                 | 2           | 3          | 36       | 36     | 58     | 24.1%  |
| Psychiatrists per 10,000 pop.|              | 0        | 0.12         | 0.09      | 0.12      | 0.09      | 0.07       | 0.05            | 0.11              | 0.58        | 0.08       | 0.31     | 0.16   | 0.16   |
| Psychiatric nurses          |              | 0        | 4            | 3         | 0         | 0         | 25         | 2               | 0                 | 1           | 16         | 399      | 450    | 450    | 43.8%  |
| Psychiatric nurses per 10,000 pop.|          | 0        | 0.23         | 0.14      | 0         | 0         | 0.41       | 0.05            | 0                 | 0.29        | 0.45       | 3.45     | 1.24   | 1.24   |

The average density of psychiatrists in MOH was 0.16 psychiatrists per 10,000 population which is below the OECD average (1.56 psychiatrist per 10,000 population) as shown in figure 7. While the average density of psychiatric nurses per 10,000 population in MOH was 1.24 which is below the OECD average (5 psychiatric nurses per 10,000 population).

Figure 7: MOH Oman psychiatrists per 10,000 population compared to OECD countries.
DISABILITY

The 2010 census revealed that the total number of disabled Omani were 62,506 which comprised 3.2% of total population (i.e. 32 disabled per 1,000 population). The males constituted 54% (33,787) and females were 46% (28,729). Figure 8 & 9 show the distribution of disability per gender per governorate.

Figure 8: Distribution of disability per gender per governorate in 2010.
Figure 9: Distribution of disability per governorate in 2010.

Figure 10 shows the disability per age group according to the results of 2010 census. It was obvious that disability was less in children below five years of age, while 25% of the disabled were in the age group 5 – 24 (education age). 58% of the disabled were in the age group of 15 – 64 (productive age), while 30% were elder (65 years and above).

Figure 10: Disability by age group (2010 census).
Table 20 shows the common types of disability. Nearly one third of the disabilities were due to vision problems. The census showed that there was disproportionate between the number of disabled and the availability of rehabilitative centers. For instance, there were 11,415 disabled in Muscat governorate while those attached to the rehabilitative centers were 621. For North and South Al Batinah there were 22,411 disabled out of whom only 815 attached to the rehabilitative centers. The census also revealed increased number of disabled in the last years as shown in figure 10.

Table 20: Common types of disability (2010 census).

<table>
<thead>
<tr>
<th>Type of disability</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Seeing</td>
<td>34%</td>
</tr>
<tr>
<td>Walking</td>
<td>26.7%</td>
</tr>
<tr>
<td>Self-care</td>
<td>12.2%</td>
</tr>
<tr>
<td>Concentration</td>
<td>8.7%</td>
</tr>
<tr>
<td>Hearing</td>
<td>7.2%</td>
</tr>
<tr>
<td>Upper part of the body</td>
<td>5.9%</td>
</tr>
<tr>
<td>Communication</td>
<td>5.3%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>100%</strong></td>
</tr>
</tbody>
</table>

Figure 10: Number of disabled (1993 – 2010)
Disability key facts:
- Over a billion people, about 15% of the world's population, have some form of disability.
- Between 110 million and 190 million adults have significant difficulties in functioning.
- Rates of disability are increasing due to population ageing and increases in chronic health conditions, among other causes.
- People with disabilities have less access to health care services and therefore experience unmet health care needs.

Injuries and road traffic accidents

Injuries and road traffic accidents (RTA) are a result of changes in lifestyle as well as demographic, economic and social changes. RTA was 9.8% among the external causes of outpatient morbidity and 33.5% of the external causes of inpatient morbidity in MOH institutions in 2012 as shown in figure 11.

![Graph showing external causes of outpatient and inpatient morbidity in MOH institutions in 2012]

External causes mean injuries of all types including falls, exposure to mechanical forces, poisons, drowning, electric current, bites, intentional self-harm and assaults.

Males were more subjected to all types of injuries compared to females both for outpatient and inpatient morbidity in MOH institutions in 2012 as shown in figure 12 and 13.
Oman has one of the highest road traffic accident death rates worldwide. In 2012, a total of 1,127 deaths were reported, with a rate of 31.1 per 100,000 of the population. The Omani rate was found to be higher than the world average in 2009, which was 21 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 road traffic accidents 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%. The highest number of deaths was reported in Al Batinah governorate.

Males were more affected by road traffic accidents, the sex ratio has increased from 3.9 males for every single female in 2000 to 5.5 in 2012. Age group 21 - 50 years age was at a higher risk of dying from road traffic accidents, 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. Speed (52%) and reckless driving (23%) were responsible for most road traffic accident deaths. The situation is still worsening, as 1,127 deaths from road traffic accidents were reported in 2012 compared with 1,044 deaths in 2011 and 820 in 2010; an 8% and 27.3% increase, respectively. Road traffic accidents 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.

Injuries and road traffic accidents key facts:
- About 1.24 million people die each year as a result of road traffic crashes.
- Between 20 to 50 million more people suffer non-fatal injuries, with many incurring a disability as a result of their injury.
- Road traffic injuries are the leading cause of death among young people, aged 15–29 years.
- 91% of the world's fatalities on the roads occur in low-income and middle-income countries, even though these countries have approximately half of the world's vehicles.
- Half of those dying on the world’s roads are “vulnerable road users”: pedestrians, cyclists and motorcyclists.
- Without action, road traffic crashes are predicted to result in the deaths of around 1.9 million people annually by 2020.
- Only 28 countries, representing 416 million people (7% of the world’s population), have adequate laws that address all five risk factors (speed, drink-driving, helmets, seat-belts and child restraints).
Organizational structure of NDCs within MOH:

The non-communicable diseases services in the Ministry of Health was initially grouped with the curative services and was often left to be managed by hospitals. With the establishment of primary health care and starting to build primary health care facilities, a need for central management of programs was appreciated. Soon, a non-communicable disease section responsible for following and monitoring of NCD was established under the department of communicable disease surveillance and control. This situation lasted until August 2003 when the Directorate General of Health Affairs (DGHA) was rearranged and a department for non-communicable diseases surveillance and control was established. The department has the following sections:

- Section for priority NCDs control
- Section for specific diseases control
- Section for mental health
- Section for control of drug addiction and abuse
- Section for traditional medicinal therapies
- Section for tobacco control

The department established several national committees to advocate for the national policies and to steer the implementation of programs. These include:

- National committee for control of diabetes
- National Committee for control of CVD
- National committee for tobacco control
- National committee for control narcotics and drug addiction
- National committee for cancer control
CHALLENGES

The evolving disease burden of NCDs along with aging of the population, will call for new models of health care and most likely will bring new actors on board. Since its establishment, the health care system in Oman was geared towards the control and management of communicable diseases and outbreaks. Slowly, NCDs started to manifest and thus the need to reorient the health system towards tackling NCDs burden became more evident.

According to available data, the health care system and NCD services are currently dealing with only 50% of people with diabetes and hypertension. The diabetes registry data and the latest world health survey showed that patients with medical encounter represent half of the number affected by the disease. With existing pressure on available services, it seems clear that significant and short-term adjustment will be required to deal with the addition of new cases.

Sustain political commitment

It is apparent that the health system in Oman is facing many challenges to override the burden of NDCs. Political commitment and support to the NCDs agenda have an important influence on NCDs control. Translation of this commitment into multisectoral action is much desirable to keep NCDs high on the agenda. Priorities need to be set to determine the allocation of resources for influencing NCD control taking the advantage of economies of scale.

Economic burden

The economic burden of NCDs has not been researched yet. This makes it hard for service providers and decision makers to draw conclusions on where to invest. Some experts looked at expenditure on certain treatments. For example, the chemotherapy treatment alone in one year cost nearly 3 million Omani Rials with the fact that yet cancer incidence in Oman is still low compared to developed world.

Two-third of people with diabetes are uncontrolled and likely to develop micro and macro-vascular complication resulting in greater number of patients with end stage renal disease, myocardial infarction, strokes, amputations and blindness. The cost of treating diabetes and its complications would also significantly increase and have greater impact on MoH expenditure. Therefore, the economic burden of NCDs is expected to steeply increase over the coming decades and MOH have to cope with this increase and at the same time have to direct more investment in preventive measure before we could see any change in epidemiological trend.
People-centered model of service delivery

The health system needs to perform distinctive tasks on primary, secondary and tertiary health care level towards the prevention, control, management and treatment of NCDs. This needs to be done through the reorganization of service delivery moving from the hospital-centered to people-centered model of service delivery. The delivery of core services requires strong primary health care as the nucleus of care with a broad task profile and handover to specialized care levels for acute and complex events, and proactive re-transfer to the primary level for disease management. The need to strengthen the emergency and ambulatory services is quite evident.

Health promotion and education

Effective primary health care is also central to peer-to-peer patient education programmes, support groups and health promotion outreach activities. The development of user-friendly information, education and communication (IEC) materials and innovative counselling services are important in the PHC institutions. The empowerment of citizens and the active involvement of patients in the management of their condition are essential for NCDs control.

Human resources for health

Planning and management of human resources for health including effective recruitment, equitable geographical distribution, retention policies, education and continuous professional development, having the right skill-mix are important aspects influencing NCDs control.

Unlike the treatment of a one-off infection, care for patients with NCDs typically involves coordination among multiple providers. Thus strengthening the multi-disciplinary team approach and the collaboration between physician and non-physician (e.g. health educators, dieticians, physiotherapists, etc.) to provide optimal level of care are of paramount importance.

Strengthening evidence-based practice is important for NCDs control. Revision of the training curricula and guidelines and improving the quality of training of health professionals are essential. Evidence-based practice approach needs be extended to the development of policies that motivate the health professionals such as performance-based incentive schemes, etc.

NCDs medicines

Another important dimension for NCDs control is ensuring availability, affordability and access to quality medicines as most of the NCDs need life-long treatment. The efficiency and functionality of the drugs and supply system; rational prescription, dispensing and drug use; quality control and sustainable financing need to be strengthened.
Screening & surveillance

The Ministry of Health implemented the national NCDs screening program since 2007. The program is now providing a screening service for all Omanis aged 40 years and above. The screening targets five common conditions, which include diabetes, hypertension, chronic renal impairment, obesity, and hypercholesterolemia.

The screening program which is currently meeting only 33% of its target is annually bringing to the clinics additional 8% and 20% new cases of diabetes and hypertension respectively.

A guideline to standardize the operational process and procedure of case management has been produced, printed and distributed to the service providers. The screening tool includes:

- Subjective assessment for common risk factors such as tobacco use, physical inactivity, consumption of alcohol and the excessive use of analgesic medications.
- Fasting plasma glucose for diabetes
- Blood pressure measurement
- Using serum creatinine and cockcroft-gault equation to evaluate for chronic renal disease; urine dipsticks for albuminuria and hematuria
- Total serum cholesterol to assess for dyslipidemia followed by differential lipid analysis (TC, HDL, LDL, TG)
- Body mass index and waist circumference to assess for obesity

As for surveillance, the cancer registry is maintained since 1996. In addition, a manual registry for diabetes in primary health care was introduced. The data of cancer registry is reported on annual reports and appointed high quality and credibility from the international agency for research on cancer (IARC). The annual total number of cancer cases registered in 2011 report was close to one thousand. A registration system for drug addiction cases and juvenile diabetes mondiale (DiaMond) register were also planned but not yet fully established. The data on the diabetes register include the initial assessment of cases at the time of diagnosis and the annual assessments. The main use of the register is to document the occurrence of complications.

Thus is a need to strengthen the NCDs surveillance system, develop targets for behaviour risk factors and to revise indicators in line with the respective aspects of the WHO Global Action Plan for the prevention and control of NCDs. In addition, to maximize the use of information technology.

Generation of more evidence

Research needs to go hand in hand with NCDs prevention, control and management. The burden of NCDs needs to be studied, interventions should be appraised to know their cost-effectiveness and more evidences need to be generated.
THE NCDS, MENTAL HEALTH AND DISABILITIES VISION FOR 2050

The long-term nature of the NCDs, mental health and disabilities demands a comprehensive multisectoral harmonized efforts; and a well-managed and financed health system at all levels of health care (with a patient-centered model of delivery) that brings together well-distributed and motivated health professionals with the appropriate competencies and skill-mix, affordable technologies, reliable and efficient supply of medicines, functional referral system, and empowered people for self-care, over a sustained period of time.

The Vision
“Omani communities are free from the preventable suffering, disability and death caused by non-communicable diseases”.

The Objectives:
1. Strengthen national capacity, leadership, governance, multisectoral action and partnerships to accelerate the response for the prevention and control of non-communicable diseases.
2. Promote people-centered care through the integration of NCDs, mental health and rehabilitation services across the different levels of the health care delivery system, starting with primary care.
3. Prevent the excess morbidity and disability from NCDs through delivering cost-effective, accessible and affordable health care interventions for all priority NCDs disorders.
4. Reduce modifiable risk factors for non-communicable diseases and underlying social determinants through creation of health-promoting environments.
5. Promote and support national capacity for high-quality research and development for the prevention and control of non-communicable diseases.
6. Monitor the trends and determinants of non-communicable diseases and evaluate progress in their prevention and control.

The following strategies are determined for each objective:

Objective 1:
Strengthen national capacity, leadership, governance, multisectoral action and partnerships to accelerate the response for the prevention and control of non-communicable diseases.

Strategies:
• Ensuring sustained and strong high-level political support for the global, regional and national commitments to tackle the rising burden of the noncommunicable diseases.
Synopsis of Strategic Studies

- Building strong leadership and coalitions among relevant partners, raising the prevention and control of NDCs among their priority agendas and developing consensus on shared goals and strategies.
- Promoting community-based empowerment interventions and fostering partnership with community-based organizations.
- Aligning national policies on agriculture, trade, industry, and transport to promote improved diets, increase physical activity, and reduce harmful behaviors and practices.
- Providing adequate financial resources.
- Issuing, updating, enforcing and administrating the relevant laws and regulatory actions in line with the agreed upon national and regional commitments for noncommunicable diseases prevention and control.
- Supporting respective regulatory and monitoring mechanisms to monitor accountability and progress.

Objective 2:
Promote people-centered care through the integration of NCDs, mental health and rehabilitation services across the different levels of the health care delivery system, starting with primary care.

Strategies:
- Implementing comprehensive and coordinated multisectoral national response plan, guided by the UN Political Declaration and WHO framework to achieve the said targets and indicators, for the prevention and control of noncommunicable diseases (annex 1, 2).
- Adopting innovative strategies to integrate noncommunicable diseases, mental health and care of disabled services at all levels of health care.
- Adopting a “life-course approach” in prevention and control of noncommunicable diseases addressing the changing needs of different age groups as they move through the subsequent stages of life i.e. from “preconception care to healthy ageing”.
- Accelerating the implementation of the WHO Framework Convention on Tobacco Control, and other key risk factors of noncommunicable diseases (e.g. diet and physical inactivity, etc.).

Objective 3:
Prevent the excess morbidity and disability from NCDs through delivering cost-effective, accessible and affordable health care interventions/programs for all priority NCDs disorders.

Strategies:
- Improving the capacity of the health care delivery system (at all levels of care) for early detection and management of NCDs in terms of human resources, infrastructure, supplies and equipment as well as the information technology.
- Adopting cost-effective, acceptable and accessible screening services to the majority of the population and specially those at risk.
- Availing affordable medicines for prompt treatment and remove barriers to access the services.
- Introducing specialized services and risk management at primary health care level.
- Improving access to palliative care services.
Exploring new health financing mechanisms and innovative financing approaches to tackle the burden of NCDs and consequently sustain universal health coverage.

Objective 4:
Reduce modifiable risk factors for non-communicable diseases and underlying social determinants through creation of health-promoting environments.

Strategies:
- Acting on the social determinants of health for both people at risk and the entire population to reach economically productive and healthy societies
- Creating social and physical conducive environments at individual, public and workplace settings to support and promote healthy lifestyle choices.
- Enabling communities and individuals to exert greater control over factors that impact on noncommunicable disease and have both direct and indirect impact on their health and involving them in long term care of NCD patients.
- Sustaining robust advocacy and public education interventions and endeavors' through engagement of civil society, mass media and health volunteers.
- Developing educational programmes, social marketing modules, and innovative information, education and communication (IEC) modalities.

Objective 5:
Promote and support national capacity for high-quality research and development for the prevention and control of non-communicable diseases.

Strategies:
- Building national capacity and promote relevant researches and studies on noncommunicable diseases for informed decision-making.
- Improving the networking, knowledge transfer and dissemination of good practices with national and international centers and research institutes.
- Promoting synergies between programmes for noncommunicable diseases prevention and control and other global and regional health priorities, including sustainable development and mitigation of climate change.

Objective 6:
Monitor the trends and determinants of non-communicable diseases and evaluate progress in their prevention and control.

Strategies:
- Forming a national database for the targeted noncommunicable diseases and their risk factors stated in global plan of action.
Synopsis of Strategic Studies

- Implementing an integrated surveillance system for noncommunicable diseases that monitors exposures (risk factors), outcomes (morbidity and mortality), and health system capacity and response (interventions)
- Developing robust monitoring and evaluation frameworks over the course of the policy implementation, and in alignment with the WHO framework.
- Utilizing the evolving information and communication technologies to enhance the monitoring and evaluation.
THE WAY FORWARD

Much of the NCDs burden can be averted through primary prevention, early diagnosis combined with effective treatment. Concerted actions need to be taken to reduce risk factors with emphasis on sound interventions that are cost-effective, affordable, and that improve access to essential health care for people with NCDs.

Review of international experience and examination of the existing knowledge and evidence provide important lessons to guide policy development and multi-sectoral strategic planning process for NCDs prevention and control (including the WHO "Best Buys"). The following summarized directions will facilitate this process.

Governance, Policy and Regulation
- Sustained and strong high-level political support for the global, regional and national commitments to tackle the rising burden of the NCDs is desired. This requires continuous advocacy, the generation of more evidence through policy briefs as well as other means.
- The need to issue, update, enforce and administer the relevant laws, regulatory actions, legal and accountability frameworks for follow-up issues pertinent to NCDs prevention and control remained constant.
- Universal health coverage, adopting equity-based and people-centered approaches by giving all people improved access to appropriate range of preventive and curative health services and the reduction of inequities need to be sustained.
- Aligning national policies on agriculture, trade, industry, transport, etc. to promote improved diets, increase physical activity, and reduce harmful behaviors and practices, etc. is mandatory.
- Providing adequate finance and inventing innovative resource-generation modalities for the NCDs prevention and control are vital.

Multi-sectoral Partnership
- Tackling the burden of NCDs requires coordinated multi-sectoral response. As the underlying determinants of NCDs are outside the purview of the health sector, thus fostering partnership and collaboration across sectors is necessary to effectively address these determinants.
- Political and community leaders, government-related institutions and municipalities, private health providers, commercial sector and industries, civil societies including women, youth and sport clubs, non-governmental organization, media, researchers and academia, universities and health training institutes, health professions associations and societies and international organizations including WHO are essential to in NCDs prevention and control.
- Public-private partnership (PPP) should be fostered through well-delineated mechanisms.
- Partnerships and stakeholder should be encouraged to participate in developing, implementing and evaluating NCDs prevention and control strategies and interventions. This will further ensure the inclusion of relevant NCDs policies and strategies in their mandates, agenda and areas of work.
- Partnerships and collaboration will mobilize additional resource that will augment the national health budgets required for NCDs prevention and control.
The inclusion and merging the NCDs prevention and control into key related sectors policies are of paramount importance such as education, urban planning and development, municipalities, housing, food and agriculture, youth and sports, industries, social welfare, entrepreneurship, transport and others.

Municipalities need to be encouraged to create supportive environments for communities (bearing especial attention to the gender).

Health Promotion and Education

Health promotion and education play pivotal role in the prevention of NCDs. Media involvement, social marketing and social networking at all levels and for all population segments to promote healthy lifestyles and positive behavioural change and to increase knowledge and awareness of NCDs risk factors need to be strengthened.

Revisiting the existing health education messages and forming new ones to address the main NCDs risk factors need to be performed. The messages need to concentrate on inculcating healthy food and eating habits, physical activity and exercise and cessation of smoking among Omani. Messages should also increase the awareness of other NCD risk factors and importance of undertaking early and regular screenings.

Innovative Community-based and Healthy Settings-based (e.g. workplaces, schools and education premises, markets, public places, etc.) initiatives and approaches to empower and educate individuals and communities (especially those at high risk or with chronic diseases) to care for themselves, adopt positive healthy lifestyles and become agents-of-change for others in disease prevention and management need be adopted.

School Health programmes should further encourage the involvement of families and communities in both health education and health-promoting activities with emphasis on re-orienting physical education in the curricula, promoting extracurricular physical activity, improving access to healthy food at schools, increasing barriers to unhealthy food at schools and expanding school-based NCDs risk factors screening & early treatment interventions.

Health Service Delivery System

The health service delivery system, at primary, secondary and tertiary levels need to be further strengthened to ensure continuity of care. The clinical practice and management guidelines, and standard operating procedures (SOPs); and evidence-based decision support tools to ensure the appropriate and timely screening, diagnosis and treatment of NCDs need to be revisited and updated on frequent basis.

Specialized NCDs services need to be integrated at PHC and to be brought closer to the communities where they live and work.

Life-course approach in prevention and control of NCDs i.e. from "preconception care to healthy ageing" should be adopted and augmented by research.

The health care institutions need to be well-equipped for the assessment and management of NCDs as specified in clinical practice and management guidelines and SOPs. Secondary and tertiary health care facilities need to be further supported to provide ambulatory, acute, critical and highly advance and specialized quality care to NCDs patients.

Structured supportive supervisory system for all health care providers and practitioners in appropriate and quality clinical management of NCDs in-adherence with the clinical practice and
management guidelines and SOPs need to be strengthened and expanded at all levels of health care.

- The rehabilitation, palliative and support services need to be strengthened and expanded at all levels (including community level).
- Innovative community-based out-reached services need to be introduced. Health care professionals need to be trained on such kind of endeavors.
- People-centered health care frameworks and approaches that promote the community empowerment as well as individuals and facilitate their full participation in making decisions relevant to the control and prevention of NCDs need to be adopted.
- Expanding cost-effective, acceptable and accessible screening services to the majority of the population and specially those at risk is important. Taking the advantage of evolving information technology and e-health will further facilitate the screening programs.
- It is important to establish a partnership between patients and their families together with the health care providers. The health care providers must ensure that patients and their families have adequate information and skills to manage their chronic conditions. The effective patient education requires health care providers to be well-equipped with effective communication skills, behavioural change techniques and patient education and counselling skills to care for patients with NCDs.
- Introducing self-management programmes for patients with NCDs. This will assist in reducing the severity of symptoms, improving self-confidence, reducing the cost and maximizing the use of the resources. This necessitates:
  - development of inter-personal health education programmes at all health care facilities
  - development of self-guided intervention packages to help patients with NCDs and NCD risk factors and their families to monitor and manage their disease or condition
  - all health facilities have dedicated room/center staffed by suitably trained health care personnel; equipped with equipment; tools; and information, education and communication (IEC) materials as specified in SOPs and guidelines.

**Human Resources for Health and Capacity Building**

- There is a need to continually improve the skills, knowledge and attitude of the health providers at all levels of care to deal with the challenge of NCDs management. This can be done through continuous professional development and reinforcement of skills. Availability of trained equitably-distributed allied health professionals is critical to support successful implementation of NCDs prevention, control and management interventions.
- There should be a constant effort to improve the skill-mix and team approach health professionals through increasing the number of specialized doctors, nurses and allied health professionals to provide quality care and appropriate management of NCDs especially at PHC level.
- Training of other categories in health promotion and prevention is also vital e.g. community health promoters, employers, media workers, teachers, parents, and students through peer-education.
- MOH is responsible for producing the necessary guidelines, manuals and training modules (school-based, community-based, work-place based and media-based).
- The clinical practice and management guidelines and standard operating procedures (SOPs) need to be integrated in pre-service training curricula.
Surveillance and Monitoring

- NCDs surveillance needs to be further strengthened to provide appropriate information needed for proper policy formulation, planning, monitoring and evaluation (of the progress made in implementing policies and programmes for NCD prevention and control) with regard to NCDs burden, the population groups at risk, estimates of NCD mortality, morbidity, risk factors and determinants, and the ability to track health outcomes and risk factor trends over time.
- Standardization of data collection on NCD risk factors (stratified by age, sex and socioeconomic group), disease incidence and cause-specific mortality need to be strengthened.
- NCDs surveillance systems need to focus on the three major components a) monitoring exposures (risk factors); b) monitoring outcomes (morbidity and disease-specific mortality); and c) assessing health system capacity and response, which also includes national capacity to prevent NCDs (in terms of policies and plans, infrastructure, human resources and access to essential health care including medicines).
- Utilization of the evolving information and communication technologies to enhance the monitoring and evaluation is vital.

Research and Evidence

- Research and utilization of its findings perform a vital function across the intervention pathway for NCDs prevention and control. Research into the economic costs of NCDs, the cost-effectiveness and cost-benefits of prevention strategies, and other health economics analyses supply powerful arguments for instituting policy and regulatory interventions to reduce NCDs burden.
- Prevalence and longitudinal studies for both risk factors and chronic disease conditions will provide critical information on which to base priority setting and the selection of appropriate population and clinical interventions for the target groups.
- Behavioural change studies and applied research, including community-based participatory research, result in greater understanding of the behavioural change process, which is fundamental to prevention, while clinical studies offer the evidence-base for clinical approaches to disease management.
- Impact assessment studies examine thoroughly the effectiveness of interventions on population risk factor and disease end-points in term of morbidity and mortality.
REFERENCES

- Annual health report 2012, Ministry of Health, the Sultanate of Oman.
- Priority actions for the non-communicable disease crisis. The lancet, April, 2011.
- Globocan 2012, IARC.
Annex 1:

UN Political Declaration of the High-level Meeting of the General Assembly on the Prevention and Control of Non-communicable Diseases

The General Assembly Adopts the Political Declaration of the High-level Meeting of the General Assembly on the Prevention and Control of Non-communicable Diseases on the 3rd plenary meeting 19 September 2011.

We, Heads of State and Government and representatives of States and Governments, assembled at the United Nations on 19 and 20 September 2011, to address the prevention and control of non-communicable diseases worldwide, with a particular focus on developmental and other challenges and social and economic impacts, particularly for developing countries,

1. Acknowledge that the global burden and threat of non-communicable diseases constitutes one of the major challenges for development in the twenty-first century, which undermines social and economic development throughout the world and threatens the achievement of internationally agreed development goals;
2. Recognize that non-communicable diseases are a threat to the economies of many Member States and may lead to increasing inequalities between countries and populations;
3. Recognize the primary role and responsibility of Governments in responding to the challenge of non-communicable diseases and the essential need for the efforts and engagement of all sectors of society to generate effective responses for the prevention and control of non-communicable diseases;
4. Recognize also the important role of the international community and international cooperation in assisting Member States, particularly developing countries, in complementing national efforts to generate an effective response to non-communicable diseases;
5. Reaffirm the right of everyone to the enjoyment of the highest attainable standard of physical and mental health;
6. Recognize the urgent need for greater measures at the global, regional and national levels to prevent and control non-communicable diseases in order to contribute to the full realization of the right of everyone to the highest attainable standard of physical and mental health;
7. Recall the relevant mandates of the General Assembly, in particular resolutions 64/265 of 13 May 2010 and 65/238 of 24 December 2010;
8. Note with appreciation the World Health Organization Framework Convention on Tobacco Control,认真学习 all relevant resolutions and decisions adopted by the World Health Assembly on the prevention and control of non-communicable diseases, and underline the importance for Member States to continue addressing common risk factors for non-communicable diseases through the implementation of the World Health Organization 2008–2013 Action Plan for the Global Strategy for the Prevention and Control of Non-communicable Diseases, and their economic and social impacts.

---

(continued on page 129)
communicable Diseases as well as the Global Strategy on Diet, Physical Activity and Health and the Global Strategy to Reduce the Harmful Use of Alcohol;  

9. Recall the ministerial declaration adopted at the 2009 high-level segment of the Economic and Social Council, in which a call was made for urgent action to implement the Global Strategy for the Prevention and Control of Non-communicable Diseases and its related Action Plan;  


11. Take note with appreciation also of the outcomes of the regional multisectoral consultations, including the adoption of ministerial declarations, which were held by the World Health Organization in collaboration with Member States, with the support and active participation of regional commissions and other relevant United Nations agencies and entities, and served to provide inputs to the preparations for the high-level meeting in accordance with resolution 65/238;  

12. Welcome the convening of the first Global Ministerial Conference on Healthy Lifestyles and Non-communicable Disease Control, which was organized by the Russian Federation and the World Health Organization and held in Moscow on 28 and 29 April 2011, and the adoption of the Moscow Declaration, and recall resolution 64.11 of the World Health Assembly;  

13. Recognize the leading role of the World Health Organization as the primary specialized agency for health, including its roles and functions with regard to health policy in accordance with its mandate, and reaffirm its leadership and coordination role in

---

3 Available at http://www.who.int/publications/en/.  
7 See A/65/859.  
promoting and monitoring global action against non-communicable diseases in relation to the work of other relevant United Nations agencies, development banks and other regional and international organizations in addressing non-communicable diseases in a coordinated manner;

A challenge of epidemic proportions and its socio-economic and developmental impacts

14. Note with profound concern that, according to the World Health Organization, in 2008, an estimated 36 million of the 57 million global deaths were due to non-communicable diseases, principally cardiovascular diseases, cancers, chronic respiratory diseases and diabetes, including about 9 million deaths before the age of 60, and that nearly 80 per cent of those deaths occurred in developing countries;

15. Note also with profound concern that non-communicable diseases are among the leading causes of preventable morbidity and of related disability;

16. Recognize further that communicable diseases, maternal and perinatal conditions and nutritional deficiencies are currently the most common causes of death in Africa, and note with concern the growing double burden of disease, including in Africa, caused by the rapidly rising incidence of non-communicable diseases, which are projected to become the most common causes of death by 2030;

17. Note further that there is a range of other non-communicable diseases and conditions, for which the risk factors and the need for preventive measures, screening, treatment and care are linked with the four most prominent non-communicable diseases;

18. Recognize that mental and neurological disorders, including Alzheimer’s disease, are an important cause of morbidity and contribute to the global non-communicable disease burden, for which there is a need to provide equitable access to effective programmes and health-care interventions;

19. Recognize that renal, oral and eye diseases pose a major health burden for many countries and that these diseases share common risk factors and can benefit from common responses to non-communicable diseases;

20. Recognize that the most prominent non-communicable diseases are linked to common risk factors, namely tobacco use, harmful use of alcohol, an unhealthy diet and lack of physical activity;

21. Recognize that the conditions in which people live and their lifestyles influence their health and quality of life and that poverty, uneven distribution of wealth, lack of education, rapid urbanization, population ageing and the economic social, gender, political, behavioural and environmental determinants of health are among the contributing factors to the rising incidence and prevalence of non-communicable diseases;

22. Note with grave concern the vicious cycle whereby non-communicable diseases and their risk factors worsen poverty, while poverty contributes to rising rates of non-communicable diseases, posing a threat to public health and economic and social development;

23. Note with concern that the rapidly growing magnitude of non-communicable diseases affects people of all ages, gender, race and income levels, and further that poor
populations and those living in vulnerable situations, in particular in developing countries, bear a disproportionate burden and that non-communicable diseases can affect women and men differently;

24. Note with concern the rising levels of obesity in different regions, particularly among children and youth, and note that obesity, an unhealthy diet and physical inactivity have strong linkages with the four main non-communicable diseases and are associated with higher health costs and reduced productivity;

25. Express deep concern that women bear a disproportionate share of the burden of caregiving and that, in some populations, women tend to be less physically active than men, are more likely to be obese and are taking up smoking at alarming rates;

26. Note also with concern that maternal and child health is inextricably linked with non-communicable diseases and their risk factors, specifically as prenatal malnutrition and low birth weight create a predisposition to obesity, high blood pressure, heart disease and diabetes later in life, and that pregnancy conditions, such as maternal obesity and gestational diabetes, are associated with similar risks in both the mother and her offspring;

27. Note with concern the possible linkages between non-communicable diseases and some communicable diseases, such as HIV/AIDS, call for the integration, as appropriate, of responses to HIV/AIDS and non-communicable diseases, and in this regard call for attention to be given to people living with HIV/AIDS, especially in countries with a high prevalence of HIV/AIDS, in accordance with national priorities;

28. Recognize that smoke exposure from the use of inefficient cooking stoves for indoor cooking or heating contributes to and may exacerbate lung and respiratory conditions, with a disproportionate effect on women and children in poor populations whose households may be dependent on such fuels;

29. Acknowledge also the existence of significant inequalities in the burden of non-communicable diseases and in access to non-communicable disease prevention and control, both between countries, and within countries and communities;

30. Recognize the critical importance of strengthening health systems, including health-care infrastructure, human resources for health, and health and social protection systems, particularly in developing countries, in order to respond effectively and equitably to the health-care needs of people with non-communicable diseases;

31. Note with grave concern that non-communicable diseases and their risk factors lead to increased burdens on individuals, families and communities, including impoverishment from long-term treatment and care costs, and to a loss of productivity that threatens household income and leads to productivity loss for individuals and their families and to the economies of Member States, making non-communicable diseases a contributing factor to poverty and hunger, which may have a direct impact on the achievement of the internationally agreed development goals, including the Millennium Development Goals;

32. Express deep concern at the ongoing negative impacts of the financial and economic crisis, volatile energy and food prices and ongoing concerns over food security, as well as the increasing challenges posed by climate change and the loss of biodiversity, and their effect on the control and prevention of non-communicable diseases, and emphasize in this regard the need for prompt and robust, coordinated and multisectoral efforts to
address those impacts, while building on efforts already under way;

**Responding to the challenge: a whole-of-government and a whole-of-society effort**

33. Recognize that the rising prevalence, morbidity and mortality of non-communicable diseases worldwide can be largely prevented and controlled through collective and multisectoral action by all Member States and other relevant stakeholders at the local, national, regional and global levels, and by raising the priority accorded to non-communicable diseases in development cooperation by enhancing such cooperation in this regard;

34. Recognize that prevention must be the cornerstone of the global response to non-communicable diseases;

35. Recognize also the critical importance of reducing the level of exposure of individuals and populations to the common modifiable risk factors for non-communicable diseases, namely, tobacco use, unhealthy diet, physical inactivity and the harmful use of alcohol, and their determinants, while at the same time strengthening the capacity of individuals and populations to make healthier choices and follow lifestyle patterns that foster good health;

36. Recognize that effective non-communicable disease prevention and control require leadership and multisectoral approaches for health at the government level, including, as appropriate, health in all policies and whole-of-government approaches across such sectors as health, education, energy, agriculture, sports, transport, communication, urban planning, environment, labour, employment, industry and trade, finance, and social and economic development;

37. Acknowledge the contribution of and important role played by all relevant stakeholders, including individuals, families and communities, intergovernmental organizations and religious institutions, civil society, academia, the media, voluntary associations and, where and as appropriate, the private sector and industry, in support of national efforts for non-communicable disease prevention and control, and recognize the need to further support the strengthening of coordination among these stakeholders in order to improve the effectiveness of these efforts;

38. Recognize the fundamental conflict of interest between the tobacco industry and public health;

39. Recognize that the incidence and impacts of non-communicable diseases can be largely prevented or reduced with an approach that incorporates evidence-based, affordable, cost-effective, population-wide and multisectoral interventions;

40. Acknowledge that resources devoted to combating the challenges posed by non-communicable diseases at the national, regional and international levels are not commensurate with the magnitude of the problem;

41. Recognize the importance of strengthening local, provincial, national and regional capacities to address and effectively combat non-communicable diseases, particularly in developing countries, and that this may entail increased and sustained human, financial and technical resources;

42. Acknowledge the need to put forward a multisectoral approach for health at all government levels, to address non-communicable disease risk factors and underlying determinants of
health comprehensively and decisively;

Non-communicable diseases can be prevented and their impacts significantly reduced, with millions of lives saved and untold suffering avoided. We therefore commit to:

**Reduce risk factors and create health-promoting environments**

43. Advance the implementation of multisectoral, cost-effective, population-wide interventions in order to reduce the impact of the common non-communicable disease risk factors, namely tobacco use, unhealthy diet, physical inactivity and harmful use of alcohol, through the implementation of relevant international agreements and strategies, and education, legislative, regulatory and fiscal measures, without prejudice to the right of sovereign nations to determine and establish their taxation policies and other policies, where appropriate, by involving all relevant sectors, civil society and communities, as appropriate, and by taking the following actions:

a) Encourage the development of multisectoral public policies that create equitable health-promoting environments that empower individuals, families and communities to make healthy choices and lead healthy lives;

b) Develop, strengthen and implement, as appropriate, multisectoral public policies and action plans to promote health education and health literacy, including through evidence-based education and information strategies and programmes in and out of schools and through public awareness campaigns, as important factors in furthering the prevention and control of non-communicable diseases, recognizing that a strong focus on health literacy is at an early stage in many countries;

c) Accelerate implementation by States parties of the World Health Organization Framework Convention on Tobacco Control, recognizing the full range of measures, including measures to reduce consumption and availability, and encourage countries that have not yet done so to consider acceding to the Convention, recognizing that substantially reducing tobacco consumption is an important contribution to reducing non-communicable diseases and can have considerable health benefits for individuals and countries and that price and tax measures are an effective and important means of reducing tobacco consumption;

d) Advance the implementation of the Global Strategy on Diet, Physical Activity and Health, including, where appropriate, through the introduction of policies and actions aimed at promoting healthy diets and increasing physical activity in the entire population, including in all aspects of daily living, such as giving priority to regular and intense physical education classes in schools, urban planning and re-engineering for active transport, the provision of incentives for work-site healthy-lifestyle programmes, and increased availability of safe environments in public parks and recreational spaces to encourage physical activity;

e) Promote the implementation of the Global Strategy to Reduce the Harmful Use of Alcohol, while recognizing the need to develop appropriate domestic action plans, in consultation with relevant stakeholders, for developing specific policies and programmes, including taking into account the full range of options as
identified in the Global Strategy, as well as raise awareness of the problems caused by the harmful use of alcohol, particularly among young people, and call upon the World Health Organization to intensify efforts to assist Member States in this regard;

f) Promote the implementation of the World Health Organization Set of Recommendations on the Marketing of Foods and Non-alcoholic Beverages to Children,\(^9\) including foods that are high in saturated fats, trans-fatty acids, free sugars or salt, recognizing that research shows that food advertising geared to children is extensive, that a significant amount of the marketing is for foods with a high content of fat, sugar or salt and that television advertising influences children’s food preferences, purchase requests and consumption patterns, while taking into account existing legislation and national policies, as appropriate;

g) Promote the development and initiate the implementation, as appropriate, of cost-effective interventions to reduce salt, sugar and saturated fats and eliminate industrially produced trans-fats in foods, including through discouraging the production and marketing of foods that contribute to unhealthy diet, while taking into account existing legislation and policies;

h) Encourage policies that support the production and manufacture of, and facilitate access to, foods that contribute to healthy diet, and provide greater opportunities for utilization of healthy local agricultural products and foods, thus contributing to efforts to cope with the challenges and take advantage of the opportunities posed by globalization and to achieve food security;

i) Promote, protect and support breastfeeding, including exclusive breastfeeding for about six months from birth, as appropriate, as breastfeeding reduces susceptibility to infections and the risk of under-nutrition, promotes the growth and development of infants and young children and helps to reduce the risk of developing conditions such as obesity and non-communicable diseases later in life, and in this regard strengthen the implementation of the International Code of Marketing of Breast-milk Substitutes\(^{10}\) and subsequent relevant World Health Assembly resolutions;

j) Promote increased access to cost-effective vaccinations to prevent infections associated with cancers, as part of national immunization schedules;

k) Promote increased access to cost-effective cancer screening programmes, as determined by national situations;

l) Scale up, where appropriate, a package of proven, effective interventions, such as health promotion and primary prevention approaches, and galvanize actions for the prevention and control of non-communicable diseases through a meaningful multisectoral response, addressing risk factors and determinants of health;

44. With a view to strengthening its contribution to non-communicable disease prevention and control, call upon the private sector, where appropriate, to:


\(^{10}\) Available at www.who.int/nutrition/publications/code_english.pdf.
a) Take measures to implement the World Health Organization set of recommendations to reduce the impact of the marketing of unhealthy foods and non-alcoholic beverages to children, while taking into account existing national legislation and policies;
b) Consider producing and promoting more food products consistent with a healthy diet, including by reformulating products to provide healthier options that are affordable and accessible and that follow relevant nutrition facts and labelling standards, including information on sugars, salt and fats and, where appropriate, trans-fat content;
c) Promote and create an enabling environment for healthy behaviours among workers, including by establishing tobacco-free workplaces and safe and healthy working environments through occupational safety and health measures, including, where appropriate, through good corporate practices, workplace wellness programmes and health insurance plans;
d) Work towards reducing the use of salt in the food industry in order to lower sodium consumption;
e) Contribute to efforts to improve access to and affordability of medicines and technologies in the prevention and control of non-communicable diseases;

**Strengthen national policies and health systems**

45. Promote, establish or support and strengthen, by 2013, as appropriate, multisectoral national policies and plans for the prevention and control of non-communicable diseases, taking into account, as appropriate, the 2008–2013 Action Plan for the Global Strategy for the Prevention and Control of Non-communicable Diseases and the objectives contained therein, and take steps to implement such policies and plans:

a) Strengthen and integrate, as appropriate, non-communicable disease policies and programmes into health-planning processes and the national development agenda of each Member State;
b) Pursue, as appropriate, comprehensive strengthening of health systems that support primary health care and deliver effective, sustainable and coordinated responses and evidence-based, cost-effective, equitable and integrated essential services for addressing non-communicable disease risk factors and for the prevention, treatment and care of non-communicable diseases, acknowledging the importance of promoting patient empowerment, rehabilitation and palliative care for persons with non-communicable diseases and of a life course approach, given the often chronic nature of non-communicable diseases;
c) According to national priorities, and taking into account domestic circumstances, increase and prioritize budgetary allocations for addressing non-communicable disease risk factors and for surveillance, prevention, early detection and treatment of non-communicable diseases and the related care and support, including palliative care;
d) Explore the provision of adequate, predictable and sustained resources, through domestic, bilateral, regional and multilateral channels, including traditional and
voluntary innovative financing mechanisms;

e) Pursue and promote gender-based approaches for the prevention and control of non-communicable diseases founded on data disaggregated by sex and age in an effort to address the critical differences in the risks of morbidity and mortality from non-communicable diseases for women and men;

f) Promote multisectoral and multi-stakeholder engagement in order to reverse, stop and decrease the rising trends of obesity in child, youth and adult populations, respectively;

g) Recognize where health disparities exist between indigenous peoples and non-indigenous populations in the incidence of non-communicable diseases and their common risk factors, and that these disparities are often linked to historical, economic and social factors, and encourage the involvement of indigenous peoples and communities in the development, implementation and evaluation of non-communicable disease prevention and control policies, plans and programmes, where appropriate, while promoting the development and strengthening of capacities at various levels and recognizing the cultural heritage and traditional knowledge of indigenous peoples and respecting, preserving and promoting, as appropriate, their traditional medicine, including conservation of their vital medicinal plants, animals and minerals;

h) Recognize further the potential and contribution of traditional and local knowledge, and in this regard respect and preserve, in accordance with national capacities, priorities, relevant legislation and circumstances, the knowledge and safe and effective use of traditional medicine, treatments and practices, appropriately based on the circumstances in each country;

i) Pursue all necessary efforts to strengthen nationally driven, sustainable, cost-effective and comprehensive responses in all sectors for the prevention of non-communicable diseases, with the full and active participation of people living with these diseases, civil society and the private sector, where appropriate;


k) Strengthen, as appropriate, information systems for health planning and management, including through the collection, disaggregation, analysis, interpretation and dissemination of data and the development of population-based national registries and surveys, where appropriate, to facilitate appropriate and timely interventions for the entire population;

l) According to national priorities, give greater priority to surveillance, early detection, screening, diagnosis and treatment of non-communicable diseases and prevention and control, and to improving accessibility to safe, affordable, effective and quality medicines and technologies to diagnose and to treat them; provide
sustainable access to medicines and technologies, including through the development and use of evidence-based guidelines for the treatment of non-communicable diseases, and efficient procurement and distribution of medicines in countries; and strengthen viable financing options and promote the use of affordable medicines, including generics, as well as improved access to preventive, curative, palliative and rehabilitative services, particularly at the community level;

m) According to country-led prioritization, ensure the scaling-up of effective, evidence-based and cost-effective interventions that demonstrate the potential to treat individuals with non-communicable diseases, protect those at high risk of developing them and reduce risk across populations;

n) Recognize the importance of universal coverage in national health systems, especially through primary health care and social protection mechanisms, to provide access to health services for all, in particular for the poorest segments of the population;

o) Promote the inclusion of non-communicable disease prevention and control within sexual and reproductive health and maternal and child health programmes, especially at the primary health-care level, as well as other programmes, as appropriate, and also integrate interventions in these areas into non-communicable disease prevention programmes;

p) Promote access to comprehensive and cost-effective prevention, treatment and care for the integrated management of non-communicable diseases, including, inter alia, increased access to affordable, safe, effective and quality medicines and diagnostics and other technologies, including through the full use of trade-related aspects of intellectual property rights (TRIPS) flexibilities;

q) Improve diagnostic services, including by increasing the capacity of and access to laboratory and imaging services with adequate and skilled manpower to deliver such services, and collaborate with the private sector to improve affordability, accessibility and maintenance of diagnostic equipment and technologies;

r) Encourage alliances and networks that bring together national, regional and global actors, including academic and research institutes, for the development of new medicines, vaccines, diagnostics and technologies, learning from experiences in the field of HIV/AIDS, among others, according to national priorities and strategies;

s) Strengthen health-care infrastructure, including for procurement, storage and distribution of medicine, in particular transportation and storage networks to facilitate efficient service delivery;

**International cooperation, including collaborative partnerships**

46. Strengthen international cooperation in support of national, regional and global plans for the prevention and control of non-communicable diseases, inter alia, through the exchange of best practices in the areas of health promotion, legislation, regulation and health systems strengthening, training of health personnel, development of appropriate health-
care infrastructure and diagnostics, and by promoting the development and dissemination of appropriate, affordable and sustainable transfer of technology on mutually agreed terms and the production of affordable, safe, effective and quality medicines and vaccines, while recognizing the leading role of the World Health Organization as the primary specialized agency for health in that regard;

47. Acknowledge the contribution of aid targeted at the health sector, while recognizing that much more needs to be done. We call for the fulfilment of all official development assistance-related commitments, including the commitments by many developed countries to achieve the target of 0.7 per cent of gross national income for official development assistance by 2015, as well as the commitments contained in the Programme of Action for the Least Developed Countries for the Decade 2011–2020, and strongly urge those developed countries that have not yet done so to make additional concrete efforts to fulfil their commitments;

48. Stress the importance of North-South, South-South and triangular cooperation, in the prevention and control of non-communicable diseases, to promote at the national, regional and international levels an enabling environment to facilitate healthy lifestyles and choices, bearing in mind that South-South cooperation is not a substitute for, but rather a complement to, North-South cooperation;

49. Promote all possible means to identify and mobilize adequate, predictable and sustained financial resources and the necessary human and technical resources, and to consider support for voluntary, cost-effective, innovative approaches for a long-term financing of non-communicable disease prevention and control, taking into account the Millennium Development Goals;

50. Acknowledge the contribution of international cooperation and assistance in the prevention and control of non-communicable diseases, and in this regard encourage the continued inclusion of non-communicable diseases in development cooperation agendas and initiatives;

51. Call upon the World Health Organization, as the lead United Nations specialized agency for health, and all other relevant United Nations system agencies, funds and programmes, the international financial institutions, development banks and other key international organizations to work together in a coordinated manner to support national efforts to prevent and control non-communicable diseases and mitigate their impacts;

52. Urge relevant international organizations to continue to provide technical assistance and capacity-building to developing countries, especially to the least developed countries, in the areas of non-communicable disease prevention and control and promotion of access to medicines for all, including through the full use of trade-related aspects of intellectual property rights flexibilities and provisions;

53. Enhance the quality of aid by strengthening national ownership, alignment, harmonization, predictability, mutual accountability and transparency, and results orientation;

54. Engage non-health actors and key stakeholders, where appropriate, including the private

---

12 See Report of the Fourth United Nations Conference on the Least Developed Countries, Istanbul, Turkey, 9-13 May 2011 (United Nations publication, Sales No. 11.II.A.1), chap. II.
sector and civil society, in collaborative partnerships to promote health and to reduce non-communicable disease risk factors, including through building community capacity in promoting healthy diets and lifestyles;

55. Foster partnerships between government and civil society, building on the contribution of health-related non-governmental organizations and patients’ organizations, to support, as appropriate, the provision of services for the prevention and control, treatment and care, including palliative care, of non-communicable diseases;

56. Promote the capacity-building of non-communicable-disease-related non-governmental organizations at the national and regional levels, in order to realize their full potential as partners in the prevention and control of non-communicable diseases;

**Research and development**

57. Promote actively national and international investments and strengthen national capacity for quality research and development, for all aspects related to the prevention and control of non-communicable diseases, in a sustainable and cost-effective manner, while noting the importance of continuing to incentivize innovation;

58. Promote the use of information and communications technology to improve programme implementation, health outcomes, health promotion, and reporting and surveillance systems and to disseminate, as appropriate, information on affordable, cost-effective, sustainable and quality interventions, best practices and lessons learned in the field of non-communicable diseases;

59. Support and facilitate non-communicable-disease-related research, and its translation, to enhance the knowledge base for ongoing national, regional and global action;

**Monitoring and evaluation**

60. Strengthen, as appropriate, country-level surveillance and monitoring systems, including surveys that are integrated into existing national health information systems and include monitoring exposure to risk factors, outcomes, social and economic determinants of health, and health system responses, recognizing that such systems are critical in appropriately addressing non-communicable diseases;

61. Call upon the World Health Organization, with the full participation of Member States, informed by their national situations, through its existing structures, and in collaboration with United Nations agencies, funds and programmes and other relevant regional and international organizations, as appropriate, building on continuing efforts to develop, before the end of 2012, a comprehensive global monitoring framework, including a set of indicators, capable of application across regional and country settings, including through multisectoral approaches, to monitor trends and to assess progress made in the implementation of national strategies and plans on non-communicable diseases;

62. Call upon the World Health Organization, in collaboration with Member States through the governing bodies of the World Health Organization, and in collaboration with United Nations agencies, funds and programmes, and other relevant regional and international
organizations, as appropriate, building on the work already under way, to prepare recommendations for a set of voluntary global targets for the prevention and control of non-communicable diseases, before the end of 2012;

63. Consider the development of national targets and indicators based on national situations, building on guidance provided by the World Health Organization, to focus on efforts to address the impacts of non-communicable diseases and to assess the progress made in the prevention and control of non-communicable diseases and their risk factors and determinants;

Follow-up

64. Request the Secretary-General, in close collaboration with the Director-General of the World Health Organization, and in consultation with Member States, United Nations funds and programmes and other relevant international organizations, to submit by the end of 2012 to the General Assembly, at its sixty-seventh session, for consideration by Member States, options for strengthening and facilitating multisectoral action for the prevention and control of non-communicable diseases through effective partnership;

65. Request the Secretary-General, in collaboration with Member States, the World Health Organization and relevant funds, programmes and specialized agencies of the United Nations system to present to the General Assembly at its sixty-eighth session a report on the progress achieved in realizing the commitments made in this Political Declaration, including on the progress of multisectoral action, and the impact on the achievement of the internationally agreed development goals, including the Millennium Development Goals, in preparation for a comprehensive review and assessment in 2014 of the progress achieved in the prevention and control of non-communicable diseases.

Vision:
A world free of the avoidable burden of noncommunicable diseases.

Goal:
To reduce the preventable and avoidable burden of morbidity, mortality and disability due to noncommunicable diseases by means of multisectoral collaboration and cooperation at national, regional and global levels, so that populations reach the highest attainable standards of health and productivity at every age and those diseases are no longer a barrier to well-being or socioeconomic development.

Overarching principles:
- Human rights approach
- Equity-based approach
- National action and international cooperation and solidarity
- Multisectoral action
- Life-course approach
- Empowerment of people and communities
- Evidence-based strategies
- Universal health coverage
- Management of real, perceived or potential conflicts of interest

Objectives
- To raise the priority accorded to the prevention and control of noncommunicable diseases in global, regional and national agendas and internationally agreed development goals, through strengthened international cooperation and advocacy.
- To strengthen national capacity, leadership, governance, multisectoral action and partnerships to accelerate country response for the prevention and control of noncommunicable diseases.
- To reduce modifiable risk factors for noncommunicable diseases and underlying social determinants through creation of health-promoting environments.
- To strengthen and orient health systems to address the prevention and control of noncommunicable diseases and the underlying social determinants through people-centered primary health care and universal health coverage.
- To promote and support national capacity for high-quality research and development for the prevention and control of noncommunicable diseases.
- To monitor the trends and determinants of noncommunicable diseases and evaluate progress in their prevention and control.
Voluntary global targets:

- 25% relative reduction in risk of premature mortality from cardiovascular diseases, cancer, diabetes, or chronic respiratory diseases.
- At least 10% relative reduction in the harmful use of alcohol, as appropriate, within the national context.
- A 10% relative reduction in prevalence of insufficient physical activity.
- A 30% relative reduction in mean population intake of salt/sodium.
- A 30% relative reduction in prevalence of current tobacco use in persons aged 15+ years.
- A 25% relative reduction in the prevalence of raised blood pressure or contain the prevalence of raised blood pressure, according to national circumstances.
- Halt the rise in diabetes and obesity.
- At least 50% of eligible people receive drug therapy and counselling (including glycaemic control) to prevent heart attacks and strokes.
- An 80% availability of the affordable basic technologies and essential medicines, including generics, required to treat major noncommunicable diseases in both public and private facilities.

Comprehensive global monitoring framework, including 25 indicators, and a set of nine voluntary global targets for the prevention and control of non-communicable diseases.

<table>
<thead>
<tr>
<th>Framework elements</th>
<th>Targets</th>
<th>Indicators</th>
</tr>
</thead>
<tbody>
<tr>
<td>MORTALITY &amp; MORBIDITY</td>
<td>25% relative reduction in risk of premature mortality from cardiovascular diseases, cancer, diabetes, or chronic respiratory diseases.</td>
<td>1. Unconditional probability of dying between ages of 30 and 70 from cardiovascular diseases, cancer, diabetes or chronic respiratory diseases</td>
</tr>
<tr>
<td>Additional indicator</td>
<td>2. Cancer incidence, by type of cancer, per 100,000 population</td>
<td></td>
</tr>
<tr>
<td>BEHAVIORAL RISK FACTORS</td>
<td>3. Total (recorded and unrecorded) alcohol per capita (aged 15+ years old) consumption within a calendar year in liters of pure alcohol, as appropriate, within the national context</td>
<td></td>
</tr>
<tr>
<td>Harmful use of alcohol</td>
<td>4. Age-standardized prevalence of heavy episodic drinking among adolescents and adults, as appropriate, within the national context</td>
<td></td>
</tr>
<tr>
<td>Physical inactivity</td>
<td>5. Alcohol-related morbidity and mortality among adolescents and adults, as appropriate, within the national context</td>
<td></td>
</tr>
<tr>
<td>Physical inactivity</td>
<td>6. Prevalence of insufficiently physically active adolescents, defined as less than 60 minutes of moderate to vigorous intensity activity daily</td>
<td></td>
</tr>
<tr>
<td><strong>BIOLOGICAL RISK FACTORS</strong></td>
<td><strong>NATIONAL SYSTEM RESPONSE</strong></td>
<td></td>
</tr>
<tr>
<td>-----------------------------</td>
<td>-----------------------------</td>
<td></td>
</tr>
<tr>
<td><strong>Raised blood pressure</strong></td>
<td><strong>Drug therapy to prevent heart</strong> At least 50% of eligible people</td>
<td></td>
</tr>
<tr>
<td>A 25% relative reduction in the prevalence of raised blood pressure or contain the prevalence of raised blood pressure, according to national circumstances.</td>
<td><strong>12.</strong> Age-standardized prevalence of raised blood glucose/diabetes among persons aged 18+ years (defined as fasting plasma glucose concentration ≥ 7.0 mmol/l (126 mg/dl) or on medication for raised blood glucose) <strong>13.</strong> Prevalence of overweight and obesity in adolescents (defined according to the WHO growth reference for school-aged children and adolescents, overweight – one standard deviation body mass index for age and sex, and obese – two standard deviations body mass index for age and sex) <strong>14.</strong> Age-standardized prevalence of overweight and obesity in persons aged 18+ years (defined as body mass index ≥ 25 kg/m² for overweight and body mass index ≥ 30 kg/m² for obesity)</td>
<td></td>
</tr>
<tr>
<td><strong>Diabetes and obesity</strong></td>
<td><strong>15.</strong> Age-standardized mean proportion of total energy intake from saturated fatty acids in persons aged 18+ years <strong>16.</strong> Age-standardized prevalence of persons (aged 18+ years) consuming less than five total servings (400 grams) of fruit and vegetables per day <strong>17.</strong> Age-standardized prevalence of raised total cholesterol among persons aged 18+ years (defined as total cholesterol ≥5.0 mmol/l or 190 mg/dl); and mean total cholesterol concentration</td>
<td></td>
</tr>
<tr>
<td>Halt the rise in diabetes and obesity.</td>
<td><strong>18.</strong> Proportion of eligible persons (defined as aged 40 years and older with a 10-year cardiovascular risk ≥30%, including those with</td>
<td></td>
</tr>
<tr>
<td>Essential noncommunicable disease medicines and basic technologies to treat major noncommunicable diseases</td>
<td>An 80% availability of the affordable basic technologies and essential medicines, including generics, required to treat major noncommunicable diseases in both public and private facilities.</td>
<td>19. Availability and affordability of quality, safe and efficacious essential noncommunicable disease medicines, including generics, and basic technologies in both public and private facilities.</td>
</tr>
<tr>
<td>---</td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>Additional indicator</td>
<td>20. Access to palliative care assessed by morphine-equivalent consumption of strong opioid analgesics (excluding methadone) per death from cancer</td>
<td>21. Adoption of national policies that limit saturated fatty acids and virtually eliminate partially hydrogenated vegetable oils in the food supply, as appropriate, within the national context and national programmes</td>
</tr>
<tr>
<td></td>
<td>22. Availability, as appropriate, if cost-effective and affordable, of vaccines against human papillomavirus, according to national programmes and policies</td>
<td>23. Policies to reduce the impact on children of marketing of foods and non-alcoholic beverages high in saturated fats, trans fatty acids, free sugars, or salt</td>
</tr>
<tr>
<td></td>
<td>24. Vaccination coverage against hepatitis B virus monitored by number of third doses of Hep-B vaccine (HepB3) administered to infants</td>
<td>25. Proportion of women between the ages of 30–49 screened for cervical cancer at least once, or more often, and for lower or higher age groups according to national programmes or policies</td>
</tr>
</tbody>
</table>
Set of 9 voluntary global NCD targets for 2025

- Harmful use of alcohol: 10% reduction
- Physical inactivity: 10% reduction
- Salt/sodium intake: 30% reduction
- Tobacco use: 30% reduction
- Raised blood pressure: 25% reduction
- Premature mortality from NCDs: 25% reduction
- Essential NCD medicines and technologies: 80% coverage
- Drug therapy and counseling: 50% coverage
- Diabetes/AIDS: 0% increase
Annex 3: Summary of the global recommendations on physical activity

**Young people (5–17 years old)**

To improve cardiorespiratory and muscular fitness, bone health, cardiovascular and metabolic health biomarkers and reduced symptoms of anxiety and depression, the following are recommended.

- Children and young people should accumulate at least 60 minutes of moderate to vigorous intensity physical activity daily.
- Most daily physical activity should be aerobic.
- Vigorous-intensity activities, including those that strengthen muscle and bone, should be incorporated in daily physical activity at least 3 times per week.

**Adults (18–64 years old)**

To improve cardiorespiratory and muscular fitness and bone health and reduce the risk of NCDs and depression the following are recommended.

- Adults should do at least 150 minutes of moderate-intensity aerobic physical activity throughout the week, or at least 75 minutes of vigorous-intensity aerobic physical activity throughout the week, or an equivalent combination of moderate- and vigorous-intensity activity.
- Aerobic activity should be performed in bouts of at least 10 minutes duration.
- Muscle-strengthening activities should be done on 2 or more days a week.

**Older adults (65 years old and above)**

- To improve cardiorespiratory and muscular fitness, and bone and functional health, and reduce the risk of NCDs, depression and cognitive decline, the same recommendations apply as for adults 18–64 years old but with the following provisions.
- Adults of this age group with poor mobility should perform physical activity to enhance balance and prevent falls on 3 or more days per week.
- When adults of this age group cannot do the recommended amounts of physical activity due to health conditions, they should be as physically active as their abilities and conditions allow.
Synopsis 4

Health Promotion

Strategic Study
Health Promotion
Strategic Study

Task Force:

- HE Dr. Ali Al Hinai, Undersecretary for Planning Affairs.
- Dr. Halima Al Hinai
- Dr. Khuloud Al Mufarji
- Dr. Huda Al Siyabi
- Dr. Zahir Al Anqoudi
- Dr. Rashid Al Saadi

Contributors:

- Dr. Wayn MIttic
- Dr. Abdul Hakeem Al Rawahi

Acknowledgment:

- Health Vision 2050 Team
- Strategic Studies Review Team
- Mr. Yassir Hassan A Sadiq
Introduction

Health is defined by the World Health Organization (WHO) as a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity. This concept equates health with a productive and creative life, focusing on living conditions rather than on categories of disease causing illness or death. It is also linked with human development, as health plays a vital role in the progress, prosperity and development of a society.

It is considered a fundamental human right and a major social investment goal, therefore the National Health Policy in Oman has an over-arching aim to create the conditions necessary to promote a state of complete wellbeing for all Omani citizens on equal terms. It confirms that the highest possible level of health is the most important social goal and that the action of many other social and economic sectors in addition to the health sector is required.

Oman’s Health indicators reflected the national policy statement. The current health indicators compare well with those of many developed countries. The average life expectancy in Oman has increased from only 49 years in 1970 to as high as 76.2 years in 2012 as illustrated below.

*Figure (1): Improvement in Life Expectancy since 1970*
The following table summarizes vital indicators.

*Table 1 Vital Indicators 2010-2012*

<table>
<thead>
<tr>
<th>Rate</th>
<th>2010</th>
<th>2011</th>
<th>2012</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Fertility Rate</td>
<td>3.3</td>
<td>3.24</td>
<td>3.7</td>
</tr>
<tr>
<td>Maternal Mortality Rate (per 100,000 live births)</td>
<td>26.4</td>
<td>15.9</td>
<td>17.8</td>
</tr>
<tr>
<td>Crude Birth Rate (per 1000 population)</td>
<td>29.2</td>
<td>29.4</td>
<td>32.1</td>
</tr>
<tr>
<td>Crude death rate (per 1000 population)</td>
<td>2.9</td>
<td>3.1</td>
<td>3.2</td>
</tr>
<tr>
<td>Infant mortality rate (per 1000 live births)</td>
<td>10.2</td>
<td>9.5</td>
<td>9.5</td>
</tr>
<tr>
<td>Under 5 mortality rate (per 1000 live births)</td>
<td>12.3</td>
<td>11.9</td>
<td>11.5</td>
</tr>
<tr>
<td>Life expectancy at birth (Years)</td>
<td>73.3</td>
<td>72.4</td>
<td>76.2</td>
</tr>
<tr>
<td>Males (Years)</td>
<td>70.8</td>
<td>70.1</td>
<td>74.5</td>
</tr>
<tr>
<td>Females (Years)</td>
<td>76.2</td>
<td>75.2</td>
<td>78.0</td>
</tr>
</tbody>
</table>

Remarkable achievements have also been made in controlling other communicable diseases such as respiratory infections, diarrheal diseases, tuberculosis and leprosy (Figure 2 & 3).

*Figure (2): Trend of ARI cases among under 5 years*

<table>
<thead>
<tr>
<th>Rate per 1000 children &lt; 5 years</th>
</tr>
</thead>
<tbody>
<tr>
<td>1995</td>
</tr>
<tr>
<td>2000</td>
</tr>
<tr>
<td>2005</td>
</tr>
<tr>
<td>2006</td>
</tr>
<tr>
<td>2007</td>
</tr>
<tr>
<td>2008</td>
</tr>
<tr>
<td>2009</td>
</tr>
<tr>
<td>2010</td>
</tr>
<tr>
<td>2011</td>
</tr>
<tr>
<td>2012</td>
</tr>
</tbody>
</table>
However, HIV/AIDS is still a new challenge to the Omani community.

Moreover, many new infectious diseases are emerging and pose potential health threats. Therefore, well planned risk communication strategies need to be well addressed and executed.

**NCDs in Oman**

Today, non-communicable diseases (NCDs), mainly cardiovascular diseases, cancers, chronic respiratory diseases and diabetes represent a leading threat to human health and development. These four diseases are the world’s biggest killers, causing an estimated 35 million deaths each year - 60% of all deaths globally - with 80% in low- and middle-income countries.

The mortality and morbidity data that appears in Table 2 shows clear signs of the onset of a health transition in Oman similar to what has already been observed in other developed countries.
Cardiovascular disease, for example, takes a significant toll on the health of the people of Oman – it is ranked first among the leading causes of death (32.5% in 2012).

The prevalence of diabetes mellitus among adults 20 years and older has risen from 11.6 % in 2000 to 12.3 % in 2008. And the trend of registered new diabetic cases is increasing as clearly shown in figure 4. The International Diabetes Federation (IDF) ranked Oman on the prevalence of diabetes as the 8th (13.4%) worldwide in 2010 and their projection to reach 14.9% by 2030.

Similarly, hypertension prevalence increased from 27% in 1995 to 33% in 2000 and to 40.3% in 2008.
Cancer reportedly accounts for 9.9% of all causes of hospital death and the third leading cause of hospital death and the third cause of lost disability adjusted life years (DALYs).

Figure (4): Total Registered Cases of Diabetes (1999-2012)

Figure (5): Age-adjusted incidence cancer rates in Omanis (2005-2011)
Risk Factors

These NCD diseases are preventable. Up to 80% of heart disease, stroke, and type 2 diabetes and over a third of cancers could be prevented by eliminating shared risk factors, mainly tobacco use, unhealthy diet, physical inactivity and the harmful use of alcohol. Unless addressed, the mortality and disease burden from these health problems will continue to increase.

The pattern of increasing disease prevalence is accompanied by observed increase in common risk factors. Data from World health survey in 2008 found that major risk factor for cardiovascular disease like, hypertension (i.e. high systolic or diastolic blood pressure), is found in 40.3% of adults (50.2% for men and 29.6% for women), while elevated total cholesterol levels occur in almost 33.6% and elevated LDL in 32% of the adult population. In addition, hypercholesterolemia, LDL and HDL dyslipidemia, and central obesity are present in a slightly over third of the adult Omani population. Age-adjusted data for metabolic syndrome showed that 21% of adults are affected by metabolic syndrome in 2008.

National health survey in 2000 showed that 61% of adults were not doing any physical activity and that number reduced to 37% in 2008.

The College KABP survey which was published 2008 stated that 50% of college students are having low level of physical activity as per the three physical activity levels proposed by the international physical activity questionnaire (IPAQ).

The prevalence of current smokers in 1995 in males over 15 years of age was 10.5% and in 2008 the prevalence among adults over 18 years of age was 14.3%. Current daily smoking among Omani males and females in 2008 was 5.8%. The pattern of smoking among the growing youth generation is also changing. Two global youth tobacco use surveys in 2003 and 2007 showed decreased pattern in prevalence of current smoking of cigarettes and water-pipe smoking. However, new ways of tobacco use are emerging among young age group. For example, Shisha smoking, chewed tobacco and Electronic cigarette.

Data from the national health surveys in 2000 and world health survey in 2008 show alarming signs; Obesity has increased from 19.1% to 24.1%, the prevalence of Overweight changed from 28.9% to 29.5. In 2008 survey the prevalence of central Obesity reached 37.4% (for men are 19.7% and 53.5% for women).

In 2001 baseline survey of Nizwa healthy lifestyle project, overweight was found to be 28.3%, obesity 13.2%, central obesity 23.7% and abnormal waist/hip ratio 45.0%. Unfortunately post interventional study in 2010 in Nizwa showed significantly increasing pattern of obesity parameters (33.4% Overweight, 32.9% central obesity and 52.3% abnormal waist/hip) as shown
in the figure below. This could be due to the persistent use of the Ghee and animal butter and the high intake of carbohydrates and oil, in addition to the emergence of fast food restaurants in Nizwa.

Figure (6): comparison of the prevalence of central obesity and waist/hip ratio between 2001 and 2010

In addition to what is mentioned above, many other risky behaviors impose great challenge to health promotion. Such behaviors are those related to injuries and accidents. Injuries (road traffic injuries, falls and occupational injuries) and poisoning are the sixth leading cause of hospital mortality and fourth leading cause of morbidity in Oman.

The annual health report of 2012 showed the main causes of Injuries & Poisoning morbidity among inpatients were due to Road Traffic Accidents (33.5%), followed by falls (32.0%). Although about 53.0% of the external causes of morbidity were reported among the age group 15-44, in-depth analysis of data reveals that children below 5 are those most frequently exposed to external causes (14.7%), followed by the children in the age group 5-14 and followed by individuals in age group 15-44(14.2%).

Oman is among the countries reporting the highest mortality rates related to road traffic crashes. Mortality rate has actually increased from 25 per 100,000 in 2002 to 28 per 100,000 in 2012, mostly involving young men.

Furthermore, a review of available data indicates the increasing severity of crashes and significant underreporting of mild and moderate injuries. In 2012, there was increase in immediate deaths, injuries and number of accidents by 15%, 3% and 2% respectively, compared to the previous year.
These morbidities and their related risks are challenges which represent a massive burden on the individuals, the health and the economy as a whole.

**Social Determinants of Health**

The lifestyle choices people make can have a direct impact on their physical and mental wellbeing. These choices—and ultimately behaviors—can be influenced by many factors or determinants of health including age, sex, social class, income, education, peer group pressure, work and living conditions and access to information.

Determinants of health are factors that contribute to a person's current state of health. These factors may be biological, socioeconomic, psychosocial, behavioral, or social in nature.

Addressing social determinants of health is a primary approach to achieving health equity. Health equity is "when everyone has the opportunity to 'attain their full health potential' and no one is 'disadvantaged from achieving this potential because of their social position or other socially determined circumstance."

Health equity has also been defined as "the absence of systematic disparities in health between and within social groups that have different levels of underlying social advantages or disadvantages—that is, different positions in a social hierarchy". Social determinants of health such as poverty, unequal access to health care, lack of education, stigma, and racism are underlying contributing factors of health inequities.

Although there was a remarkable improvement in health status in Oman in the past 40 years, however, this improvement can be attributed as much to improvement of non-health conditions as to those related to the health system [e.g. income, education, transport, empowerment among women and access to information (improvement in health literacy). Oman has witnessed a high rate of economic growth during the past two decades.
The educational system has witnessed at the beginning of the present century expansion in the application of the basic education system and the development of post-primary education to meet the needs of the knowledge, skills and abilities of the student. The illiteracy rate has declined to about 14% among Omanis aged 15 years and above and it is higher in females (19.4%) than in males (8.9%).

School enrollment has increased over time. 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. Figure 6 shows the distribution of government school students according to governorates.

*Figure (7): Trend of GDP per capita, 2000–2012*
### Table 3: Social indicators

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Age dependency ratio ((below 15 yrs and 65 yrs +)/(15–65 yrs)) (%)</td>
<td>87</td>
<td>70</td>
<td>63</td>
<td>61</td>
</tr>
<tr>
<td>% Omanis married (15 years +)</td>
<td>50.4</td>
<td>46.1</td>
<td>49.8</td>
<td>n.a.</td>
</tr>
<tr>
<td>% Omani males married (15 years +)</td>
<td>49.3</td>
<td>44.8</td>
<td>49.0</td>
<td>n.a.</td>
</tr>
<tr>
<td>% Omani females married (15 years +)</td>
<td>51.6</td>
<td>47.4</td>
<td>50.7</td>
<td>n.a.</td>
</tr>
<tr>
<td>Average family size</td>
<td>8.7</td>
<td>8.0</td>
<td>7.8</td>
<td>n.a.</td>
</tr>
<tr>
<td><strong>Social services</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cases of beneficiaries of government grants</td>
<td>46,407</td>
<td>49,075</td>
<td>51,770</td>
<td>81,532</td>
</tr>
<tr>
<td>Cost of beneficiaries of government grants (000 RO)</td>
<td>23,325</td>
<td>27,491</td>
<td>37,723</td>
<td>122,136</td>
</tr>
<tr>
<td>Social welfare (cases)</td>
<td>46,032</td>
<td>48,869</td>
<td>51,262</td>
<td>81,014</td>
</tr>
<tr>
<td>% Social welfare of government beneficiaries</td>
<td>99.2</td>
<td>99.6</td>
<td>99.0</td>
<td>99.4</td>
</tr>
<tr>
<td>% Social welfare of Omani population 15 years +</td>
<td>4.6</td>
<td>4.3</td>
<td>4.1</td>
<td>5.8</td>
</tr>
<tr>
<td><strong>Education</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Schools</td>
<td>1,158</td>
<td>1,240</td>
<td>1,466</td>
<td>1,529</td>
</tr>
<tr>
<td>% Females students (government schools)</td>
<td>48.7</td>
<td>48.5</td>
<td>48.9</td>
<td>49.7</td>
</tr>
<tr>
<td>Illiteracy rate (Omani population 15+ years) (%)</td>
<td>26.4</td>
<td>21.9</td>
<td>14.1</td>
<td>n.a.</td>
</tr>
<tr>
<td>Illiteracy rate (Omani males 15+ years) (%)</td>
<td>15.4</td>
<td>14.5</td>
<td>8.9</td>
<td>n.a.</td>
</tr>
<tr>
<td>Illiteracy rate (Omani females 15+ years) (%)</td>
<td>34.1</td>
<td>29.4</td>
<td>19.4</td>
<td>n.a.</td>
</tr>
<tr>
<td>Gross primary enrollment rate (grades 1–6) (%)</td>
<td>100.3</td>
<td>99.8</td>
<td>102.5</td>
<td>101.2</td>
</tr>
<tr>
<td>Net primary enrollment rate (grades 1–6) (%)</td>
<td>89.7</td>
<td>98.6</td>
<td>95.5</td>
<td>98.1</td>
</tr>
<tr>
<td><strong>Employment (workers)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total workers</td>
<td>661,498</td>
<td>656,114</td>
<td>1,297,982</td>
<td>1,684,574</td>
</tr>
<tr>
<td>% of potential workers (aged 15–65 years)</td>
<td>44.0</td>
<td>39.3</td>
<td>67.5</td>
<td>61.7</td>
</tr>
<tr>
<td>% Omanis</td>
<td>20.8</td>
<td>31.8</td>
<td>24.5</td>
<td>20.1</td>
</tr>
<tr>
<td>Public workers</td>
<td>110,498</td>
<td>132,114</td>
<td>163,982</td>
<td>194,326</td>
</tr>
<tr>
<td>% Omanis</td>
<td>74.0</td>
<td>82.8</td>
<td>85.6</td>
<td>85.8</td>
</tr>
<tr>
<td>% Women</td>
<td>27.7</td>
<td>33.0</td>
<td>36.4</td>
<td>39.7</td>
</tr>
<tr>
<td>Total workers in private sector</td>
<td>551,000</td>
<td>524,000</td>
<td>1,134,000</td>
<td>1,488,248</td>
</tr>
<tr>
<td>% Omanis working in private sector</td>
<td>10.2</td>
<td>18.9</td>
<td>15.7</td>
<td>11.6</td>
</tr>
<tr>
<td><strong>Communication and transportation</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Internet subscribers (000)</td>
<td>24</td>
<td>49</td>
<td>74</td>
<td>119</td>
</tr>
<tr>
<td>Fixed telephone lines (000)</td>
<td>225</td>
<td>257</td>
<td>282</td>
<td>305</td>
</tr>
<tr>
<td>Mobile phones (000)</td>
<td>162</td>
<td>1,980</td>
<td>4,606</td>
<td>5,278</td>
</tr>
<tr>
<td>Active mobile broadband subscribers (000)</td>
<td>48</td>
<td>48</td>
<td>48</td>
<td>48</td>
</tr>
<tr>
<td>Asphalted roads (km)</td>
<td>8,477</td>
<td>15,943</td>
<td>28,903</td>
<td>31,365</td>
</tr>
<tr>
<td>Road traffic accidents</td>
<td>13,040</td>
<td>9,247</td>
<td>7,571</td>
<td>8,209</td>
</tr>
<tr>
<td>% Fatalities</td>
<td>3.0</td>
<td>5.9</td>
<td>9.1</td>
<td>10.8</td>
</tr>
<tr>
<td><strong>Environment</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Households with safe water for household use (%)</td>
<td>65.3</td>
<td>n.a.</td>
<td>77.0</td>
<td>n.a.</td>
</tr>
<tr>
<td>Households with safe drinking water (%)</td>
<td>69.5</td>
<td>n.a.</td>
<td>87.6</td>
<td>n.a.</td>
</tr>
<tr>
<td>Electricity production (GW/h)</td>
<td>9,111</td>
<td>12,648</td>
<td>19,159</td>
<td>24,365</td>
</tr>
<tr>
<td>Electricity distribution (GW/h)</td>
<td>8,682</td>
<td>12,023</td>
<td>15,626</td>
<td>20,958</td>
</tr>
<tr>
<td>Cultivated area (000) feddan or acres</td>
<td>173</td>
<td>151</td>
<td>167</td>
<td>173</td>
</tr>
<tr>
<td><strong>Media</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>TV broadcasting hours (per year)</td>
<td>8,784</td>
<td>17,520</td>
<td>12,045</td>
<td>14,640</td>
</tr>
<tr>
<td>Radio broadcasting hours (per year)</td>
<td>14,274</td>
<td>19,710</td>
<td>28,470</td>
<td>36,600</td>
</tr>
</tbody>
</table>
Health Promotion:

Many initiatives across the world have been tried to combat such challenges and to address Health Determinants. Previous approaches recommend that government need to conduct awareness campaigns to educate the people on the risk of adopting unhealthy behaviors. These approaches stress on the responsibility of individuals to make healthy choices. However, these interventions failed neither to slow nor reverse such problem. Therefore, there is an urge to search for new holistic approaches and call to shift in the way these interventions designed and executed to tackle such problems as a whole. Health promotion is found to be the successful approach to address these interventions. It has a holistic view which provides a broader spectrum to collectively address all relevant issues, determinants and factors.

Health promotion is defined as a comprehensive social and political process; it not only embraces actions directed at strengthening the skills and capabilities of individuals, but includes action directed towards changing social, environmental and economic conditions so as to lessen their negative impact on public and individual health. Health promotion is the process of enabling people to increase control over the determinants of health and thereby improve their health.

The Ottawa Charter (WHO1986) identifies three basic strategies for health promotion. These are: advocacy for health to safeguard the conditions essential to health as previously established; enabling all people to achieve their full health potential; and mediating between the different interests in society in the pursuit of health. These strategies are supported by five priority action areas for health promotion—building healthy public policy, creating supportive environments, strengthening community action, developing personal skills and reorienting health services as illustrated below in the Framework of Health Promotion.
Health promotion Models

Globally, government agencies (such as health departments) and non-governmental organizations have significant efforts in the area of health promotion. The Pan American Health Organization and the International Union for Health Promotion and Education, and many more around the world, are influential in health promotion. There are many successful stories of health promotion interventions, in schools, worksites and societies that showed the effectiveness of health promotion strategies in many countries. For instance, The National Program of Healthy Life Style for Non-communicable Diseases Prevention and Control in Isfahan (Iran) and The North Karelia Project (Finland) are two significant examples of successful health promotion interventions.
The North Karelia Project

The North Karelia Project: a program for community control of cardiovascular diseases. The North Karelia Project is a comprehensive community program for health promotion in North Karelia, a rural county with 180,000 inhabitants in Eastern Finland. The Project was launched in Finland in 1972 in response to the local petition to get urgent and effective help to reduce the great burden of exceptionally high coronary heart disease (CHD) mortality rates in the area. The aims of the program were to improve detection and control of hypertension, to reduce smoking, and to promote diets lower in saturated fat and higher in vegetables and low fat products.

In cooperation with local and national authorities and experts, as well as with WHO, the North Karelia Project was formulated and implemented to carry out a comprehensive intervention through the community organizations and the action of the people themselves. Comprehensive activities have been used, involving health and other services, schools, innovative media campaigns, local media, supermarkets, food industry, agriculture, etc.

The published results of the North Karelia Project show how over the 25-year period major changes took place in the levels of the target risk factors in North Karelia.

Among the male population, smoking greatly reduced and dietary habits markedly changed. In 1972, 52% of middle-aged men in North Karelia smoked. In 1997 the percentage had fallen to 31%. In the early 70’s use of vegetable oil products was very rare; now it is very common. In 1972 about 90% of the population in North Karelia reported that they use mainly butter on bread. Today it is less than 5%. The dietary changes have led to about 17% reduction in the mean serum cholesterol level of the population. Elevated blood pressures have been brought well under control and leisure time physical activity has been increased. Among women, similar changes in dietary habits in cholesterol and in blood pressure levels took place. At the same time, however, smoking somewhat increased, but from a low level. These risk factor changes were in the 70’s in North Karelia significantly greater than in the original comparison area. With national action the changes have thereafter concerned all Finland. In the 80’s some leveling off took place in the trends in North Karelia, but thereafter remarkably great changes took place concerning particularly dietary changes. This has been associated with major reductions in serum cholesterol levels.

By 2002 the annual age adjusted mortality rate of coronary heart disease in the middle aged (below 65 years) male population in North Karelia had reduced about 82% from the pre-program years (1967–71). 75%. At the same time the lung cancer mortality has also reduced, more than 70% in North Karelia: and nearly 60 % in all Finland.

With greatly reduced cardiovascular and cancer mortality the all-cause mortality has reduced more than 50 %, leading also to greater life expectancy: approximately 7 years for men and 6
years for women. Associated with approving risk factor and lifestyle changes, the general health status of the people has greatly improved. A separate analysis has shown that most of the decline in CHD mortality was due to reduction in the incidence and can be explained by the changes of the target risk factors in the population. The reduction in serum cholesterol level of the population due to general dietary changes has been the strongest contributor.

The Project has included a comprehensive evaluation, and has acted as a major demonstration program for national and international applications. Over the years the scope of the Project has been enlarged to include broader objectives of integrated prevention of major non-communicable diseases and health promotion, as well as prevention of risk related lifestyles in childhood and youth.

**Isfahan Healthy Heart Program**

Isfahan Healthy Heart Program (IHHP): (Sarrafzadega, & Baghae, et al, 2006) Isfahan Healthy Heart Program (IHHP) is a five to six year comprehensive community based intervention program for non-communicable diseases (NCDs) prevention and health promotion. The program was launched in late 1999 and finished in 2005-2006.

The communities of intervention were Isfahan and Najafabad (rural and urban areas) in central Iran (with a population of 1,900,000), and the local city of Arak with a population of 700,000 has been selected as the reference community. The aim of this program was to improve NCDs prevention, control and promote healthy lifestyle through healthy nutrition, tobacco control, physical activity and coping with stress.

IHHP also aims to assess the feasibility and impact of a comprehensive, community based approach in a developing country setting.

As results of this project, major changes took place in the levels of the targeted risk factors in Isfahan. A significant increase in the consumption of oil versus hydrogenated fat was observed among males and females in the intervention community compared to the reference area. While daily smoking decreased and daily exercise increased among males in the intervention community, less favorable changes were observed among women. Daily exercise and oil consumption increased significantly, and attempts to smoke decreased among adolescents in the intervention community.

Knowledge about healthy life style improved significantly among physicians, nurses and health trainees in the intervention compared to reference areas. Age, Gender level of education and urban or rural place of residence modified the response to intervention activities. These results also show the effectiveness of these programs in attaining short-term improvements in lifestyles and risk factors.
Health Promotion in Oman

Since 1970 and after the blessed Omani Renaissance, His Majesty Sultan Qaboos Bin Said has always emphasized the importance of health in social and economic development. From the beginning, the Government made a commitment to develop a modern welfare state, including promotion of health of the Omani people. A Royal Decree was issued to establish the Ministry of Health (MOH) in August 1970. Since then, the MOH was able to build from scratch a modern national system that offers all Omani citizens universally accessible health services free of charge.

Based on health situation during that time and believing that preventive programs such as health education are an effective strategies aiming to save Omani nation lives from the most preventable diseases that depend on hygiene and to tackle other communicable diseases which are prevalent. Moreover, there was an urgent need for increasing health awareness among the community about hygiene and safe source of clean water. Realizing this, Ministry of Health in 1973 established a health education unit.

Health Education became an integral part of all health services and programs since it plays a prominent role not only at dissemination of health information to the community but also in informing the citizens about the programs and services offered by the ministry of health in order for them to take advantage of these services.

Through the years many progress and development have been introduced and implemented in order to support the function of health education and to improve the quality. Many of health education activities take the form of awareness campaigns and disseminating information to promote healthy behavior and change the attitude.

These activities have contributed to the remarkable improvements in health indicators. Moreover, prevention initiatives have been implemented for many years by Ministry of Health and other ministries with the intention of improving the quality of life of the Omani population.

The health policy statement in Oman is comprehensive and has the advantage of paving the way for health and non-health national and local initiatives to improve not only people’s health, but also the underlying social, lifestyles and environmental conditions that contribute to their health.
Here are some examples of health promotion initiatives in Oman:

- **The Municipality Month Annual Award** has been in place since 1985 and encourages municipalities throughout the country to implement innovative community and social development projects.

- **The Baby Friendly Hospital Initiative** has been in place since 1992. Approximately 3,000 volunteers were trained to promote breastfeeding and birth spacing. Today these volunteers also encourage healthy lifestyles and participate in community-based initiatives.

- **The fortification of flour with iron and folic acid** was started in 1997 as a collaboration of the Ministry of Health, Ministry of Commerce, WHO and UNICEF. Under this program white flour is enhanced with 60mg/kg of electrolytic iron and 1.5 to 2mg/kg of folic acid. Subsequently and in expansion to tackle micronutrient deficiencies, salt was fortified with iodine and cocking-oil was fortified with vitamin A.

- **Community Support Groups (CSGs).** Volunteering in health is one of the mechanisms used in the community health development and community participation in the progress of their own health. Community support groups are one of the most significant tools to spread knowledge and awareness on health related issues in the community. Their roles can be summarized as: Health promoters, Data collectors and Social mobilizers.

- **Willayate Health Committees (WHC) and projects based on community participation:** Since 1990 Ministry of Health implemented immense developmental efforts and decentralization was a symbol for this development. This was started with the decentralization of the regional and Willayate authorities. The Willayate Health Committees (WHC) which resembles a multisectoral approach has introduced the community based projects competition. These projects were based on the Willayate Team Problem Solving (WTPS) approach. For example, between 2008 and 2010, there were total of 18 projects addressing elderly care, nutrition, NCDs and related healthy lifestyle, mother and child health and environmental health. The MOH took successive steps in the sustainability of these projects through meriting the best community based project.

- **Health Promoting Schools (HPS),** a WHO initiative and was adopted in 2004 by collaboration between the Ministry of Health and the Ministry of Education. The project was piloted in nineteen randomly selected schools and has now been expanded to 219 schools throughout the country.

Health Promotion Page | 167
Nizwa Healthy Lifestyle Project (NHLP): In the late 1990s, Oman started discussions with the World Health Organization (WHO) about adopting community-based initiatives (CBIs). The Wilayat of Nizwa in Dakhliyah Governorate in Oman seized this opportunity and approved to host one of the CBIs as a pilot project to promote healthy lifestyles among the community in Nizwa.

The main objectives of the project were: to analyze the social, economic, behavioral, and political determinants of NCDs, to reduce the exposure of individuals and populations to the major determinants of NCDs, and to prevent the emergence of preventable common risk factors and to strengthen health care for people with NCDs by supporting effective interventions. The project focused on four aspects: promoting physical activity, healthy diets, tobacco control, and preventing road traffic injuries.

Evaluation of the project was carried out from March 2009 till August 2010 showed that the project had succeeded in installing new ideas within the community; it had an impact beyond initially set objectives, as now it is a reference for all kinds of community supported projects.

The following graph reflects the impact of interventional activities in Nizwa compared to the baseline indicators.

Figure (9): Impact of NHLP on NCD and their risk factors
NHLP survey in 2001 showed the level of physical activity at leisure time is 38.9%. Post intervention evaluation showed that this figure has increased to 71.3% as shown in the chart below.

Figure (10): Comparison of physical activity during leisure time between 2001 and 2010

Nizwa Healthy Lifestyle Project (NHLP) evaluation showed significant decrease in the level of tobacco use from 9.6% to 5.3% between males where it remains 0% between adult females as shown in the figure below.

Figure (11): percentage current smokers 2001 and 2010
**Existing Structure resembling Health Promotion within MOH**

The Ministry has established health education and information department in 1973 that aimed to increase the health awareness in the community; to promote healthy attitudes and behaviors and correct risky behaviors; to develop and improve the skills and the experiences of MoH staff working in the field of health education and to implement health education programs and campaigns in collaboration with different sectors.

Since the Ministry has established the Institute of Public Health in 1990, a two-year diploma program in health education was added in 1993 which offers young women with high school diploma to be qualified in health education. Total of 170 health educators were graduated from this institute and were distributed all over the governorates as shown in the figure below.

The department of health education and information (DHEI) at the central level supervise the activities of the health education section at the level of the governorate. There are two Master Degree holders in Health Promotion and Social Marketing in the Department of Health Education.

* Holders of bachelor degree who were qualified with health education diploma
In 2004, a multi-sectoral, national health education committee was established and chaired by the Director General of Health Affairs. Its role, however, was limited to raising awareness on different health issues, which constitutes only a small part of health promotion.

The Ministry of Health realized the importance of addressing the social determinates of health through empowering the community and developing community member’s capacities to actively participate in projects and programs to limit and modify the negative effects of these social determinants of health. Therefore, in August 2006 the department of community based initiatives was established to implement the CBI and health promotion concepts and strategies in the Omani community. The department of CBI works with different community organizations and government agencies. Aiming to help the community to identify its needs, draw upon its problem-solving abilities, and mobilize its resources to develop, promote, implement and evaluate strategies to improve its own health status.

While several isolated committees have contributed significantly to the advancement of population health in Oman, there remains a lack of clear structure for health promotion within the Ministry of Health and within other ministries.

**Legislation related to health promotion**

Legislation is an important component of health promotion, therefore analysis of all HP and Public health laws and by-laws were reviewed by an Omani prolead team (WHO initiatives to create leaders in health promotion) headed by an official from Al Shura Council and members from Ministry of Health and Other sectors to analyze legislations in health promotion in Oman through a project called the Rule of Law in 2009. The goal was to examine the existence of health promotion laws in the country.

The Omani team was able to draw the legislative life cycle in Oman. The Figure below shows the route a piece of legislation takes from the moment of conception by the relevant department or government agency passing through the Council of Ministers and Al Shura Council to the final stage of promulgation.

Utilizing this cycle has simplified the process of identifying active players and their respective playgrounds, as well as several stakeholders and their impact on the process. This has eventually facilitated identifying nodes of governance and the interlinking relations. Subsequently, team-members identified two groups of key players in the context of legislation:

1. Members of A’Shura Council
2. Technical Staff and Advisers to the Council of Ministers, especially key ministries and agencies.
This identification proved useful at subsequent stages of designing the project, as it helped in focusing on the outcomes. By using different methods provided in the Prolead program the problem statement was developed as follows:

“There is No apparent strategic vision to consolidate HP related legislations”

Then problem analysis was done using the Fishbone Analysis method, also known as Ishikawa. Four root causes were identified as follows:

1. Inadequate knowledge of the fact and extent of the impact of the legal environment on HP.
2. Inadequate knowledge of HP related legislation in the country.
3. Government departments and agencies confine their interventions to their respective grounds and jurisdictions. In other words limited inter-departmental interventions.
4. No overarching organizational (or legal) structure that enshrines HP values and principles.
**Findings of the Analysis of Legislative Review:**

Gap analysis was done to identify missing laws, fragmented legislation and integration of laws. All comments and finding were collated and an inventory list of all health promotion laws and related sectors was developed. The major findings of analysis are summarized below

1. Legislation impacting health is voluminous and multi-sectored.
2. Health Promotion Legislation cannot be consolidated in a single act/ law.
3. Several factors inhibiting effective implementation of Health Promotion legislation.

**Challenges**

Although some Health Promotion Models have been established still Health Promotion faces many challenges and coordinated efforts required to address these challenges.

Challenges facing health promotion are summarized as follows:

- Limited inter-sectoral cooperation and coordination
- Limited resources (both human and financial) for health promotion initiatives and programs
- Legislation impacting health is both voluminous and multi-sectored, and for the most part, not effectively implemented
- Lack of clear structure for health promotion within MOH
- Lack of a national multisectoral plan for health promotion
- Lack of enough qualitative data to understand the underlying factors that can influence health behaviors
- Rapid social change and an increasing shift towards riskier health behaviors
- Limited involvement in health promotion by the private sector
- Health is not accorded a high enough priority in the agendas of non-health sector ministries
- Natural disasters and the emergence of diseases (Pandemics)
- Lack of qualified staff in different fields related to health promotion

Therefore the Vision 2050 for Health Promotion is developed to address these challenges and to build upon the existing successes, to coordinate all the efforts where possible, and to create a synergy whereby an even greater collaborative health promotion planning and implementation process can be realized.

The guiding principles to achieve this vision are developed and they centered on quality of life and the strategic objectives translated into actions needed to achieve the objectives and ultimately attain the stated vision.
Guiding principles

Principles provide the compass that guides the approach to health promotion. The following principles provide the foundation on which the strategic study is developed and will guide how it will be implemented and assessed:

- Health is fundamental human rights and to stress on health equity by eliminating health disparities and achieving optimal health for all.
- The health choices people make can have a direct impact on physical and mental wellbeing.
- The empowerment of individuals, communities and organizations. Building capacity to improve health is an important element of effective health promotion practice.
- Inter-sectoral collaboration: Building partnership with related sectors is crucial in order to combine strengths of public and civil society.
- Evidence-based approaches and innovation are critical to success. To inform the direction of health promotion initiatives, it is essential to use on an ongoing basis the most accurate and up-to-date information on the determinants of health such as the social, economic, and environmental factors, mental health and lifestyle behaviors of population groups.

Vision for the Health Promotion

The vision put for Health Promotion as Healthier Oman is:

*Healthy individuals living in healthy communities*

Mission for Health Promotion

The mission as it relates to the Health Promotion Strategy is:

- To instill *health* in the minds, hearts and daily actions of individuals, families, communities and government.
- To support the development of a sustainable environment that contribute to the reduction of prevalence of illnesses and premature disability and death associated with major preventable diseases, injuries and conditions.
- To promote health wellbeing among individuals, communities and populations, enabling them to address the broad determinants of health and improve their quality of life.
Strategic objectives

Objective.1
Establish a national health Council for health promotion to lead and coordinate health promotion policies, initiatives and activities at all levels in Oman.

Actions:
- Establish a high level, multi-sectoral body that will provide leadership, increase the ministries' awareness of the ways in which they affect population health and encourage commitment to re-orient programs, services and policies to reflect their awareness of the ways in which they affect quality of life, and increase inter-sectoral collaboration and planning.
- Dedicate liaison units within offices of ministers of represented ministries.
- Upgrade of the council into an independent foundation for health promotion attached to the Ministers Council (as a second phase – 2030.)

Objective.2
Build the human resources capacity for health promotion

Actions
- Set a clear career path for the officials working in health promotion
- Train officials on leadership and concept of health promotion at all levels.
- Enrollment of pre-graduate and post graduate in different specialties of health promotion.
- Instill health promotion as a core module in all national academia (for pre-service).
- Institutionalize of the HP short course in Oman Health College to ensure its sustainability (for officials from other sectors).

Objective.3
Address SDH through different approaches (building healthy public policy, reorienting health services, creating supportive environments, strengthening community actions)

Actions
- Develop personal skills and public education and communication) and interventions and
- Maintain and develop partnerships with key governmental, non-governmental and private sector as well voluntary, and community agencies and
- Ensure adaptation of a community development approach.
Objective 4
Use social marketing approach to advocate for health promotion and to develop health promotion initiatives and campaigns and disseminate health knowledge to empower the community to play a role in promoting their health.

Actions
- Develop Information, education and communication center
- Establish social media strategies
- Use of innovative technologies to disseminate health information

Objective 5
Develop settings for health promotion through:

I. Support the implementation of a health promoting health service model. This includes:
   a) supporting the implementation of health promoting hospital initiatives
   b) Supporting primary care teams to improve capacity in community profiling, needs assessment, etc.
   c) building capacity of health workers to integrate health promotion into service delivery
   d) establishing links to other settings (such as schools and communities)

Actions:
- Develop of an organizational plan with allocated resources
- Support service areas at different levels to develop health needs assessment, health impact assessment and community participation
- Support the implementation of plans and strategies related to Tobacco control and prevention, obesity management, breastfeeding etc.
- Develop an integrated approach to address key health issues aimed at reducing morbidities and mortalities.

II. Expand on the implementation of health promoting communities based on existing approach (healthy cities, healthy villages, community based health promoting projects, health promoting educational institutes, healthy work places, etc).

Actions:
- Review and update the community based initiatives strategy and the implementation guidelines.
- Increase number of health promoting community settings
- Build capacity of the community and the voluntary sector to identify and address health promotion priorities at community level
- Develop strategic partnerships with relevant governmental sectors, community, NGOs etc.
- Evaluate and review the implementation and successes of the programs
• Collect, analyze and disseminate evidence of effectiveness of community participation interventions.

**Objective.6**

Improve legislation impacting health

**Actions:**

• Adopt simple, yet Effective, Legislative Options which address:
  
  o Legislation to restrict access to health damaging goods and services: Tobacco and Drugs.
  
  o Legislation to regulate advertising, particularly those targeting adolescents and children at peak viewing time.
  
  o Legislation to facilitate human behavior conducive to healthy outcomes at work and public places: Breast Feeding.
  
  o Legislation to mandate health impact assessment on all projects, policies and legislation prior to implementation.

• Develop a Legislative Guide for Legislators and Stakeholders

**Objective.7**

Improve national emergency preparedness and response through well planned risk communication strategies.

**Actions:**

• Establish a risk communication unit within health promotion structure
  
  • Build and develop capacities in risk communication
  
  • Develop guidelines, plans, strategies for risk communication

**Objective.8**

Monitor and evaluate health promotion initiatives, services and policies in Oman.

**Actions:**

• Establish of a model for health promotion monitoring and evaluation—the identification of information needs, quality of life indicators, data collection and analysis methods, and dissemination processes through Adopting global SDH metric indicators and healthy settings indicators.
  
  • Undertake researches on needs assessment and outcome intervention researches to generate evidence for policy on effective health promotion interventions.
  
  • Conduct interim evaluation of the strategy
  
  • Conduct regular cost analysis studies

**Objective.9**

Develop appropriate mechanisms for financing health promotion to ensure sustainability.
Actions:

- Allocate specific budget for health promotion from governmental institutions (for example specifying percentage from Health Council or from MOH budget and other ministries to health promotion)
- Resource mobilization (from private sectors, NGO's, taxes,..) towards health promotion
- Conduct study of how health promotion is currently being financed is also needed, and a case study of financing under different economic situations would be valuable.
References:

4. World Health Survey-Oman 2008
5. National Health Survey-Oman 2000
6. IDF, Global profile
7. Nizwa Healthy Lifestyle Project (NHLP) evaluation report- MOH report 2010
10. A KAPB survey on lifestyle among students in universities, colleges and other higher education institutes. MOH 2008
17. Adapted from Dalghren and Whitehead, 1991 and Grant and Barton, 2006
19. Household expenditure and income survey in the Sultanate (2010-2011)
26. Ministry of Health Report of the Qualitative and Quantitative Survey on Injecting Drug Use in Oman (Draft)
30. Willett W (2006) Executive Summary of the WHO Consultancy assist with the formulation of the National Diet, Physical Activity and Health Strategy
35. Adrian Bauman, p88 quoted in Reynolds, Op Cit.


Synopsis 5

The National Nutrition Strategic Study
The National Nutrition Strategic Study

Task Force:

- Dr. Samia Al Ghannami
- Dr. Lyutha AL Subhi
- Dr. Mariam Waili
- Hanadi Al Rajab
- Iman Al Hinai
- Fatma Al Mamari
- Asad Hamood Al-Qasmi
- Ashwaq Mohammed Al-Harthi
- Fathiya Hamood Al-Jufaili
- Fathiya Abdullah Al-Rashdi
- Kauther Warith Al-Kharusi
- Nahla Sulaiman Al-Anqodi
- Najwa Mansoor Al-Kindi
- Salah Salim Al-Shukaili

Contributors:

- Dr. Halima Qalm Al Hinai

Acknowledgment:

- Health Vision 2050 Team
- Strategic Studies Review Team
Introduction

The Sultanate of Oman is a high-income country with a population of 3,623,441 of which 2,092,560 are Omani. 291,441 Omanis and 31,400 non-Omanis are under 5 years of age as per 2012.

The population is mainly urban based. There has been major improvement in economic development, health indicators, education levels, and the status of women in the last forty years. Health services are provided free of charge to all Omanis and to expatriate employees of the government and their dependent families and based on a primary health care approach with a very wide network of facilities even in rural areas.

The nutrition program was established in Oman in 1991 as part of the health service package. Initially, it focused on management and control of protein energy malnutrition among infants and young children; promotion of breastfeeding and micronutrients supplementation to pregnant women. The importance in nutrition as a preventive and curative approach was has come to the forefront of health policy and planning over the last two decades, and this was reflected in the Seventh Five Years plan of action (2006-2010). In this plan; nutrition vision was realized as Better Nutrition for All; and it’s objectives included high quality nutrition services in the health care system; as well as promotion of adequate nutritional practices; prevention of nutritionally related chronic illnesses as well as promoting food safety; control of child malnutrition and control of micronutrients deficiencies.

Nutrition is becoming a major modifiable determinant of chronic disease. Scientific evidence is increasingly supporting the view that alterations in diet have strong effects on health throughout life. Most importantly, dietary adjustments may not only influence present health, but may determine whether or not an individual will develop such diseases as cancer, cardiovascular disease and diabetes much later in life.

Despite ensuring major improvements in health of Omani population basically in decreased mortality rates and child malnutrition statistics show that rates of premature death from cardiovascular diseases are the highest in Oman compared to other countries in the Middle East. This finding has also had a negative impact on the costs enquired on healthcare services and has also shown to decrease work efficiency.

Addressing the issue of nutrition-related premature morbidity and mortality requires attention to both prevention through public health nutrition, and treatment through clinical nutrition and dietetics.

Strategies that are considered for planning to improve nutrition security in Oman will be through considering multi sector aspects of the complete nutrition chain that impacts the population’s civilization as a whole.

In response to the urgency of the nutritional situation, the Ministry of health initiated the development of National Strategic Study addressing the situation and challenges and future map of nutrition, dietetics and food services in healthcare.

The strategic study sets out for each key nutrient the need to think in a completely different way about the fundamental drivers and control points in the food system that determine the input of nutrients into the
food chain. The general access to foods of different qualities is determined by the decisions of food importers, by edible oil refiners, food manufacturers, by pricing policies, by the decisions made relating to food standards, by marketing initiatives, by the pervasive advertising of junk food and soft drinks, and decisions by the agriculture industries of Oman about their future and sales' targets.

This Executive Summary reflected issues relating to food and nutrition are addressed appropriately and effectively through the co-operation and co-ordination of a large number of people, organizations, agencies, services and program within and beyond MOH.

**Nutrition Situation in Sultanate of Oman**

Protein energy malnutrition (PEM) with all its forms underweight (low weight for age), wasting (low weight for height) and stunting (low height for age) is considered one of the major nutrition challenges in Oman since the 90s. A National Nutrition Strategic Plan was developed to combat child malnutrition in Oman and nutrition services were incorporated into the national health system. The main objective of the plan was to reduce the prevalence rate of PEM among children below the age of five years to less than 5% in 2010. As shown in the table below, the rate of PEM has dropped to 4.6 in 2012.

The annual health report 2012 showed that 25.6% of PEM cases were managed and converted to normal and this was highest in the North Sharqiyah Region (75%). The report also shows that the highest proportion of PEM admitted with associated conditions was in Al Wusta Governorate (100%) and that malnourished children suffering from anemia was recorded to be (36.8%) and was highest in Adh-Dhahirah Governorate (43.0%).

The level of under nutrition has reduced rapidly in the last forty years as the economic situation has improved in Oman and on a national average under-nutrition is no longer the problem it was in the past. Underweight and stunting are at levels below the WHO level for a public health problem, though there are still some specific areas with high levels. Wasting is still an area of concern, again with variations across areas, and overweight is becoming a noticeable concern.
Oman has made dramatic progress in reducing stunting in young children. Stunting rates declined from 26% in 1991 to 13% in 1999. Over the same period, underweight prevalence also came down, but not to the same extent. However, by 2009, the rate was 9%, meaning that Oman had achieved the MDG 1 target on underweight prevalence six years before the target date of 2015.
Prevalence of stunting, underweight and wasting in children under age 5.

* Expressed in percent below minus 2 standard deviation units from the median of the 2006 WHO standards.
Source: World Health Organization, Global Database on Child Growth and Malnutrition. Country-level data of years prior to the 2009 survey were calculated with 1977 NCHS-WHO standards and are not comparable for trends.
In 2002, the Fifty-fifth World Health Assembly and the UNICEF Executive Board endorsed The Global Strategy for Infant and Young Child Feeding (IYCF). The Nutrition Department of MoH adopted and elaborated this strategy and developed present IYCF Policy and Strategy for 2009-2013, addressing different aspects including public policies, health services and community involvement.

The Baby Friendly Initiatives (BFHI) was initiated to promote exclusive breastfeeding for 6 months. However, according to the annual health report in 2012 that exclusive breastfeeding at birth has dropped from 97.5% in 2005 to 94.9% in 2012. Exclusive breastfeeding in 6 months has dropped from 31.3% in 2005 to 9.1% in 2012.
The revision of the current ‘Omani Code for Marketing of Breast milk Substitutes’ is going on. Then meeting will be conducted with concerned departments and sectors to clarify the role and responsibility of the DGSM in monitoring and taking legal action in regards to any violation of the Omani Code of BMS.

Overweight and obesity prevalence rates in children and young people increase after the age of five years. The rates are higher before the age of 24 months, and decline in the age group 2 to 5 years). The rates then increase in the school-aged population (1) and keep on increasing with age into the adult population.
Percentage of children under age 5 affected by overweight & obesity, by age group, 2009

Overweight and obesity were considered at +2 and +3 Z-scores, respectively for BMIA. Second National Health Survey for Protein Energy Malnutrition in Children below Five Years of Age 2009
Percentage of children under 5 who are overweight and obese by region and sex, 2009

Over one in four infants are born to mothers whose nutrition is suboptimal. However, there is an improvement from the situation in 2000. Health facility data from 2012 show that 26.7 per cent of all registered pregnant women were anemic, a notable decrease from 36.3% in 2000). Region-wise, Musandam has the highest rates of maternal anemia (33.3%) followed by North Batinah (32.1%), South Batinah (29.5%) and Muscat (28.4%), all above the national average.
Proportion of registered pregnant women who are anaemic


Proportion of registered pregnant women who are anemic
Anaemia levels are still high, affecting at least half of all children of all age groups. 41.5% of infants and young children has hemoglobin levels below the normal. the annual health report 2012 reported the following:

Reports from the health school program indicated levels of 6%, 6.3% and 14% in the years 2005-2007. The table below shows the rates of iron deficiency anemia in 2012.

### Nutritional Anemia

<table>
<thead>
<tr>
<th>Grade</th>
<th>10</th>
<th>7</th>
<th>1</th>
</tr>
</thead>
<tbody>
<tr>
<td>No. of cases</td>
<td>1,143</td>
<td>1,092</td>
<td>1,920</td>
</tr>
<tr>
<td>% of students examined</td>
<td>2.77</td>
<td>3.01</td>
<td>4.92</td>
</tr>
<tr>
<td>% newly Detected</td>
<td>17.59</td>
<td>14.74</td>
<td>10.10</td>
</tr>
</tbody>
</table>

Anemia in school age children

### Anemia Severity in Infants 9-18 months

<table>
<thead>
<tr>
<th>Age group</th>
<th>% Mild anemia</th>
<th>% Severe Anemia</th>
</tr>
</thead>
<tbody>
<tr>
<td>9 month</td>
<td>54.9</td>
<td>0.7</td>
</tr>
<tr>
<td>18 months</td>
<td>48.1</td>
<td>0.8</td>
</tr>
</tbody>
</table>

Anemia Severity in Infants 9-18 months
WHO has set standards for the classification of anemia into high, moderate and low anemia. However, WHO warns that “mild” is a misnomer: iron deficiency is already advanced by the time anemia is detected, and the deficiency has consequences even when no anemia is clinically apparent. Accordingly, this analysis will include all children with anemia, be it mild, severe or moderate. Under the age of five years, the rate for mild anemia is very high below 6 months of age (over 60%) and declines, but nonetheless around half the children under five years of age are still affected by anemia.


**Initiation of the flour fortification program in Oman**

As flour fortification was being initiated in 1996, vitamin A and Iodine deficiencies were on the decline among infants and children in Oman; at the same time child malnutrition and anemia among all age groups were known to be un-acceptably high. Extrapolating from international data, iron deficiency was assumed to be the main cause of anemia in the region and thereby fortification was considered the intervention of choice.

A multi-organization consultation was held in Muscat, Oman and it concluded that fortification would potentially contribute to the reduction of anemia among women and children in Oman. It was decided that “fortification of flour in most countries in the region will be simple and cheap and will be a major strategy to prevent anemia”; and “Ferrous sulphate is the compound of choice, folic acid can be added at little additional cost”. Oman consented to 30 ppm iron and 1.5 ppm folic acid fortification level.

Early 1997, a legislation to mandate fortification of flour with 30 ppm iron and 1.5 ppm folic acid was issued by Ministry of Commerce and Industry and Oman Flour Mills complied with the legislation. In 2010, the standards and amount of fortificant has being changed to be electrolytic iron of 60ppm and folic acid of 2 ppm. Swift fortification of flour in Oman had elements of political support, dedicated management, and a convenient technical and logistic set up.
Outcome of the fortification program:

The most pronounced outcome observed was that of folate fortification. Reduction of Spina Bifida to less than 20% of its original rate is a significant achievement that has important implications on health cost savings, let alone the value of emotional lifelong strain that affects families and their communities.

A worrying trend is that the low birth-weight rate seems to be increasing. In 2012, one in ten infants born alive had a body weight lower than 2.5 kilograms. The annual health report 2012 showed that 8.7% of children in the Child Health Care Registry were born with low weight. With AlBuraimi having the highest percentage (10.9%) followed by AdDakhalyia (10.7%) and North AshSharqia (9.5%).
Oman has brought iodine deficiency diseases (IDD) under control.

In 2004, the micronutrients survey showed that almost 34% of the Omani households do not consume iodized salt, which indicates that universal salt iodization is not achieved in Oman. In addition, Vitamin A fortification has been looked at and found to be needed intervention which will assist in gradual withdrawal of the vitamin A supplementation for women and children.

The National Micronutrient Status and Fortified Food Coverage survey in 2009 showed that very large proportions of the population are covered with fortified flour (81%) and adequately iodized salt (60%). This indicates that the salt and flour industries have contributed significantly toward national efforts to improve vitamin and mineral nutrition of the Omani population.

Despite legislation on the marketing of iodized salt, only about two thirds of households consume iodized salt. A new survey is planned to take place in 2014. This survey will be the first to assess median urinary iodine levels in children, the first since 1994; it is hoped that the results will give a comprehensive picture of the progress made in Oman towards universal salt iodization and the eradication of IDD.
Synopsis of Strategic Studies

In 2005 MOH initiated screening for Thyroid Stimulant Hormone, as it considered an important indicator for iodine status in the population. The results indicated that less than 2% of infants screened were at risk of hypothyroidism.

Trend in Salt Coverage in Oman: 1993-2004

Trend in salt coverage in Oman

**Vitamin A**

The national supplementation program for vitamin A is still continued and oil fortification program is being proposed.

**Vitamin D**

In a recent study, researchers measured vitamin D levels in 206 healthy Omani volunteers in Muscat, Oman, aged 18-55, and found that most of the participants were lacking in vitamin D. The mean vitamin D level was 13.1 ng/ml, with levels being slightly higher in men than women. The prevalence of vitamin D deficiency in the study population was 87.5%; this was higher than the rates reported for the British, and European-, Hispanic-, and African-Americans. The researcher speculate that this may be linked to sun avoidance, inadequate dietary vitamin D, and virtual non-intake of supplemental vitamin D.
Non-communicable Diseases

Non-communicable diseases constituted 45.2% of outpatient morbidity and 38% of inpatient morbidity in MoH institutions in 2012. These have increased from previously being 42.5% and 37.4%. Cardiovascular diseases (CVD) are the leading cause of hospital deaths in 2012, accounted for 32.5% of all hospital deaths followed by infectious diseases (11.2%) and cancer that accounted for 9.9%.

The prevalence of lifestyle-linked risk factors is high, as overweight and obesity among adults in Oman were 28.9% and 19.1% respectively in 2000. High total cholesterol (> 5.2mmol/l) was present in 40.6% in the surveyed adult population. Metabolic syndrome was also observed in 21% of this adult group. About 63% of adults in 2008 reported engaging in physical activity at leisure time. In addition, at least 5.8% of Omanis are smokers.

The national non-communicable diseases screening program in started in 2006 provides a screening service for all Omanis aged 40 years and above who have never been previously diagnosed with diabetes or hypertension or chronic kidney disease. The screening targets five common conditions, which include diabetes, hypertension, chronic renal impairment, obesity, and hypercholesterolemia. The detection of non-communicable diseases above 40 years of age program in 2012 showed that 18.2% have hypertension (>=140/90) and 9.8% have fasting blood sugar FPG>=7.0 mmol/l). 38.2% were overweight and 33.5% obese, while more than half (62.5%) have high waist circumference. New registered diabetic cases were 4832 cases in 2012, females constituted 50.5%.
Percentage of Risk Factors (Metabolic Syndrome) in Sample screened 2012

**Nutrition and Communicable Diseases**

Food borne disease control and outbreak detection is coordinated through the Department of Communicable Disease Surveillance and Control in conjunction with the Community Nutrition Department which is responsible for food safety. Both departments are part of the Directorate General of Health Affairs National Communicable Disease Surveillance System was established in 1991 under Communicable Disease department did not involve nutrition Department. Food poisoning notifications have been recorded since 1991. The Manual can be found in all primary, secondary and tertiary government facilities and in some private clinics and hospitals. There is regular updating of the Communicable Disease Surveillance and Control Manual, approximately every 5 years. The most recent edition came out in 2011.
Nutrition and Food Security

There are three components of food security: food availability, access to food and food utilization. Oman produces only a small fraction of the food it consumed, most food especially grains are imported. The leading constraints to agriculture production were land and water scarcity. As indicated by the below figure by 2050 Oman will have between 0 - 500 cubic meters per capita per year of fresh water, when the actual requirement is 1,300 cubic meter per capita per year.

The arable land in Oman is estimated at 2.2 million hectares, which is 7% of total area of Oman. However, only 2.8% of the arable land is being cropped which is equal to 0.2% of the total country area.

Based on Food and Agricultural Organization data, by 2030 developing countries such as Oman would need an average production of 3,000 kcal per capita per day.
**Structure of Department of Nutrition in MOH:**

The ministry of health has established a comprehensive network of local, district and regional health institutions with quite a good number of highly qualified staff. There are three levels of care: Primary, Secondary and Tertiary. The PHC includes health centers, extended health centers and local hospitals. The secondary health care is composed of regional mostly autonomous and willayat hospitals. Tertiary care is provided through four referral hospitals each specializing in few fields. MOH also provide health services to population living in remote areas.

Defining the right structure will be a key factor in enabling the members of staff to function efficiently. The organizational framework of Nutrition, dietetics and food services (NDF) is currently complex, as the responsibility of overseeing the services is divided on multiple parties. For example the primary health care and the implementation of the programs in this level is managed by the department of nutrition. While the dietetics and food service in secondary and tertiary levels is managed by the nutrition Section at the department of hospital affairs. However nutrition in schools is overseen by the school health department, nutrition management of NCD is under the NCD department…etc.

This division of responsibilities has led to miscommunication between the various departments and duplication of work. This led to poor resources utilization, and consequently it affected quality of services provided to the general public.

Also, there are a large number of government and private sector organizations/stakeholders with either direct or indirect impact on the food supply chain in Oman. The activities of these stakeholders need to be coordinated to achieve the best food security outcomes for Oman.

Current legislations specifically related to food security includes the Royal decree to establish the public authority for stores and food reserves and the national committee for national catastrophes, as well as food safety regulations promulgated by the Ministry of regional municipalities and water resources.

There are a number of non-government organizations with interest in food security such as the Sultan Qaboos university, the research h council and others. These organizations should be included as a resource and part of food security groups.

The government and private sector are currently engaged in a number of marketing and manufacturing strategies and these efforts need to be coordinated. Effective coordination of the Oman security strategy is needed.

One of the core responsibilities of dieticians in any organization setup is counseling the patients, and one of the successful elements of counseling is the physical surrounding of the counseling secession. Poor or interrupted environment will lead to poor quality counseling secession, poor allocation counseling room for dieticians will defiantly hinder their productivities.

Looking at the structure form the catering side, it might be obvious that none of ministry of health kitchens meeting the minimum food safety standards in terms of the structures or operational set up. Studies needed to evaluate the kitchen suitability from food safety standard point of view.
The physical environment for clients and counselors should be flexible; Clients may prefer different types of environments during counseling depending on physical, emotional and psychological needs, currently there are no allocated areas or offices for dieticians, which makes the counseling process very challenging for both the counselor and the patients, and it might not reach it ultimate goals as its planned for which reflects on diet therapeutic management plans.

**Human Resources:**

Currently there are around 200 individuals working as nutritionist in different ministry of health setups. There are 2 Registered Dietitian working in ministry of health setups. Sultan Qaboos University- College of Agricultural and Marine Sciences, Department of Food Science and Nutrition, is graduating Nutritionists, there are some student are in the pipe line currently, and other on the way for the next at least 5 years to come.

Looking at the current situation it’s clearly shows that we almost have no clinical dieticians working in the clinical set ups in Ministry of Health (MoH) institutes as clinical dieticians. After reviewing the list of the current employees it shows that almost all of the current working dieticians are nutrition graduates, and most of the food service managers are graduates as food science.

Both of the above jobs are not matching the qualifications of the people are working in them. Currently the cadre consists of diploma holders who some graduated with a degree in dietetics and the bachelor and master holders who graduated with a nutrition specialization that shows the qualifications needed for the different categories of staff working in nutrition field.
Some areas or hospital have no dieticians or food services manager at all, this defiantly affects the quality of services provided to the public in that given area of Oman. The below table shows the shortage in some institutions as an example:

<table>
<thead>
<tr>
<th>Institutions</th>
<th>Ratio (WISN)</th>
<th>Current</th>
<th>Needed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Primary Muscat</td>
<td>1-3 DT/10000*</td>
<td>30</td>
<td>80</td>
</tr>
<tr>
<td>Secondary Sohar Hosp</td>
<td>1 DT – 30 beds</td>
<td>4</td>
<td>13</td>
</tr>
<tr>
<td></td>
<td>Haima Hosp</td>
<td>1 DT – 30 beds</td>
<td>0</td>
</tr>
<tr>
<td>Tertiary Royal Hosp</td>
<td>1 DT – 25 beds</td>
<td>17</td>
<td>22</td>
</tr>
<tr>
<td></td>
<td>AlMassarh Hosp</td>
<td>1 DT – 25 beds</td>
<td>4</td>
</tr>
</tbody>
</table>
Human Resource distribution verses needs in sample institutes

Multidisciplinary team is the best approach in patients care management, dieticians input in any medical or surgical condition is very vital; therefore, they have to be qualified in terms of specialization as their counter part of doctors and nurse. Specialization of dieticians will help the specialized doctors and consultants’ to reach job satisfaction by getting all the professional support from other medical professional to serve their patients and achieve the clinical management outcome.

Looking at the current situation analysis it shows that the primary health care services provides only half of the hours needed to be generated by dieticians in order to cover the demand for the dietetics services needed in these organizations. This might be a result of lack of HR and specialization.

It will be more cost effective to have dieticians because Dieticians can work as Nutritionists but Nutritionist cannot work as Dieticians. If the students are sent now for dietetics they will not need further training to become registered dieticians, but if we send them for nutrition than they chose to change to become dieticians that will cost additional money for further training to become dieticians.

The suggested career path scholarship allocation for possible specialties that are related to nutrition professional in Oman, to meet the projection needs of Nutritionists and Dieticians to serve in different settings of health care services that are provided by ministry of health in Oman.

The possible study path that are related to Nutrition:
1- Nutrition
2- Dietetics

The group has decided to allocate the scholarships:

<table>
<thead>
<tr>
<th>Specialty</th>
<th>Scholarship allocation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nutrition</td>
<td>0%</td>
</tr>
<tr>
<td>Dietetics</td>
<td>100%</td>
</tr>
</tbody>
</table>

It is recommended to allocate all the scholarships for the fresh school graduates and diploma to **dietetcs** and meet the nutrition specialty requirements from Sultan Qaboos University- College of Agricultural and Marine Sciences.
Distribution of the scholarships:

The recommended distribution of the scholarships for the fresh school graduates and diploma for dietetics studies as the following:

1. Fresh School Graduates: 86% of the scholarships for fresh school graduates

2. Diploma Holders: 14% of the scholarships for diploma holders, the 14% should be further distributed to 60% males and 40% females.
The projection of the Dieticians requirement up to the year 2050:

Stage 1: Each year send 14 Dietetics in all student dietetics programs.
Stage 2: Send 17 Dietetics annually to meet the dietetic requirements by 2050.
Pathways for Postgraduate Employees of MOH to Dietetic Registration

The following is a descriptive proposal for possible pathways through which MOH employees with a university degree could acquire the title registered dietician (RD) or dietitian. The presentation is based on the system in four counties. All information given herein has been formulated based on thorough review of homepages of and e-mail communications with regulatory bodies for each country. Also, the information was based on e-mail communications with program directors in two universities within each country.

Public Health Education Framework (e.g. Nutritionist / dietetics)
### SWOT Analysis of Nutrition Services in Oman:

<table>
<thead>
<tr>
<th>Strengths</th>
<th>Weakness</th>
</tr>
</thead>
</table>
| • Established Department of Nutrition, in Ministry of Health, looks after nutrition practices, professionals, and nutritional programs in Oman.  
• Established Department of Hospital Affairs looks after the dietetics practices in Ministry of Health care services providers.  
• Recognition of the Dietetics, Nutrition and food services professional in some organizations.  
• Screening for all adult above 40 years in the Wellbeing clinics, and children less than 5 years in The Integrated Management of Childhood Illness IMCI program.  
• Reasonable support of the other government, nongovernment, and private sectors to Dietetics, Nutrition and food services professionals and practices.  
• Good basis for health promotion and community based programs.  
• Productive community accessibility for nutrition programs and implementation. | • No standardized guidelines, system and policies for nutrition, dietetics and food services.  
• Nutrition screening for inpatients is not implemented in some health services institutions  
• Non-availability of comprehensive patient-centered approach.  
• Poor networking or information exchange  
• Between different health care facilities that belong to Ministry of Health and Non Ministry of Health care facilities.  
• Progress notes of nutrition therapy are not documented on patient file on-line and kept in the department in some regions that operates under Ministry of Health.  
• Too many initiatives and recommendation from multiple ministries causing confusion due to lack of overall structure. |
| **Staffing:**  
• Staffs are ready to learn new skills that help enhance efficiency of jobs performed.  
• The staffs have good understanding of their patients and environment.  
• Promoting nutrition care as an integral part if all care pathways is cost effective.  
• Carrier opportunities especially in private sector. | **Policies:** |

<table>
<thead>
<tr>
<th>Policies:</th>
</tr>
</thead>
</table>
| • No standardized guidelines, system and policies for nutrition, dietetics and food services.  
• Nutrition screening for inpatients is not implemented in some health services institutions  
• Non-availability of comprehensive patient-centered approach.  
• Poor networking or information exchange  
• Between different health care facilities that belong to Ministry of Health and Non Ministry of Health care facilities.  
• Progress notes of nutrition therapy are not documented on patient file on-line and kept in the department in some regions that operates under Ministry of Health.  
• Too many initiatives and recommendation from multiple ministries causing confusion due to lack of overall structure. |
| **Resources:** |

<table>
<thead>
<tr>
<th>Resources:</th>
</tr>
</thead>
</table>
| • Unavailability and allocation for consultation rooms in different health care institutions.  
• Lack of needed equipments and instruments for accurate and professional production.  
• Lack of dietetic and nutritional kit for health education, and consultative nutrition sessions do not use innovative and patient friendly tools.  
• Lack of clear use of resources, and resource allocations. |
Limitation, unavailability, and under use of nutritional oral supplements leads to further disease complications, longer hospital stay and compromised quality of life.

**Services:**
- Current services focus on system and process rather than outcome and output.
- Limited of multi- interdisciplinary teams’ interaction in different health care institutions leads to poor communication.
- Non-clinical side take over the clinical side of work in some health care institutions.

<table>
<thead>
<tr>
<th>Opportunities</th>
<th>Threat</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Available technology system in different institutions such as schools, academic institutions, coffee shops, internet café, government and private sectors that can be used for nutrition education.</td>
<td>• Oman is receiving minimal annual rain levels, therefore, the food production percentage is very low, and it does not exceed 20% of total food consumption in Oman.</td>
</tr>
<tr>
<td>• Use the new media technology by creative media companies such as developing new games with physical activity for children.</td>
<td>• Food production is very costly as water bills are very high.</td>
</tr>
<tr>
<td>• Social marketing of importance of nutrition and health.</td>
<td>• Limitation of verities of crops produced food in Oman.</td>
</tr>
<tr>
<td>• Utilize Social media technologies to educate the public on the importance of healthy nutrition.</td>
<td>• Limited numbers of factories that produce food.</td>
</tr>
<tr>
<td>• Start education consumer on healthy nutrition and nutrition security at young age, such as in school programs and projects.</td>
<td>• Poor food technology expertise in Oman due to lack of facilities and tools.</td>
</tr>
<tr>
<td>• Feasibility to communicate with public at the community through different organizations such as Ministry of sport, NGOs, Municipalities. This is achieved through several events related to healthy lifestyle at the community level.</td>
<td>• No clear food quality standard in Oman poor implementation of national and international food quality and safety strategies.</td>
</tr>
<tr>
<td>• Availability of gyms and healthy clubs and facilities.</td>
<td>• Genetic modified could be used and sold without clear identification to the public.</td>
</tr>
<tr>
<td>• Incorporate family in interventions such as the Ministry of Social Development sending some members of client’s family to learn about feeding strategies.</td>
<td>• Food and nutrition labeling is not well controlled.</td>
</tr>
<tr>
<td>• Community care services provided by other organizations such as Ministry of Social Development.</td>
<td>• High caloric free food promotions with some fast food outlets.</td>
</tr>
<tr>
<td>• Utilizing and benefiting of National</td>
<td>• Special discount on fast food in different occasions and on weekend.</td>
</tr>
<tr>
<td></td>
<td>• Flyers are sent to residential areas for unhealthy food.</td>
</tr>
<tr>
<td></td>
<td>• Advertisement in the TV targeting the children for high calories food and drinks.</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>
• Standards, policies established by other governmental institutions such as Ministry of Commerce, Agriculture, regional municipalities, water resources, Environment, Legal affairs and Public Transportation.
• Healthy eating projects and Food services provided by different institutions such as food companies. For instance, Al-Sultan School serves healthy meals.
• National factories produce highly standard healthy food such as healthy flours and low fat milk.
• Research Council to study the current nutrition security and come up with researches and studies that address future all food related unforeseen possible problems that related and none related to the public health.
• Research by other governmental and private sectors that are done in food and nutrition fields.
• Utilize university and graduate students.
• Food and nutrition labeling is not well controlled.
• High caloric free food promotions with some fast food outlets.
• Special discount on fast food in different occasions and on weekend.
• Flyers are sent to residential areas for unhealthy food.
• Advertisement in the TV targeting the children for high calories food and drinks.
• Weak promotion and education campiness from healthy organization for healthy food.
• Uncontrolled of advertisement in different media for food products that carries unscientific therapeutic and health claims, which mislead the general public.
• Absence of a unified body that regulates food safety policies, standard, monitoring and management in Oman.
• Absence of local Omani food safety expertise
• Absence of international certified food safety laboratories, to ensure the food safety standards for local produced food and imported food items.

• Absence of internationally certified food safety laboratories, to ensure the food safety standards for local produced food and imported food items.
• Increased number of food outlets, which encourages families and individuals to eat nutritionally poor quality food outside the house.
• Food deliveries from different outlet encouraged family not to cook at home and encouraged them to adopt more sedentary life style.
• Busy life style which do not allow people to shop and cook nutritious food.
• Availability of fast food at cheap price encourages more families and individuals to consume these foods.
• Over consumption of food by some family member or individual due to high availability of food at home and work place such as oil; and gas camps in the remote areas.
• Close food shops encourage more food shopping behavior even if the food is not really needed.
• Diet management centers that are not qualified to promote unhealthy diet management plan.
• Some of the families will give their children some money in the afternoon to go and buy poor quality snacks from the shop next door to the house.
• Availability of good means of enjoyments such as cars and video games at home made people more attached to their houses and not go out for outdoor activities.
• Availability of mean of private transportation with the cheap fuel prices encouraged people to use more of their private cars instead of walking, cycling or using public transportation which will require some walking most of the time.
• Dietetic students change their specialty once in university due to unclear job opportunity.
• Global food trade and its implications on national food policies.
• Global media and its effects on general public views.
• World economics and purchasing power of individuals.
• Political instability in the world
- Increased number of food outlets, which encourages families and individuals to eat nutritionally poor quality food outside the house.
- Food deliveries from different outlet encouraged family not to cook at home and encouraged them to adopt more sedentary lifestyle.
- Busy life style which do not allow people to shop and cook nutritious food.
- Availability of fast food at cheap price encourages more families and individuals to consume these foods.
- Over consumption of food by some family member or individual due to high cost.
- Use available data from other ministries (Ministry of Education, Ministry of Agriculture etc.) and build on them to conduct future research.
- Develop National food safety law.
- Establish Food Safety and Quality Center, and monitoring Food processing and supply.
- Good relations and support from other inner organization (UNICEF, WHO, FAO).
Challenges and Emerging issues:

- The very high rates of anemia need special action. Studies are needed in the regions with the highest levels of anemia to determine the causes. As discussed above, one cause could be genetic.

- A study is needed on why the low birth weight rate is on the rise. As mentioned above, the causes of low birth weight include: poor nutritional status of the mother, including folate deficiency, the mother’s infections during pregnancy, her exposure to tobacco smoke (including environmental tobacco exposure) or congenital or chromosomal abnormalities in the fetus.

- Rate of exclusive breastfeeding for 6 months is decreasing

- Maternal nutrition needs to be improved. Even though this has improved through the years, the levels of anemia in pregnant women is still high.

- Rates of obesity & overweight and other NCD are on the rise. Non-communicable diseases such as obesity, micronutrient deficiency due to the increase of fast food intake, high salt intake and low physical activities are on the rise affecting the young generation.

- Inadequate coordination mechanism among stakeholders involved in nutrition, NCD, food safety and child health.

- Weak monitoring system for the national fortification programs.

- Limited capacity to undertake training in the area of clinical dietetics, surveillance and monitoring.

- Inactive BFHI program including the implementation of the Code of marketing for breast milk substitute

- Inadequate funding required for implementing the national nutrition programs.

- The elimination of industrial trans fats which is the most cost-effective interventions to reduce risk of NCD is big a challenge

- Need for Coordinated mechanisms for regulating food imports from non-GCC countries,

- A scheme for assessing the relative contributions of salt in different foods in Oman. All these Ministries and approaches are required when developing and progressing a suitably effective salt reduction strategy.
• The total intake of fruit and vegetables in different sectors of the population of Oman is very poorly documented.

• Promoting ready to consume foods high in fat, sugar and salt is now a huge global business which has a major role in causing an enormous burden of disease and premature death

• There is a need for recent and disaggregated household data. Nutrition is not easily measured by health facilities, because families who bring children to health facilities to measure their nutritional status are already self-selected – in other words, they are not a representative sample of the population. In particular, they are not the most vulnerable because their parents already know enough and have the means to bring them to the health facilities. Additionally, the data needs to be disaggregated not only by region, but also by other factors such as educated mothers, household expenditure (poverty quintiles), and so on.

• Lack policies that regulate dietitian jobs. Current professionals who work as dieticians are unprotected by any clear rules on their scope of work, job responsibilities and their rights, due to unavailability of policies or guidelines or their availability but they are not updated as the supposed to be. Currently Nutrition department working very closely with sultan Qaboos university , college of agriculture and marine science to build up infrastructure tools for nutritionists and dietitians to organize their jobs; such as code of ethics, standards of practice, and scope of practice guidelines and documents.

• Limited and Uneven distribution of human resources. Looking at the current situation analysis it shows that the primary health care services provides only half of the hours needed to be generated by dieticians in order to cover the demand for the dietetics services needed In these organizations. This might be a result of lack of HR and specialization

The National Nutrition Strategic Study for the Health Vision 2050 is put to improve nutrition status of people in Oman and to address all gaps and challenges. The Ministry of Health with other sectors has an opportunity for setting out a strategy for transforming the health of the children and adults in Oman. The challenges are very substantial but the record of achievements and the very substantial successes achieved over the last 30 years demonstrate the intrinsic capacity of the country to provide better services and reaches very fast to the global targets.

A vision for 2050 is achievable if the decision makers take the evidence of best practice emerging from the experiences of other countries and pioneers a new approach to a public health approach to economic development in the Arab world. Therefore, a reprioritization to facilitate preventive policies will be far
more effective as much as to spend on clinical services in order to cope with the expected burden of disease in 2050. However, suitable preventive interventions have been shown to be ten times more cost-effective than focusing primarily on the medial services to treat preventable diseases.

**The vision**

Globally recognized Nutrition Dietetic and Food Management center which support the national nutritional security.

**The Mission**

Collaborate with multi sectorial and other partners in Nutrition, dietetic and food services to unified, and upgrade nutritional, dietetic and food organizational structure

Provide qualified human resources that will put together and implement the strategies to achieve the vision.

Provide tools and facilities that will allow the organizational structure to produce outcomes.

Research center that will study and support strategies and ideas to translate them to vision through knowledge, technology and innovation in areas of nutrition, dietetics and food management.

**The main objectives of the strategy are to:**

- Improve the nutritional status of people throughout the life-cycle;
- Prevent and treat malnutrition among pregnant and lactating women and children under five years of age;
- Promote adequate micronutrient intake;
- Integrate actions to address the determinants of obesity and non-communicable diseases;
- Promote safe and healthy food choices;
- Provide comprehensive nutrition information and education to public.
- Improve nutrition and dietetic services in the health sector;
- Enhance nutrition assessment, monitoring and evaluation.
Synopsis of Strategic Studies

**Strategies:**

To achieve the above objectives, 9 approaches have been identified:

1. Strengthen / revitalizing intersectoral coordination mechanism to harmonize on-going nutrition programs and interventions being implemented by different departments in MOH as well as in other Ministries and stakeholders in Oman.
2. Supporting a healthy start by promoting and protecting the nutritional well-being of women and children and ensure good nutrition throughout the life cycle for all age groups.
3. Ensuring a safe, healthy and sustainable food supply.
4. Promoting food with adequate micronutrient content.
5. Carrying out integrated actions to address obesity and non-communicable diseases.
6. Providing comprehensive information and education to public.
7. Strengthening nutrition and food safety.
8. Improving nutrition & dietetic services and capacity building in the health sector.
9. Monitoring, evaluating and conducting research into nutrition.
Synopsis 6

Elderly Care
Strategic Study
Elderly Care

Strategic Study

Task Force:
- Dr. Osman Yassin Mohamed Ali
- Dr. Sheikha Bint Salem Aljabri

Acknowledgment:
- Health Vision 2050 Team
- Strategic Studies Review Team
Synopsis of Strategic Studies

Introduction

Definitions of old age
Most developed world countries have accepted the chronological age of 65 years as a definition of 'elderly' or older person, but this concept does not adapt well to the situation in developing countries. While this definition is somewhat arbitrary, it is many times associated with the age at which one can begin to receive pension benefits. At the moment, there is no United Nations (UN) standard numerical criterion, but the UN agreed cutoff is 60+ years to refer to the older population.

Although there are commonly used definitions of old age, there is no general agreement on the age at which a person becomes old. The common use of a calendar age to mark the threshold of old age assumes equivalence with biological age, yet at the same time, it is generally accepted that these two are not necessarily synonymous.

Healthy ageing
‘Healthy ageing is a life-long process shaped by several factors that alone and acting together favor health, participation and security in older adult life. It is a whole-of community response and requires a population-based approach and preventative focus. Older people have a wide range of capacities and are a resource to families, communities, economy and society. Older people are not a homogeneous group and have a diversity of interests, abilities and socio-economic backgrounds. Thus, Planning is difficult on view of this diversity.

There are many definitions of healthy ageing, a term that is often used interchangeably with terms such as active ageing, successful ageing, positive ageing and productive ageing. Although there is no universal definition, there is general acceptance that healthy ageing involves more than just physical or functional health.

WHO defines active ageing as “the process of optimizing opportunities for health, participation and security in order to enhance quality of life as people age’ allowing people to ‘realize their potential for physical, social and mental well-being throughout the life course’”.

"The ageing process is of course a biological reality which has its own dynamic, largely beyond human control. However, it is also subject to the constructions by which each society makes sense of old age. In the developed world, chronological time plays a paramount role. The age of 60 or 65, roughly equivalent to retirement ages in most developed countries is said to be the beginning of old age. In many parts of the developing world, chronological time has little or no importance in the meaning of old age.

Other socially constructed meanings of age are more significant such as the roles assigned to older people; in some cases it is the loss of roles accompanying physical decline which is significant in defining old age. Thus, in contrast to the chronological milestones which mark life stages in the developed world, old age in many developing countries is seen to begin at the point when active contribution is no longer possible."
Many people are able to age in good health and remain active participants in society throughout their lives. But others experience physical and cognitive limitations, and may lose the ability to live independently.

**Global overview**

The population worldwide is ageing. Due to falling fertility rates, increased life expectancy and falling mortality rates the number and proportion of older people in the population is increasing faster than any other age group. In 1950, the world median aged was 24 and by 2050 it is projected to be 38 years. Between 2000 and 2050, the proportion of the world's population over 60 years will double from about 11% to 22%. The absolute number of people aged 60 years and over is expected to increase from 605 million to 2 billion over the same period.

<table>
<thead>
<tr>
<th>2 Billion</th>
<th>4 - 6%</th>
<th>25 - 30%</th>
</tr>
</thead>
<tbody>
<tr>
<td>2 billion people will be aged 60 and older by 2050. This represents both challenges and opportunities.</td>
<td>Around 4-6% of older persons in high-income countries have experienced some form of maltreatment at home.</td>
<td>25 - 30% of people aged 85 or older have some degree of cognitive decline.</td>
</tr>
</tbody>
</table>

**Global Trends**

Population ageing is taking place in every country, although each country is at a different stage of this transition. Figure 1 shows how the proportion of older people is increasing across the globe.

While the shift to older populations started in wealthy regions such as Europe and North America, it is now low- and middle-income countries that are experiencing the greatest change. By 2050, 80% of older people will live in these countries. Chile, China and the Islamic Republic of Iran will have a greater proportion of older people than the United States of America.

These trends are also evident for the oldest age groups. In the middle of the 20th century there were just 14 million people on the whole planet aged 80 years or older. By 2050, there will be 100 million living in China alone, and 400 million people in this age group worldwide.
Life expectancy

One statistic that is commonly used when discussing population ageing is “life expectancy at birth”. This is defined as the average number of years that a newborn could expect to live if they were to pass through life exposed to the death rates prevailing at the time of their birth.

Life expectancy at birth is a measure of both survival at younger ages and how long survivors tend to live. Table 1 shows life expectancy at birth for different WHO regions in 2011. The disparity of almost 20 years in life expectancy at birth between high-income countries and low-income countries partly reflects greater longevity in richer countries, but is also heavily influenced by the higher risk of dying at an early age, generally from communicable (infectious) disease in poorer countries.

A different perspective on population ageing can be gained by examining the number of additional years that someone who has already reached the age of 60 might expect to live. This “life expectancy at age 60”
is a better measure of longevity than life expectancy at birth, and the variation between countries is less marked.

A 60-year-old woman in sub-Saharan Africa can expect to live for another 14 years, while a 60-year-old woman in a high-income country can expect to live 25 years as shown in the same table. However, life expectancy at 60 in high-income countries is increasing twice as fast as in low- and middle-income countries, and almost three times as fast as in sub-Saharan Africa.

Table 1: Life expectancy at birth for different WHO regions in 2011.

<table>
<thead>
<tr>
<th>WHO Region</th>
<th>Male (years)</th>
<th>Female (years)</th>
<th>Annual average rate of change 2000 - 2009 (%)</th>
<th>Male 2009 (years)</th>
<th>Female 2009 (years)</th>
<th>Annual average rate of change 2000 - 2009 (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>World</td>
<td>66</td>
<td>71</td>
<td>0.5%</td>
<td>18</td>
<td>21</td>
<td>0.5%</td>
</tr>
<tr>
<td>Africa</td>
<td>52</td>
<td>56</td>
<td>0.3%</td>
<td>14</td>
<td>16</td>
<td>0.3%</td>
</tr>
<tr>
<td>Americas</td>
<td>73</td>
<td>79</td>
<td>0.7%</td>
<td>21</td>
<td>24</td>
<td>0.5%</td>
</tr>
<tr>
<td>Eastern Mediterranean</td>
<td>64</td>
<td>67</td>
<td>0.4%</td>
<td>16</td>
<td>18</td>
<td>0.4%</td>
</tr>
<tr>
<td>Europe</td>
<td>71</td>
<td>79</td>
<td>1.0%</td>
<td>19</td>
<td>23</td>
<td>0.7%</td>
</tr>
<tr>
<td>South-East Asia</td>
<td>64</td>
<td>67</td>
<td>0.1%</td>
<td>15</td>
<td>18</td>
<td>0.2%</td>
</tr>
<tr>
<td>Western Pacific</td>
<td>72</td>
<td>77</td>
<td>0.5%</td>
<td>19</td>
<td>22</td>
<td>0.6%</td>
</tr>
</tbody>
</table>

In understanding survival patterns in older age, examining the Years of Life Lost for people aged 60 and over is a better measure of the major diseases that cause death in older age groups. This is important since it helps in prioritizing the issues on which focus is needed to better address the health of older people.

Figure 2 shows the 15 greatest causes of Years of Life Lost for people aged 60 and over by different country income group. Regardless of the level of economic development, the three biggest causes of premature death are non-communicable diseases: ischemic heart disease, cerebrovascular disease (stroke) and chronic obstructive pulmonary disease.

Since this analysis is calculated for every 100,000 older people (rather than by the absolute number in each country), it also allows to compare the relative impact of each of these conditions in different settings. It shows that the burden of premature mortality from non-communicable diseases in older people is, in fact, even higher in low- and middle-income countries than for high-income countries. Thus, among the same number of older people living in low- or middle-income countries, more than three times as many years are lost to stroke than in high-income countries. More than twice as many years are lost to ischaemic heart disease and more than four times as many to chronic obstructive pulmonary disease.
Disability

Older people experience higher rates of disability that reflects an accumulation of health risks throughout their life course. WHO’s Global Burden of Disease (2004) estimates show that prevalence of disability increases with age and suggests that more than 46% of people aged 60 years and over have disabilities. The disability prevalence among older people in low-income countries is higher than in high-income countries, and higher among women than among men.

Population ageing is therefore likely to lead to an increase in demand for health care and social support. The extent of this increase will be heavily influenced by whether these trends remain the same or change with increasing longevity. If these patterns stay the same and a 75-year old in 2050 experiences the same level of disability as one in 2012, the increase in demand will be much greater than if the added years of life are healthy. Understanding which of these scenarios is occurring is therefore fundamental for better planning for the future. Unfortunately, despite very clear evidence that people are living longer, it is yet unknown whether these added years are necessarily healthier.

Even if the onset of disability is delayed, increasing numbers of the oldest age groups, those most at risk of disability, will inevitably result in increased demand for long-term care. The Organization for Economic Co-operation and Development (OECD) has therefore concluded that it would be unwise for...
policy-makers to expect that reductions in severe disability among older people will offset increased demands for long-term care.

There is clearer information on the current causes of disability in older age. Figure 3 shows the burden of disability by country income group using the concept of “Years Lost due to Disability” (YLD). YLDs are calculated from the incidence of nonfatal disease and a weight factor reflecting the severity of the disease. Using this approach, the four biggest causes of disability (visual impairment, dementia, hearing loss and osteoarthritis) are the same in low, middle- and high-income countries, although the ranking changes by income setting.

Figure 3: Years Lost due to Disability (YLDs) per 100 000 adults over age 60 by country income group.

Table 2 shows the absolute numbers of people affected by the common causes of disability by country income group. More than 250 million older people around the world experience moderate to severe disability. There are more than 40 million older people in low- and middle-income countries with significant hearing impairment, while 32.5 million have significant visual impairment from cataracts, and 39.8 million significant visual impairment from refractive errors.
Synopsis of Strategic Studies

Dementia is the greatest cause of years lost due to disability in high-income countries and the second greatest worldwide. More recent data suggests that, in 2010, there were 35.6 million people living with dementia globally, with 7.7 million new cases each year. Numbers of people with dementia will nearly double every 20 years, with much of the increase occurring in rapidly developing middle-income countries. Currently, 58% of people with dementia live in low- and middle-income countries, and this proportion is projected to rise to 71% by 2050.

Table 2: The absolute numbers of people affected by the common causes of disability by country income group.

<table>
<thead>
<tr>
<th>Disability</th>
<th>High-income countries</th>
<th>Low- &amp; middle-income countries</th>
</tr>
</thead>
<tbody>
<tr>
<td>Visual impairment</td>
<td>15.0</td>
<td>94.2</td>
</tr>
<tr>
<td>Hearing loss</td>
<td>18.5</td>
<td>43.9</td>
</tr>
<tr>
<td>Osteoarthritis</td>
<td>8.1</td>
<td>19.4</td>
</tr>
<tr>
<td>Ischemic heart disease</td>
<td>2.2</td>
<td>11.9</td>
</tr>
<tr>
<td>Dementia</td>
<td>6.2</td>
<td>7.0</td>
</tr>
<tr>
<td>Chronic obstructive pulmonary disease</td>
<td>4.8</td>
<td>8.0</td>
</tr>
<tr>
<td>Cerebrovascular disease</td>
<td>2.2</td>
<td>4.9</td>
</tr>
<tr>
<td>Depression</td>
<td>0.5</td>
<td>4.8</td>
</tr>
<tr>
<td>Rheumatoid arthritis</td>
<td>1.7</td>
<td>3.7</td>
</tr>
</tbody>
</table>

The total burden of death and disability

The total burden of disease faced by older people is a combination of both premature death and poor health experienced during life. This concept is captured in a measure known as the Disability Adjusted Life Year (DALY).

One DALY can be thought of as one lost year of “healthy” life and is calculated as the sum of both the years of life lost due to premature death and those lost due to disability.

When applied to all ages, the leading causes of burden of disease (DALY s) are lower respiratory disease, diarrheal disease and depressive disorders. Examining the burden of disease in older ages gives a different picture as shown in figure 4. For older adults in high-income countries, the biggest causes of burden of disease are, in order of importance, ischemic heart disease, visual disorders, dementia, cancers and stroke. For low- and middle-income countries, the biggest causes are ischemic heart disease, stroke, visual disorders, and chronic obstructive pulmonary disease. All are non-communicable diseases.

The behavioral and metabolic risk factors for these chronic diseases (e.g. smoking) vary by country. The estimated proportion of the total burden of disease by risk factors is shown in figure 5. The biggest underlying risk factor observed in older people is high blood pressure which can explain 12-19 % of the total burden of disease in poorer countries. Other key determinants are smoking and high blood glucose levels.
Figure 4: Disability Adjusted Life Years (DALYs) per 100 000 adults over age 60 by country income group.

Figure 5: Proportion of DALYs in each country-income group caused by specific risk factors for adults over age 60.
10 FACTS ON AGEING AND THE LIFE COURSE

The world population is rapidly ageing
Between 2000 and 2050, the proportion of the world's population over 60 years will double from about 11% to 22%. The number of people aged 60 years and over is expected to increase from 605 million to 2 billion over the same period.

The number of people aged 80 and older will quadruple in the period 2000 to 2050
By 2050 the world will have almost 400 million people aged 80 years or older. Never before have the majority of middle-aged adults had living parents.

By 2050, 80% of older people will live in low- and middle-income countries
Chile, China and the Islamic Republic of Iran will have a greater proportion of older people than the United States of America. The number of older people in Africa will grow from 54 million to 213 million.

The main health burdens for older people are from non-communicable diseases
Already, even in the poorest countries the biggest killers are heart disease, stroke and chronic lung disease, while the greatest causes of disability are visual impairment, dementia, hearing loss and osteoarthritis.

Older people in low- and middle-income countries carry a greater disease burden than those in the rich world
Older people in low- and middle-income countries have around three times the number of years lost to premature death from heart disease, stroke, and chronic lung disease. They also have much higher rates of visual impairment and hearing loss. Many of these problems can be easily and cheaply prevented.

The need for long-term care is rising
The number of older people who are no longer able to look after themselves in developing countries is forecast to quadruple by 2050. Many of the very old lose their ability to live independently because of limited mobility, frailty or other physical or mental health problems. Many require long-term care, including home-based nursing, community, residential and hospital-based care.

Effective, community-level primary health care for older people is crucial
Good care is important for promoting older people's health, preventing disease and managing chronic illnesses. Most training for health professionals does not include instruction about specific care for older people. However, health workers will increasingly spend more of their time caring for this section of the population. WHO maintains that all health providers should be trained on ageing issues.

Supportive, “age-friendly” environments allow older people to live fuller lives and maximize the contribution they make
Creating “age-friendly” physical and social environments can have a big impact on improving the
active participation and independence of older people.

**Healthy ageing starts with healthy behaviors in earlier stages of life**
These include what we eat, how physically active we are and our levels of exposure to health risks such as those caused by smoking, harmful consumption of alcohol, or exposure to toxic substances. But it is never too late to start: for example, the risk of premature death decreases by 50% if someone gives up smoking between 60 and 75 years of age.

**We need to reinvent our assumptions of old age**
Society needs to break stereotypes and develop new models of ageing for the 21st century. Everyone benefits from communities, workplaces and societies that encourage active and visible participation of older people.

---

**Enabling Healthy Ageing**
Healthy ageing depends on genetic, environmental and behavioral factors, as well as broader environmental and socio-economic determinants. Some of these factors are within the control of the individual, usually referred to as lifestyle factors, and others are outside the individual’s control. Social determinants of health, such as income and education, influence the choices that individuals can make and create life circumstances that limit opportunities for healthy lifestyle and create health inequalities.

WHO Active Ageing Framework (figure 6) provides a useful model for understanding how social, personal and behavioral determinants interact with the physical environment and access to health services to enable or prevent active ageing.

A key component of WHO active ageing framework is the consideration of how the broad determinants of health affect the process of ageing. Gender and culture are listed as two ‘cross-cutting’ determinants that shape the way we age and influence all the other determinants of active ageing. Other determinants of health identified in this framework include:

- Health and social service system determinants (e.g. health promotion and disease prevention, curative services, long-term care, mental health services)
- Behavioral determinants (e.g. tobacco use, physical activity, nutrition, alcohol, oral health, medications)
- Physical environment determinants (e.g. housing, safety of home environment, clean water/air, safe foods)
- Social environment determinants (e.g. social support, violence and abuse, education)
- Personal determinants (e.g. biology, genetics, psychological factors)
- Economic determinants (e.g. income, social protection, work).
CARE OF ELDERLY IN SULTANATE OF OMAN

Demographic Characteristics of the Sultanate of Oman

The population size in 2012 was 3,623,001 of whom 42.2% were non-Omani. The Omani population is a relatively young population where almost half the population is below the age of 21 years in 2012.

Population projections suggested changes in the age structure of the population. 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 as shown in table 3.
Table 3: Demographic characteristics of population in Oman.

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

The dependency ratios 2010 – 2050:
Table 4 reflects the expected dependency ratio in Oman according to WHO estimates. It is expected that the declining dependency ratio will intercept the increased working age population.

Table 4: The expected dependency ratio in Oman according to WHO estimates

<table>
<thead>
<tr>
<th>Indicator</th>
<th>Age</th>
<th>1950</th>
<th>1975</th>
<th>2000</th>
<th>2025</th>
<th>2050</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dependency ratio</td>
<td>Total</td>
<td>83.0</td>
<td>88.5</td>
<td>87.2</td>
<td>76.4</td>
<td>50.8</td>
</tr>
<tr>
<td></td>
<td>Youth</td>
<td>77.5</td>
<td>83.6</td>
<td>82.5</td>
<td>68.4</td>
<td>40.4</td>
</tr>
<tr>
<td></td>
<td>Old age</td>
<td>5.5</td>
<td>5.0</td>
<td>4.7</td>
<td>8.0</td>
<td>10.4</td>
</tr>
</tbody>
</table>

The distribution of elders (60 years and above) in Oman per nationality and per governorate is shown in table 5. The Omani elders constituted 6.1% of the total population in all governorates. However, the percent of elders (Omani and non-Omani) of the total population varied from 3.3% in Muscat governorate to 5.0% in AdDhahirah governorate with a national average of 4.0%. Table 6 shows the distribution of elders per gender per governorate.
Table 5: The distribution of elders (60 years and above) in Oman per nationality and per governorate, 2012.

<table>
<thead>
<tr>
<th>Governorate</th>
<th>Omani elders</th>
<th>Non-Omani elders</th>
<th>Total</th>
<th>% Omani elders of total population</th>
<th>% Omani &amp; non-Omani elders of total population</th>
</tr>
</thead>
<tbody>
<tr>
<td>Muscat</td>
<td>26,440</td>
<td>11,571</td>
<td>38,011</td>
<td>6.1</td>
<td>3.3</td>
</tr>
<tr>
<td>Dhofar</td>
<td>10,659</td>
<td>1,911</td>
<td>12,570</td>
<td>6.1</td>
<td>3.5</td>
</tr>
<tr>
<td>Musandam</td>
<td>1,423</td>
<td>115</td>
<td>1,538</td>
<td>6.1</td>
<td>4.5</td>
</tr>
<tr>
<td>Al Buraymi</td>
<td>2,795</td>
<td>491</td>
<td>3,286</td>
<td>6.1</td>
<td>3.6</td>
</tr>
<tr>
<td>Ad Dakhiliyah</td>
<td>17,468</td>
<td>503</td>
<td>17,971</td>
<td>6.1</td>
<td>4.8</td>
</tr>
<tr>
<td>North Al Batinah</td>
<td>25,101</td>
<td>1,161</td>
<td>26,262</td>
<td>6.1</td>
<td>4.3</td>
</tr>
<tr>
<td>South Al Batinah</td>
<td>15,219</td>
<td>496</td>
<td>15,715</td>
<td>6.1</td>
<td>4.8</td>
</tr>
<tr>
<td>South Ash Sharqiya</td>
<td>10,210</td>
<td>385</td>
<td>10,595</td>
<td>6.1</td>
<td>4.3</td>
</tr>
<tr>
<td>North Ash Sharqiya</td>
<td>8,833</td>
<td>266</td>
<td>9,099</td>
<td>6.1</td>
<td>4.1</td>
</tr>
<tr>
<td>Ad Dhabirah</td>
<td>7,719</td>
<td>907</td>
<td>8,626</td>
<td>6.1</td>
<td>5.0</td>
</tr>
<tr>
<td>Al Wusta</td>
<td>1,238</td>
<td>46</td>
<td>1,284</td>
<td>6.1</td>
<td>3.5</td>
</tr>
<tr>
<td>Total</td>
<td>127,105</td>
<td>17,852</td>
<td>144,957</td>
<td>6.1</td>
<td>4.0</td>
</tr>
</tbody>
</table>

Table 6: The distribution of elders per gender per governorate, 2012.

<table>
<thead>
<tr>
<th>Governorate</th>
<th>Omani Elder</th>
<th>Non-Omani Elder</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Male</td>
<td>Female</td>
<td>Total</td>
</tr>
<tr>
<td>Muscat</td>
<td>13,903</td>
<td>12,537</td>
<td>26,440</td>
</tr>
<tr>
<td>Dhofar</td>
<td>5,588</td>
<td>5,071</td>
<td>10,659</td>
</tr>
<tr>
<td>Musandam</td>
<td>758</td>
<td>665</td>
<td>1,423</td>
</tr>
<tr>
<td>Al Buraymi</td>
<td>1,490</td>
<td>1,305</td>
<td>2,795</td>
</tr>
<tr>
<td>Ad Dakhiliyah</td>
<td>8,942</td>
<td>8,526</td>
<td>17,468</td>
</tr>
<tr>
<td>North Al Batinah</td>
<td>13,031</td>
<td>12,070</td>
<td>25,101</td>
</tr>
<tr>
<td>South Al Batinah</td>
<td>7,812</td>
<td>7,407</td>
<td>15,219</td>
</tr>
<tr>
<td>South Ash Sharqiya</td>
<td>5,243</td>
<td>4,967</td>
<td>10,210</td>
</tr>
<tr>
<td>North Ash Sharqiya</td>
<td>4,490</td>
<td>4,343</td>
<td>8,833</td>
</tr>
<tr>
<td>Ad Dhabirah</td>
<td>3,972</td>
<td>3,747</td>
<td>7,719</td>
</tr>
<tr>
<td>Al Wusta</td>
<td>649</td>
<td>589</td>
<td>1,238</td>
</tr>
<tr>
<td>Total</td>
<td>65,878</td>
<td>61,227</td>
<td>127,105</td>
</tr>
</tbody>
</table>

Table 7 shows the distribution of MOH health institutions per governorates. It indicates that all governorates have tertiary level hospital (i.e. governorate hospital), four governorates have secondary level hospital (i.e. Wilayat hospital), and all governorates have the three types of PHC institutions (i.e. local hospital, extended health center and health center) except Al Wusta which has not an extended health center.
Table 7: The distribution of MOH health institutions per governorates, 2012.

<table>
<thead>
<tr>
<th>Governorate</th>
<th>Health center</th>
<th>Extended health center</th>
<th>Local hospital</th>
<th>Wilayat hospital</th>
<th>Governorate hospital</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Muscat</td>
<td>27</td>
<td>4</td>
<td>2</td>
<td>0</td>
<td>4</td>
<td>37</td>
</tr>
<tr>
<td>Dhofar</td>
<td>29</td>
<td>1</td>
<td>6</td>
<td>0</td>
<td>1</td>
<td>37</td>
</tr>
<tr>
<td>Musandam</td>
<td>3</td>
<td>1</td>
<td>2</td>
<td>0</td>
<td>1</td>
<td>7</td>
</tr>
<tr>
<td>Al Buraymi</td>
<td>6</td>
<td>1</td>
<td>1</td>
<td>0</td>
<td>1</td>
<td>9</td>
</tr>
<tr>
<td>Ad Dakhliyah</td>
<td>19</td>
<td>4</td>
<td>3</td>
<td>2</td>
<td>1</td>
<td>29</td>
</tr>
<tr>
<td>North Al Batinah</td>
<td>17</td>
<td>5</td>
<td>3</td>
<td>1</td>
<td>1</td>
<td>27</td>
</tr>
<tr>
<td>South Al Batinah</td>
<td>14</td>
<td>3</td>
<td>4</td>
<td>0</td>
<td>1</td>
<td>22</td>
</tr>
<tr>
<td>South Ash Sharqiyah</td>
<td>17</td>
<td>2</td>
<td>2</td>
<td>1</td>
<td>1</td>
<td>23</td>
</tr>
<tr>
<td>North Ash Sharqiyah</td>
<td>14</td>
<td>2</td>
<td>4</td>
<td>1</td>
<td>1</td>
<td>22</td>
</tr>
<tr>
<td>Ad Dhahirah</td>
<td>14</td>
<td>1</td>
<td>1</td>
<td>0</td>
<td>1</td>
<td>16</td>
</tr>
<tr>
<td>Al Wusta</td>
<td>9</td>
<td>0</td>
<td>2</td>
<td>0</td>
<td>1</td>
<td>12</td>
</tr>
<tr>
<td>Total</td>
<td>168</td>
<td>24</td>
<td>30</td>
<td>5</td>
<td>14</td>
<td>241</td>
</tr>
</tbody>
</table>

The distribution of MOH PHC institutions (i.e. local hospital, extended health center and health center) per governorate is shown in table 8. The numbers varied from 36 institutions in Dhofar governorate to six institutions in Musandam governorate.

Table 8: The distribution of PHC institutions per governorate, MOH 2012.

<table>
<thead>
<tr>
<th>Governorate</th>
<th>PHC institutions</th>
<th>Population served by PHC institutions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Muscat</td>
<td>30</td>
<td>38,506</td>
</tr>
<tr>
<td>Dhofar</td>
<td>36</td>
<td>9,872</td>
</tr>
<tr>
<td>Musandam</td>
<td>6</td>
<td>5,763</td>
</tr>
<tr>
<td>Al Buraymi</td>
<td>8</td>
<td>11,529</td>
</tr>
<tr>
<td>Ad Dakhliyah</td>
<td>26</td>
<td>14,321</td>
</tr>
<tr>
<td>North Al Batinah</td>
<td>25</td>
<td>24,353</td>
</tr>
<tr>
<td>South Al Batinah</td>
<td>21</td>
<td>15,544</td>
</tr>
<tr>
<td>South Ash Sharqiyah</td>
<td>21</td>
<td>11,699</td>
</tr>
<tr>
<td>North Ash Sharqiyah</td>
<td>20</td>
<td>11,137</td>
</tr>
<tr>
<td>Ad Dhahirah</td>
<td>15</td>
<td>11,525</td>
</tr>
<tr>
<td>Al Wusta</td>
<td>11</td>
<td>3,339</td>
</tr>
<tr>
<td>Total</td>
<td>219</td>
<td>16,543</td>
</tr>
</tbody>
</table>
Figure 7 shows the average population served by PHC institution. Only three governorates were within the national standard of one PHC institute per 10,000 population.

The average elder population (Omani and non-Omani) served by PHC institute is shown in table 9. Muscat and North Al Batinah governorates had the highest average, while Musandam and Al Wusta governorates had the lowest average. Seven governorates were below the national average (653 elder per PHC institute) as shown in figure 8.

Table 9: The average elder population served by PHC institute, MOH 2012.

<table>
<thead>
<tr>
<th>Governorate</th>
<th>PHC institutions</th>
<th>Elderly population served by PHC institutions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Muscat</td>
<td>30</td>
<td>1,267</td>
</tr>
<tr>
<td>Dhofar</td>
<td>36</td>
<td>349</td>
</tr>
<tr>
<td>Musandam</td>
<td>6</td>
<td>256</td>
</tr>
<tr>
<td>Al Buraymi</td>
<td>8</td>
<td>411</td>
</tr>
<tr>
<td>Ad Dakhliyah</td>
<td>26</td>
<td>691</td>
</tr>
<tr>
<td>North Al Batinah</td>
<td>25</td>
<td>1,050</td>
</tr>
<tr>
<td>South Al Batinah</td>
<td>21</td>
<td>748</td>
</tr>
<tr>
<td>South Ash Sharqiyyah</td>
<td>21</td>
<td>505</td>
</tr>
<tr>
<td>North Ash Sharqiyyah</td>
<td>20</td>
<td>455</td>
</tr>
<tr>
<td>Ad Dhahirah</td>
<td>15</td>
<td>575</td>
</tr>
<tr>
<td>Al Wusta</td>
<td>11</td>
<td>117</td>
</tr>
<tr>
<td>Total</td>
<td>219</td>
<td>662</td>
</tr>
</tbody>
</table>
Figure 8: The average elder population served by PHC institute per governorate, MOH 2012.

Table 10 shows the distribution of doctors and nurses per PHC institutions per governorate, while table 11 shows the average elders (Omani) per doctor and per nurse in each governorate.

Table 10: The distribution of doctors and nurses per PHC institutions per governorate, MOH 2012.

<table>
<thead>
<tr>
<th>Governorate</th>
<th>PHC institutions</th>
<th>Doctors</th>
<th>Nurses</th>
</tr>
</thead>
<tbody>
<tr>
<td>Muscat</td>
<td>30</td>
<td>401</td>
<td>776</td>
</tr>
<tr>
<td>Dhofar</td>
<td>36</td>
<td>156</td>
<td>434</td>
</tr>
<tr>
<td>Musandam</td>
<td>6</td>
<td>56</td>
<td>90</td>
</tr>
<tr>
<td>Al Buraymi</td>
<td>8</td>
<td>52</td>
<td>101</td>
</tr>
<tr>
<td>Ad Dakhliyah</td>
<td>26</td>
<td>296</td>
<td>446</td>
</tr>
<tr>
<td>North Al Batinah</td>
<td>25</td>
<td>354</td>
<td>701</td>
</tr>
<tr>
<td>South Al Batinah</td>
<td>21</td>
<td>316</td>
<td>473</td>
</tr>
<tr>
<td>South Ash Sharqiyah</td>
<td>21</td>
<td>183</td>
<td>396</td>
</tr>
<tr>
<td>North Ash Sharqiyah</td>
<td>20</td>
<td>114</td>
<td>313</td>
</tr>
<tr>
<td>AdDhahirah</td>
<td>15</td>
<td>116</td>
<td>282</td>
</tr>
<tr>
<td>Al Wusta</td>
<td>11</td>
<td>29</td>
<td>92</td>
</tr>
<tr>
<td>Total</td>
<td>219</td>
<td>2,073</td>
<td>4,104</td>
</tr>
</tbody>
</table>
Table 11: Average elders (Omani) per doctor and per nurse in each governorate, MOH 2012.

<table>
<thead>
<tr>
<th>Governorate</th>
<th>Omani Elderly</th>
<th>Average Omani elderly per doctor</th>
<th>Average Omani elderly per nurse</th>
</tr>
</thead>
<tbody>
<tr>
<td>Muscat</td>
<td>26,440</td>
<td>66</td>
<td>34</td>
</tr>
<tr>
<td>Dhofar</td>
<td>10,659</td>
<td>68</td>
<td>25</td>
</tr>
<tr>
<td>Musandam</td>
<td>1,423</td>
<td>25</td>
<td>16</td>
</tr>
<tr>
<td>Al Buraymi</td>
<td>2,795</td>
<td>54</td>
<td>28</td>
</tr>
<tr>
<td>Ad Dakhliyah</td>
<td>17,468</td>
<td>59</td>
<td>39</td>
</tr>
<tr>
<td>North Al Batinah</td>
<td>25,101</td>
<td>71</td>
<td>36</td>
</tr>
<tr>
<td>South Al Batinah</td>
<td>15,219</td>
<td>48</td>
<td>32</td>
</tr>
<tr>
<td>South Ash Sharqiyah</td>
<td>10,210</td>
<td>56</td>
<td>26</td>
</tr>
<tr>
<td>North Ash Sharqiyah</td>
<td>8,833</td>
<td>77</td>
<td>28</td>
</tr>
<tr>
<td>AdDhahirah</td>
<td>7,719</td>
<td>67</td>
<td>27</td>
</tr>
<tr>
<td>Al Wusta</td>
<td>1,238</td>
<td>43</td>
<td>13</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>127,105</strong></td>
<td><strong>61</strong></td>
<td><strong>31</strong></td>
</tr>
</tbody>
</table>

The average elders (Omani) per doctor varied from 78 in North Ash Sharqiyah governorate to 25 in Musandam as shown in figure 9, while average elders (Omani) per nurse varied from 39 in Ad Dakhliyah governorate to 14 in Al Wusta governorate as shown in figure 10.

Figure 9: The average elders (Omani) per doctor in each governorate, MOH 2012.
Figure 10: The average elders (Omani) per nurse in each governorate, MOH 2012.

Table 12 shows the distribution of all MOH physiotherapists per governorate. However, the physiotherapists who worked in elderly care were only 61.

Table 12: The distribution of MOH physiotherapists per governorate, 2012.

<table>
<thead>
<tr>
<th>Governorate</th>
<th>No. of physiotherapist</th>
</tr>
</thead>
<tbody>
<tr>
<td>Muscat</td>
<td>103</td>
</tr>
<tr>
<td>Dhofar</td>
<td>14</td>
</tr>
<tr>
<td>Al Buraymi</td>
<td>7</td>
</tr>
<tr>
<td>Musandam</td>
<td>6</td>
</tr>
<tr>
<td>Ad Dakhliyah</td>
<td>17</td>
</tr>
<tr>
<td>North Al Batinah</td>
<td>24</td>
</tr>
<tr>
<td>South Al Batinah</td>
<td>10</td>
</tr>
<tr>
<td>North Ash Sharqiyah</td>
<td>13</td>
</tr>
<tr>
<td>South Ash Sharqiyah</td>
<td>13</td>
</tr>
<tr>
<td>Al Dhahirah</td>
<td>7</td>
</tr>
<tr>
<td>Al Wusta</td>
<td>0</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>214</strong></td>
</tr>
</tbody>
</table>
Elderly Care Program in MOH:

The pathway to reach the present elderly care services represented into the national elderly care program included three main studies:


The First pilot study: Nizwa Pilot Elderly Care Home Project 2003.

In August 2003, an Elderly Care Home Pilot Project started in Nizwa – AdDakhiliya Governorate (Nizwa Pilot Elderly Care Home Project 2003). The aims of this pilot project were:

- To study the problem of bed blocking by elders abandoned by their families in secondary and tertiary care hospitals in Oman.
- To find suitable solutions for the problem mentioned above.
- To develop a strategy for elderly care services in Oman.
- To establish tools and process for this service, train and prepare some health workers for this service.
- To sensitize the community towards elderly care services.

Before this pilot project, there were no specific elderly care program and the routine services were provided to the elderly population through the general health system in its primary, secondary and tertiary levels, with some social support provided by the Ministry of Social Development. After good preparations for this pilot project, five main targets were identified:

- Definition and classification of the elderly population.
- Clinical and social assessment of elderly condition.
- Proper diagnosis of the elder health problems.
- To identify the actual and specific needs for the elderly population.
- Suggests the suitable interventions.

The pilot phase was planned as follows:

- Formation of a vision.
- Identify the co-workers for elderly service.
- Objectives and expectations to complete the tasks mentioned above.
- Situation analysis.
- Process for the clinical and social assessment and service provision (Pathways).
- Survey and clinical assessment.
- Service packages.
• Intervention.
• Indicators to measure performance.
• Monitoring and evaluation.

After reviewing the literature and the experience of many workers, the first question faced was the definition of elderly. It was agreed to take the elderly definition as (anyone who is 60 years age or above).

This is the definition of the WHO, Arab league and the Ministry of National Economy in Oman. Most of the relevant definitions and classifications for the elders were studied. The following were noticed:

• The classifications based on age were arbitrary and depend on single criterion that relates poorly to the elderly physical and mental conditions. The required interventions for the elder cannot be related to the classification. Thus it difficult for the health or social care provider to know identify exactly the elderly population.
• The classifications did not reflect the state of the quality of life for the elderly, which is very important for intervention.

Therefore, for any classification to be practical and useful, it must answer the following questions:

• What are the physical and mental conditions of the elderly?
• What is the state of the quality of life of the elderly?
• Does the classification relate to the required intervention?
• Does the classification helps the provider to define the type of health or social services required to the elderly?

The most important outputs of Nizwa Pilot Elderly Care Home Project were:

• The real need for elderly care service was recognized.
• The need for definition and classification of the elderly targeted population.
• The need for putting manuals and guidelines for the service.
• The development of elderly care strategy.

The strategy for elderly care service outlined the following:

1. The elderly care service should be:
   - Integrated into the primary health care services.
   - Establishing an elderly friendly and sensitive health care environment in the health care institutions.
   - Establishing an elderly care register in all PHC institutions.
   - Developing a simple and rapid process between the ministry of health and ministry of social development to provide the necessary social support like supportive devices, financial aid and consumables.

2. The human resources required for the elderly care programme:
   - A focal point in each governorate (a doctor from the PHC institution).
   - A coordinator for the programme in each governorate (a nurse).
   - Two trained nurses in each PHC institution.
- Physiotherapist for each sector (one).
- The other paramedical personnel in the PHC institution.
- One social worker for each sector.
- The volunteers in the community support groups and the NGOs.

3. Training orientation and awareness:
- Training of the PHC doctors on elderly care services.
- Putting a manual for elderly care services in PHC.
- Training of nurses in the PHC institutions on the manual, clinical service provision, home care and home occupational assessment.

4. Orientation of the other health workers involved.

5. Community awareness according to an established awareness programme.

6. Partners:
- Improvement of the quality of life which is a goal for the program depends upon providing some specific aid like supportive aids (dentures, hearing aids, spectacles, wheelchairs and other supportive aids) which is provided by the Ministry of Social Development in addition to providing the social workers who assess the social condition of the elder and collaborate in intervention and home visits.
- The local community like families, scout and Omani woman association, they collaborate by:
  - Escort the elder to the health or social services.
  - Assist in follow up of medication compliance by the elders.
  - Social recreational initiatives for the elders.

7. Types of service provided:
- Three groups of elders according to Nizwa classification:
  a. The activity class: they are health and living among their families and need preventive services from risks of diseases expected in old age.
  b. Prevention class: most of them they need review of health institutions for PHC, secondary or tertiary care.
  c. Retirement class: they need home care (service is provided by the medical and social teams).


It was a research study continued from June to October 2005. It was done in collaboration between the MOH department of studies and research and the Directorate General of Health Services, Ad Dakhliyah Governorate. The main outputs of the study were:
- Stressed on the importance of establishing elderly care services.
- Agreed with the strategic report 2003 and the national elderly care strategy.

It was a service pilot project in which the strategy, the process and the tools for elderly care service were tested. It included 13 health institutions (12 PHC centers and one local hospital) in Ad Dakhliyah governorate representing 8.7% of the total number of PHC institutions at the national level.

The aims of the project were:
- To cover 60 – 75% of the elderly population in the study institutions by elderly care services.
- Evaluation of the direct effect of this service on the health of the elders.
- Develop knowledge and skill for elderly care service among the PHC staff.
- Develop orientation on elderly care service on among all health workers in PHC.
- Develop elderly care service awareness among all health workers and administrators in Dakhliya governorate.
- Develop community awareness on elderly care services.
- Develop an elderly care service model suitable for Oman.

The main outputs of the Ad Dakhliyah extended pilot project:
- Established the manuals, the elderly care service tools and management guidelines for elderly care service.
- Classified the elders according to Nizwa classification and test this classification in this wider study.
- Established training models for elderly care and national elderly care training centres.
- Tested the elderly care service packages and the physiotherapy mobile unit’s model of physiotherapy service provision invented within this project.
- Established a referral and feedback system for the service.
- Established a model for social service provision for the elders.
- Developed Omani trained staff to run this service.
- Achieved a coverage rate of 85.5% from the targeted population.
- The elderly care model was implemented at the national level.
- Forming the Elderly Friendly Association in the Ad Dakhliyah governorate.

THE EXPANSION PHASE:

The National Elderly Care Programme:

In April 2010 the elderly care services are expanded to the national level. It was planned to be implemented into the national level on four phases and this plan was included into the eight five years health plan as a domain. The indicators, management and monitoring process were unified between the eight five years plan and the four implementation phases. Detailed management plan was set including all the PHC in all the governorates.
Below are some glimpses about the programme under the following topics:

1 - Management:

The management process similar to phase 2 study was followed. At the central level there is an elderly care section in the department of PHC Affairs in the MOH. At the level of the governorate one focal point was appointed (a trained doctor) and a coordinator (a trained nurse). At the level of the PHC institution at least two nurses were trained. One of them was appointed as the institutional coordinator. Social workers were trained in all the governorates and recently 61 physiotherapists were recruited to the program.

Here is an example for part of the management plan for South Ash Sharqiyah Governorate:

<table>
<thead>
<tr>
<th>Phase</th>
<th>Sector</th>
<th>Institution</th>
<th>T. Population</th>
<th>E. Population</th>
<th>DS</th>
<th>Pysio visits/ week</th>
<th>Target/month</th>
<th>home visits/ year</th>
<th>no. of clinics/ week</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Amerat sector</td>
<td>Amerat HC</td>
<td>21798</td>
<td>828</td>
<td>8</td>
<td>5</td>
<td>41</td>
<td>640</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Nahdha HC</td>
<td>18889</td>
<td>718</td>
<td>7</td>
<td>4</td>
<td>36</td>
<td>560</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Saya HC</td>
<td>3327</td>
<td>126</td>
<td>1</td>
<td>1</td>
<td>6</td>
<td>80</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Qurayat sector</td>
<td>Qurayat PC</td>
<td>31315</td>
<td>1190</td>
<td>12</td>
<td>8</td>
<td>60</td>
<td>960</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Mazarie HC</td>
<td>2386</td>
<td>91</td>
<td>1</td>
<td>1</td>
<td>5</td>
<td>80</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td></td>
<td>W, Al arabeyeen</td>
<td>466</td>
<td>18</td>
<td>1</td>
<td>0</td>
<td>1</td>
<td>80</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Bama HC</td>
<td>2845</td>
<td>108</td>
<td>1</td>
<td>1</td>
<td>5</td>
<td>80</td>
<td>1</td>
</tr>
<tr>
<td>2</td>
<td>Muscat sector</td>
<td>Muscat HC</td>
<td>17760</td>
<td>675</td>
<td>7</td>
<td>8</td>
<td>34</td>
<td>560</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Yaeti HC</td>
<td>3625</td>
<td>138</td>
<td>1</td>
<td>1</td>
<td>7</td>
<td>80</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Al saifa HC</td>
<td>1611</td>
<td>61</td>
<td>1</td>
<td>1</td>
<td>3</td>
<td>80</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Matrah 2 sectors</td>
<td>Ruwi HC</td>
<td>15057</td>
<td>572</td>
<td>6</td>
<td>4</td>
<td>29</td>
<td>480</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td></td>
<td>W. Alkabeer HC</td>
<td>14304</td>
<td>544</td>
<td>5</td>
<td>3</td>
<td>27</td>
<td>400</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Matrah HC</td>
<td>16204</td>
<td>616</td>
<td>6</td>
<td>5</td>
<td>31</td>
<td>480</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Wataiya HC</td>
<td>22821</td>
<td>867</td>
<td>9</td>
<td>8</td>
<td>43</td>
<td>720</td>
<td>5</td>
</tr>
<tr>
<td>3</td>
<td>Boser</td>
<td>Al Khewair HC</td>
<td>28555</td>
<td>1085</td>
<td>11</td>
<td>8</td>
<td>54</td>
<td>880</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Al Ansab HC</td>
<td>8423</td>
<td>320</td>
<td>3</td>
<td>2</td>
<td>16</td>
<td>240</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>Ghobra</td>
<td>Al Ghobra HC</td>
<td>26019</td>
<td>989</td>
<td>10</td>
<td>8</td>
<td>50</td>
<td>800</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Al Uthaiba HC</td>
<td>13843</td>
<td>526</td>
<td>5</td>
<td>2</td>
<td>26</td>
<td>400</td>
<td>3</td>
</tr>
<tr>
<td>4</td>
<td>Seeb (2)</td>
<td>Al Shadi HC</td>
<td>26000</td>
<td>988</td>
<td>10</td>
<td>10</td>
<td>49</td>
<td>800</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Al Seeb HC</td>
<td>27650</td>
<td>1051</td>
<td>11</td>
<td>10</td>
<td>53</td>
<td>880</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>Khodh</td>
<td>Al Khodh HC</td>
<td>28720</td>
<td>1091</td>
<td>11</td>
<td>10</td>
<td>55</td>
<td>880</td>
<td>5</td>
</tr>
</tbody>
</table>
2 - Training:

Guidelines:
The program has manuals and guidelines distributed in all PHC institutions such as:
- Gerontology and geriatric manuals.
- Guidelines for home care.

The program also provided training and capacity building activities to the health professionals. There were three types of training activities:

a. The basic training:
   It is a five days training that all the nurses and doctors working in the program must complete before they are appointed to work in the program. Table 13 shows the numbers of MOH staff trained in elderly care since 2011 per governorate.

Table 13: The numbers of MOH staff trained in elderly care since 2011 per governorate.

<table>
<thead>
<tr>
<th>Region</th>
<th>No. of institutions</th>
<th>No. of doctors</th>
<th>No. of nurses</th>
</tr>
</thead>
<tbody>
<tr>
<td>Muscat</td>
<td>28</td>
<td>49</td>
<td>72</td>
</tr>
<tr>
<td>Dhofar</td>
<td>36</td>
<td>54</td>
<td>69</td>
</tr>
<tr>
<td>Musandum</td>
<td>6</td>
<td>13</td>
<td>23</td>
</tr>
<tr>
<td>N. Al Batinah</td>
<td>28</td>
<td>89</td>
<td>112</td>
</tr>
<tr>
<td>S. Al Batinah</td>
<td>17</td>
<td>47</td>
<td>58</td>
</tr>
<tr>
<td>S. Ash Sharqiyah</td>
<td>18</td>
<td>47</td>
<td>63</td>
</tr>
<tr>
<td>N. Ash Sharqiyah</td>
<td>17</td>
<td>22</td>
<td>43</td>
</tr>
<tr>
<td>Ad DakhiliyaH</td>
<td>24</td>
<td>38</td>
<td>50</td>
</tr>
<tr>
<td>Al Dhahirah</td>
<td>16</td>
<td>23</td>
<td>41</td>
</tr>
<tr>
<td>Al Wusta</td>
<td>11</td>
<td>18</td>
<td>29</td>
</tr>
<tr>
<td>Al Buraymi</td>
<td>8</td>
<td>15</td>
<td>27</td>
</tr>
<tr>
<td>Total</td>
<td>209</td>
<td>415</td>
<td>587</td>
</tr>
</tbody>
</table>

b. Training of master trainers:
   11 doctors and 11 nurses from the 11 governorates were trained as master trainers.

c. Continuous training (on hand) training:
The master trainers will train the staff in their governorate. Either the staff will be trained in the elderly care office in the governorate or he will be trained on the site...
during the visit to the PHC institution immediately after the training need is recognized or the training may be through the phone or communication media.

3 - Assessment:

Comprehensive elderly assessment

The elderly care program has a clear assessment process for the elders composed of the following. The elder is assessed by physical, mental and social assessment. The end of the assessment process is the diagnosis and classification whereby the elder is classified according to Nizwa Classification:

a. The comprehensive elderly assessment: composed (at the present time) of history, examination, tests and scales and investigations.

b. Tests and scales: composed of 11 tests and scales; 9 of them done by the nurse, one by the nutritionist and one by the physiotherapist.

c. Investigations: composed of basic, special and follow up investigations.

The diagnosis and classification:
The Classification: (Nizwa Classification – Osman Classification)
The elderly individuals is classified into three classes:

Activity class:
Characterized mainly by continuation of life activities approximately the same as below 60 years age.

Prevention class:
In which all efforts are made to delay the effects and complications of old age. Further divided into two subclasses:

Prone to activity:
Characterized by capability to return to activity if good intervention succeed in changing the life style of the individual.

Prone to retirement:
Characterized by failure of all interventions to change the progression of the individual towards the retirement.

Retirement class:
Characterized by deterioration of the quality of life which is inevitable in spite of the interventions to improve them. So the main task is to make the retirement with dignity and with fewer complications as possible.

4 - Intervention:
The types of intervention in this program are:

- Clinical intervention in the PHC.
- Referral to secondary care.
- Home intervention through:
 ✓ Nursing home visits. Which is done by a team of a nurse, dietician, health educator and social worker according to need.
 ✓ Medical home visits. Which are done by the team in addition to a doctor.
- Physiotherapy intervention. Done through physiotherapy mobile units.
- Social intervention. Where social support is provided by the Ministry of Social Development, but it is requested by the medical team. It includes supportive and assistive aids, financial support and home environment intervention.

5 - Monitoring:
Is done mainly through the monitoring format. It is a form that includes the list of indicators for the program and hence for the five year plan. The same form is completed for each PHC institution every month and sent to the elderly care section in the concerned directorate general of health services who compile one form for the governorate and send it to the elderly care section in the MOH. There is one form is compiled for the whole country.

6 - Output:
Figure 11 shows the output of the national elderly care program till the end of phase three.
1- Total Coverage by elderly care services:

![Bar chart showing total coverage by end of 2013](image)

Figure 11: The output of the national elderly care program till the end of phase 3.

2- Figure 12 shows the numbers of registered elders in each governorate in the period from March 2011 to December 2013.
3 – Figure 13 shows the percentage of achievement in registration for the governorates for the period from March 2011 to December 2013.

Figure 13: The percentage of achievement in registration for the governorates (March 2011 - December 2013).

4 - Interventions: Figure 14 shows the total number of interventions in the period from March 2011 to December 2013. The best intervention during this period was the clinical intervention (PHC intervention, referral to secondary care and outreach intervention).
Physiotherapy should be around 50% of the intervention but it didn’t start yet. Social intervention is expected to be around 16% of total interventions but it is still suboptimal due to some constraints. Outreach intervention was done the same as expected percentage.

<table>
<thead>
<tr>
<th>Intervention</th>
<th>National Elderly Care Program</th>
<th>Ad Dakhliyah Project</th>
</tr>
</thead>
<tbody>
<tr>
<td>Referral to secondary care</td>
<td>10,938</td>
<td>61.3%</td>
</tr>
<tr>
<td>Referral to Physiotherapy</td>
<td>1,135</td>
<td>6.7%</td>
</tr>
<tr>
<td>Referral to Social service</td>
<td>2,269</td>
<td>13.4%</td>
</tr>
<tr>
<td>Referred for Nutritionist</td>
<td>1,835</td>
<td>9.5%</td>
</tr>
<tr>
<td>Total Outreach</td>
<td>1,476</td>
<td>8.7%</td>
</tr>
<tr>
<td>Newly diagnosed (detected)</td>
<td>1,689</td>
<td>10.0%</td>
</tr>
<tr>
<td>Total coverage in three years</td>
<td>19,376</td>
<td>37.3%</td>
</tr>
</tbody>
</table>

Figure 14: The total number of elderly care interventions (March 2011 - December 2013).

5 - The percentage of interventions from the total registered is shown in table 14. A control (comparison) from phase two study was included (Ad Dakhliyah elderly care project 2008 – 2010, the sample in Ad Dakhliyah project was 2117 and the duration was three years). The total coverage in Ad Dakhliyah project was 85.6% at the end of the third year. In the Ad Dakhliyah project both the physiotherapy and social interventions were introduced efficiently and early with the start of the service provision.

8 - The best intervention was the clinical intervention reflected by referral to secondary care, newly diagnosed cases (cases diagnosed for the first time in the programme) and the number of outreach visits as shown in figure 15.
Figure 15: The details of referral to secondary care

9 - Newly discovered cases:
Figure 16 shows the total and percentage of newly diagnosed cases. This is one of the quality measures in the program.
Figure 16: The total and percentage of newly diagnosed cases (March 2011 – December 2013).

10 – Types of disorders diagnosed:
Figure 17 shows the types of disorder diagnosed for the first time. In the monthly monitoring report, the disorders were the target as shown in the following chart.

Figure 17: The types of disorder diagnosed for the first time (March 2011 – December 2013).
11 – The importance of physiotherapy service:

Figure 18 shows the referral to physiotherapy in the various governorates. The referral for physiotherapy in Ad Dakhliyah Project was 54% of the total elders assessed (availability of the service affects the referral). As this service was available in Ad Dakhliyah since 2008, the referrals to physiotherapy in Ad Dakhliyah were the highest among all governorates:

![Bar chart showing referrals to physiotherapy by governorate (March 2011 – December 2013).](image)

Figure 18: The referral to physiotherapy in the various governorates (March 2011 – December 2013).

12 – The social services: Figure 19 shows the referral to social worker in the various governorates.

![Bar chart showing referrals to social worker by governorate (March 2011 – December 2013).](image)

Figure 19: The referral to social worker in the various governorates (March 2011 – December 2013).
13 – The outreach intervention: Figure 20 shows the total number of outreach visits (medical home visits, nursing home visits and collaborative visits) in the various governorates in the period from March 2011 to December 2013.

![Figure 20](image)

**Figure 20:** The total number of outreach visits in the various governorates (March 2011 - December 2013).

14 – The classification: Figure 21 shows Nizwa Elderly Classification (Osman Classification) at the end of the first three years of the national elderly care program.

![Figure 21](image)

**Figure 21:** Nizwa Elderly Classification at the end of the first three years of the national elderly care program.
Publications:
- The National Elderly Care Program – 28 Steps from Vision to Service Provision – an experience from Oman) was published as a document for elderly care.
- 15 booklets under the National Elderly Care Program were considered an example and model for documentation for the other programs.
- Nizwa Elderly Classification (Osman Classification) was sent for publication.

CHALLENGES

Oman has a vast experience in running elderly care program. Nizwa (Ad Dakhliyah governorate) served as a pilot and research project the national elderly care program. All Wilayat were covered with elderly care services through the network of PHC institutions.

In spite of the successes, the MOH is facing many challenges which can be summarized as follow:
1. Better understanding the complexity of older people’s health care needs
2. Availing geriatric care in secondary and tertiary care services.
3. Bridging the gap in human resources for health with special attention to doctors, specialized geriatric nurses, nutritionists and dieticians, physiotherapists, health educators and social workers and counselors.
4. Allocating physiotherapy equipment in various PHC institutions as well as availing more spaces which are currently not enough.
5. Sustaining and strengthening the partnership with the Ministry of Social Development.
6. Involving more partners in elderly care services like Ministry of Housing, Ministry of Municipality and the Royal Court.
7. Involving other health sectors and health providers like Royal Omani Police, Defense and private sector.
8. Training civil society volunteers on home care of elderly in all governorates.
9. Introducing new health and social care models that are culture sensitive and acceptable by the communities.
10. Involving the elder people to make well-informed choices about options for healthy living, health care and/or disability support needs.
ELDERLY CARE VISION 2050

Older people make important contributions to society as family members, as volunteers and as active participants in the workforce. The wisdom they have gained through life experience makes them a vital social resource. However, along with these benefits come special health challenges for the 21st century. The health providers and societies need to be well prepared and well informed to meet the specific needs of older populations. It is important to acknowledge that investing in healthy ageing will have a significant social and economic return for the whole community.

This strategic study proposes the following, vision, objectives and strategies for the care of elderly for 2050.

Vision:
“Quality life for the elder people through a full range of health care and social support services to achieve active ageing within the family”

Objectives:
1. Promote timely access to quality integrated health care and support services for the elders.
2. Establish clinical health and social interventions to support the care of elderly who access the health institutions and outreach services for the elder who is unable to access the health institutions.
3. Empower the elders and promote their ability for self-care, self-assessment and self-monitoring.

The following strategies are determined for each objective:

Objective 1:
Promote timely access to quality integrated health care and support services for the elders.

Strategies:
- Integrate elderly care programme with the wellbeing programme with aim of early intervention 20 years before reaching old age, with the aim of achieving minimal complications of non-communicable diseases in old age.
- Improving the policies, strategies and assure continuity of sustainable interventions on long-term and develop palliative care for the elders.
- Expanding elderly health care services at all levels of care and ensuring that they are accessible, timely-flexible, of high quality, coordinated and comprehensive in nature and take account of family care needs.
- Ensuring that all health institutions at all levels of care are elderly-friendly.
- Increasing the number of health professionals who provide elderly care services and ensuring their equitable distribution and their continuous professional development.
- Introducing geriatric care and management in the pre-service training curricula.
- Fostering partnerships with relevant government sectors, national and international organizations, private sector and community-based organizations to facilitate and promote the care of the elderly.
- Promoting research, surveys and studies on active aging to generate more evidence for informed policies and decisions.
Objective 2:
Establish clinical and social interventions to support the care of elderly who access the health institutions and outreach services for the elder who is unable to access the health institutions.

Strategies:
- Early introduction of outreach preventive services for the elders starting from the age of 40 years that ensure early detection, early diagnosis and avoiding late presentations with complicated health conditions.
- Introducing innovative accessibility models for clinical and social services that proactively improve and maintain the functionality and wellbeing of the elders.
- Raising the awareness of the population on active ageing through different information, education and communication means.

Objective 3:
Empower the elders and promote their ability for self-care, self-assessment and self-monitoring.

Strategies:
- Invest the spread of the media and technology knowledge to improve the self-assessment by designing shared programs that include easy assessment of the elder’s condition including some parts of the comprehensive elderly assessment.
- Involving the elder people in the designing, implementation and evaluation of the self-care and self-management interventions specially the self-monitoring of compliance, daily activity, dietary habits and other easily monitored issues related to self-care and self-management.
- Establishing net-working and communication for knowledge sharing and fostering solidarity and cohesion among the elders.

Future plan:
In the near future, the following are planned:
1. Expand the coverage to all the PHC institutions in Oman, at the present time the elderly care services are provided in 76.2% of the institutions.
2. To receive and distribute the physiotherapy mobile unit’s equipment – fixed and mobile-according to the distribution shown in the table below.

<table>
<thead>
<tr>
<th>Issue</th>
<th>Available or sanctioned</th>
<th>Minimal required</th>
<th>Balance to be availed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Physiotherapy mobile units</td>
<td>83</td>
<td>88</td>
<td>5</td>
</tr>
<tr>
<td>Fixed Physiotherapy equipment</td>
<td>210</td>
<td>231</td>
<td>21</td>
</tr>
<tr>
<td>Treadmill exercise system</td>
<td>210</td>
<td>231</td>
<td>21</td>
</tr>
<tr>
<td>Wall mounted gym</td>
<td>210</td>
<td>231</td>
<td>21</td>
</tr>
<tr>
<td>Static exercise cycle</td>
<td>210</td>
<td>231</td>
<td>21</td>
</tr>
<tr>
<td>Exercise mat</td>
<td>210</td>
<td>231</td>
<td>21</td>
</tr>
<tr>
<td>Vehicles</td>
<td>61</td>
<td>88</td>
<td>27</td>
</tr>
</tbody>
</table>
3. To receive and distribute the elderly care kits as shown in the table below.

<table>
<thead>
<tr>
<th>Governorate</th>
<th>Elderly population</th>
<th>Bedridden</th>
<th>Number elderly care kits according to type</th>
<th>Number of kits for the governorate</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Uncomplicated bedridden</td>
<td>Complicated bedridden</td>
</tr>
<tr>
<td>Muscat</td>
<td>15243</td>
<td>808</td>
<td>8700</td>
<td>972</td>
</tr>
<tr>
<td>Dhofar</td>
<td>7922</td>
<td>401</td>
<td>4332</td>
<td>480</td>
</tr>
<tr>
<td>N. Al Batinah</td>
<td>24283</td>
<td>1382</td>
<td>14914</td>
<td>1659</td>
</tr>
<tr>
<td>S. Al Batinah</td>
<td>11520</td>
<td>603</td>
<td>6501</td>
<td>723</td>
</tr>
<tr>
<td>Ad Dakhliyah</td>
<td>12095</td>
<td>605</td>
<td>6537</td>
<td>726</td>
</tr>
<tr>
<td>Buraymi</td>
<td>1956</td>
<td>98</td>
<td>1055</td>
<td>118</td>
</tr>
<tr>
<td>Musandam</td>
<td>1734</td>
<td>87</td>
<td>936</td>
<td>104</td>
</tr>
<tr>
<td>N. Ash Sharqiya</td>
<td>7576</td>
<td>379</td>
<td>4063</td>
<td>455</td>
</tr>
<tr>
<td>S. Ash Sharqiya</td>
<td>8905</td>
<td>445</td>
<td>4813</td>
<td>535</td>
</tr>
<tr>
<td>Al Wusta</td>
<td>1190</td>
<td>60</td>
<td>646</td>
<td>71</td>
</tr>
<tr>
<td>Al Dhahirah</td>
<td>4393</td>
<td>220</td>
<td>2831</td>
<td>315</td>
</tr>
<tr>
<td>Total</td>
<td>96817</td>
<td>5083</td>
<td>55328</td>
<td>6158</td>
</tr>
</tbody>
</table>

4. To empower the PHC institutions by necessary human resources as in the following table.

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Muscat</td>
<td>1</td>
<td>16</td>
<td>23</td>
<td>8</td>
<td>11</td>
<td>5</td>
</tr>
<tr>
<td>Dhofar</td>
<td>1</td>
<td>8</td>
<td>17</td>
<td>11</td>
<td>5</td>
<td>7</td>
</tr>
<tr>
<td>Musandam</td>
<td>1</td>
<td>3</td>
<td>6</td>
<td>4</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Al Buraymi</td>
<td>1</td>
<td>4</td>
<td>7</td>
<td>4</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>Ad Dakhliyah</td>
<td>1</td>
<td>12</td>
<td>20</td>
<td>6</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td>N. Al Batinah</td>
<td>1</td>
<td>18</td>
<td>22</td>
<td>8</td>
<td>14</td>
<td>8</td>
</tr>
<tr>
<td>S. Al Batinah</td>
<td>1</td>
<td>10</td>
<td>21</td>
<td>4</td>
<td>6</td>
<td>8</td>
</tr>
<tr>
<td>S. Ash Sharqiya</td>
<td>1</td>
<td>10</td>
<td>19</td>
<td>7</td>
<td>7</td>
<td>6</td>
</tr>
<tr>
<td>N. Ash Sharqiya</td>
<td>1</td>
<td>10</td>
<td>16</td>
<td>4</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>Al Dhahirah</td>
<td>1</td>
<td>8</td>
<td>13</td>
<td>8</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>Al Wusta</td>
<td>1</td>
<td>4</td>
<td>9</td>
<td>4</td>
<td>2</td>
<td>4</td>
</tr>
<tr>
<td>Total</td>
<td>11</td>
<td>103</td>
<td>173</td>
<td>68</td>
<td>61</td>
<td>55</td>
</tr>
</tbody>
</table>

5. To introduce the electronic elderly care file.

6. To start establishing the elderly care clinics according to the priority list.
REFERENCES
- Annual health report 2012, Ministry of Health, the Sultanate of Oman.
Synopsis 7

Quality and Patient Safety

Strategic Study
Synopsis of Strategic Studies
Quality and Patient Safety
Strategic Study

Task Force:
- Dr. Waleed Al Nadabi
- Dr. Amr Taman
- Dr. Mariyam Al Khusaibi

Contributors
- Dr. Gillian White
- Dr. Adil Al Ansari
- Dr. Mohammed Kamal
- Ms Samra Al barwani
- Mr Khalfan Al Kharousi
- Mrs Saleema Al Farsi
- Mrs Nada Moosa

Acknowledgment:
- Health Vision 2050 Team
- Strategic Studies Review Team
List of Abbreviations

CPHQ  Certified Professionals in Health Care Quality
DGHS  Directorate General Of Health Services
EMRO  East Mediterranean Regional Office
GOV   Government
HC    Health Center
KPI   Key Performance Indicators
MOH   Ministry Of Health
NGO   Non Government Organizations
PHC   Primary Health Care
QA/I  Quality Assurance/Improvement
QMS   Quality Management System
SQUH  Sultant Qaboos University Hospital
STC   Short Term Consultant
TMR   Top Management Review
USA   United States of America
WHO   World Health Organization
Introduction

The Quality and Patient Safety strategic study aims to be the principal guide for the Ministry of Health in Oman in planning the future of quality and patient safety system. This study can be flexibly updated and continuously enriched to meet the needs at different stages of implementation. This strategic study is composed of three chapters. The First chapter, current situation and achievements, starts with providing a brief background of quality and patient safety system and its phases of implementation. It ends with highlighting the main activities and achievements made in the field of quality and patient safety during the last years from its inception. The status laid out in this document represents what has been achieved till the year 2012. This year was made as the reference year for all the strategic documents. The second chapter titled challenges and SWOT analysis outlines the main challenges facing the implementation of quality and patient safety. The third chapter, the vision, lays out the vision and main goals of the quality and patient safety system. It describes a number of strategies that will be adopted towards achieving the stated visions and goals.

Current situation of quality and patient safety in Oman

The following sections describe the current status of implementing quality and patient safety in Oman. It starts with describing the phases through which the system has passed; accreditation status; and the status of Oman in terms of quality and patients safety compared with the Gulf countries.

Implementation of quality and patient safety in Oman

Successful implementation of quality and patient safety in health care institutions requires a clear vision and integrated strategy; ongoing top leadership support for the strategy; developing and carrying out comprehensive training plans; continued technical support in all phases of implementation; building and investing in national capacity; commitment of all employees at all levels, in addition to a system of continuous assessment of the strategy to ensure effectiveness and efficiency of implementation (Batalden & Davidoff, 2007).

In 2001, the first step of implementing quality as a system started by recruiting a Quality Advisor in the Ministry of Health to evaluate the health care sector by conducting a situational analysis of the strengths and weaknesses of the health care system. A directorate for quality and patient safety was established in the organizational chart of MoH. The directorate reports to the Deputy Director General for support services in the Directorate General for Health Affairs. Currently, the directorate (as shown in figure 2) has three sections: technical support, standardization and studies section; accreditation and quality assurance section; and patient safety section. Using Pareto's Principle (80/20 rules) theory, the choice was made to start implementation at primary health care (PHC) level, which presents a high number of health institutions as well as deals with high numbers of patients. So establishment of a functional quality management in PHC services was given top priority.
The implementation of a quality system in the Ministry of Health passed through a number of stages. The following section describes briefly the four phases of implementation the MoH pursued.

**The four phases of the implementation process**

The implementation process of quality and patient safety system in MoH passed through phases. The four phases can be described as introduction/preparatory phase, early implementation phase, expansion phase and consolidation phase. It is worth mentioning that quality and patient safety activities and initiatives were mainly focused in MoH institutions with varying degree of maturity. This does not mean that no efforts were made in the non-MoH institutions or private sectors. On the contrary, well respected achievements were made by other institutions. For example, Sultan Qaboos University Hospital (SQUH) has attained its first International Standards...
certification award, ISO 9001:2000 in 2005, recertified in 2008 and in its way for the Canadian accreditation. However, the maturity level of quality system in other non-MoH institutions varies greatly. With regard to the private hospitals, monitoring is done both during the planning, construction and the actual running stage in the form of technical protocol and the selection of doctors, nurses and paramedical staff. The MOH, through the Directorate General of Private Health Establishment Affairs, "advises these hospitals on various protocols about patient care and ensures through periodic visits that the hospitals function within the framework of these protocols" (MoH web site). Despite these efforts, a more comprehensive, coordinated and solid system for quality and patient safety need to be established in private health care settings as well as all governmental health institutions.

Introduction/Preparatory Phase (2002)

The purpose of the Introductory Phase was to ensure that the key MoH Officials became acquainted with and approved the vision, goals, strategies and approaches of the quality and patient safety. During this period and in the early stages of implementation, MoH has approved its national vision for quality and patient safety. It was during this phase that a comprehensive assessment (SWOT analysis) of the situation of the health care system was done.

Early Implementation Phase (2002 -2005)

Armed with the knowledge of the current strengths, weaknesses, threats and opportunities for improvement, an early implementation phase was commenced. During this phase (2002), the quality and patient safety System was implemented in a limited number of PHC facilities in selected regions as a pilot(at Muscat Governorate and South Sharqia Region as well as North Sharqiya and North Batinah Regions). The regional quality committee planned a series of training activities for all level of health care workers to ensure that all elements of the system were understood. This phase provided the basis for future planning and implementation in the expansion phase.

During 2006, a national training program on quality and patient safety was conducted by the quality advisor. A total of 21 Omani cadres participated in the program and awarded "Certified Quality Professional in HealthCare". In 2007, the lessons learned from the previous phase broadened the range of the implementing the quality and patient safety system to other PHC facilities at the same regions as well as additional regions and other levels of health care like polyclinics, local hospitals, and wilayat hospitals, as well as adapting some activities for the autonomous hospitals. Problems identified during the early implementation phase were addressed, priorities agreed, and strategies for expansion were developed.

Consolidation Phase (2010 till present)

Consolidation is defined as maintenance and technical support for ensuring consistency and continual improvement of the quality management system. Consolidation can be achieved by continuously monitoring and evaluating the different processes taking place in the health care institutions. This phase can also be called institutionalization of the quality management system in the different Ministry of Health institutions (Primary Health Care and Hospitals) in addition to the processes within the Ministry itself. Existing quality activities and programs are simultaneously strengthened and anchored into standard organizational operations, while at the same time being fortified by addressing lagging or missing activities. This phase is a continuous process to ensure sustainability of the quality system.

Accreditation of MoH institutions

"Accreditation is a conformity assessment process where organizations define standards of acceptable operation/performance and then measure compliance with them" (Hamm et al 2007). Accreditation bodies verify whether an organization is meeting the preset standards. Accreditation as a tool for quality improvement is rapidly changing and increasingly demanded worldwide. Countries used different accreditation systems and standards. Examples of the accreditation systems that have been used in health care settings include Joint Commission International (JCI), Malcolm Baldrige Awards, ISO 9000, the European Foundation for Quality Management and many others. A survey by the WHO covering 47 countries showed that there are 36 accreditation programs known to be operational at national level. The WHO report showed that few countries made accreditation mandatory while the majority made it voluntary. The cost of implementing the programs ranged from 5000 US$ in Mongolia to as high as 1,200,000 in the US (WHO, 2003). The decision to select the 'proper' accreditation system/body might not be as easy as it might be expected. The reason is that countries' experience in implementing the accreditation system shows opposing results. Issues of compatibility, cost and sustainability were among the main obstacles facing successful adaptation of any accreditation system. A nationally developed accreditation system that is recognized by international organizations assures sustainability, compatibility and at the same time assures the community and the government.
In other words, adopting an international accreditation system (whether JCI, or ISO or any other) may not fulfill the requirements and priorities of countries. It is, therefore, important to locally develop a national accreditation system that is accredited and affiliated by an international accreditation body. By doing this, it would be ensured that the standards meet the needs, priorities and requirements of the national health system and at the same time assure the community and the government that the standards are internationally recognized. Further, the nationally developed accreditation system will ensure sustainability as the cost of maintaining and upgrading will be minimal compared with other systems. The use of nationally developed standards will minimize the cost and ensures responsiveness of standards to the national needs.

With regard to the accreditation system in MoH, some efforts were made. Experts from the Canadian accreditation body were invited in 2011 to assess the readiness of MoH institutions for the Canadian accreditation. The team of experts made visits to a number of facilities and submitted their report along with proposals on how to proceed with accreditation. The proposal is awaiting the financial approval by the concerned authorities.

Quality in MoH Higher Educational Institutes

Quality in higher education is essential in assuring quality and safety of health services. Competent and skilled graduates support the delivery of high quality care. In 2008, steps were taken to systematically introduce quality in MoH higher educational institutes. A ministerial decision No 167/2008 article 10, (p.6) was issued stating: "A general committee for quality assurance in health care education will be constituted through a decision taken by the minister". The committee was mandated to develop and plan mechanisms to control the quality of education according to established polices and standards. Currently, a quality assurance section is operating under the umbrella of Directorate General of Education and Training DGET. Many achievements were made through the previous years with the support of the Oman Accreditation Council now known as Oman Academic Accreditation Authority (OAAA). All institutes have submitted their initial plans for quality assessment and quality improvement program and prepared a self-report compiled as a portfolio for an external audit by OAAA. The quality section-DGET is in the process of developing a continuous quality improvement framework and an operational plan (Continuous Quality Improvement in Health Profession Education, 2012) following on the OAA Audit (2013).

The OAAA audit took place in 2013 which confirmed that institutes were operating at the edge of their own capabilities and capacities. The need to improve communication and responsiveness between the Ministry and the Institutes was also identified. While the report of the audit commended the institutes on 8 aspects of good practice, affirmed recognition by the institutes of 6 significant opportunities for improvement, it also drew attention to 43 areas requiring improving that are current not being attended to. The quality section-DGET is in the process of developing a continuous quality improvement framework and an operational plan (Continuous Quality Improvement in Health Profession Education, 2012) following the OAA Audit (2013).

In addition, Continuing Professional Education (CPE) is a requirement of medical and other health care professionals’ practice and is an integral part of maintaining professional standards including...
communication, teaching and leadership management. The MoH has adopted a regulatory mechanism, similar to other countries where CPE is provided primarily by the specialty colleges and professional bodies, participation is mandatory and linked to re-accreditation and re-certification. This Ministry has therefore likewise adopted a similar regulatory mechanism for its CPE based on a credit point system aimed at promoting and maintaining good practice and professional standards of its health professionals.

Main Activities / Achievements (2002 – 2012):

The quality and patient safety system accomplished many of its goals throughout the years (2002–2012). These accomplishments were seen in different areas of the services such as planning, training, capacity building, implementing quality improvement activities and programs, study and surveys, and monitoring and evaluation.

Planning for quality and patient safety

1. Setting strategic quality Management Plans (7th and 8th 5 year health development plans)
   Quality and patient safety has become a domain by itself in the 7th (2006-2010) and 8th (2011-2015) 5 year health development plans. In the 7th health development plan the main objectives of quality and patient safety were: to establish and develop quality management systems in health care services, to ensure safety of patients and health care workers, to improve satisfaction among users and providers of health care, to achieve optimal utilization of resources and to qualify national Omani cadres to lead quality system in their regions.
   In the 8th plan (2011-2015), the Quality and Patient Safety domain focused on three main objectives:
   - To establish and develop quality management and accreditation systems in health care facilities.
   - To establish patient safety system in health care facilities.
   - To build the qualified national capacity in quality assurance / improvement and patient safety systems

An annual progress report is submitted to the Directorate General of planning to monitor the status of achievements. The 2012 annual report demonstrates the impressive expansions and activities conducted during the period from 2010-2012. For example, the number of facilities implementing the quality system has increased from 64 PHC centers in 2005 to 118 centers in 2010 and reached 165 in 2012. Similarly, the number of certified national auditors has increased from 240 in 2005 to 655 in 2010 and more than 800 in 2012. Figures 3 and 4 show the progress of implementing quality and patient safety during the period from 2000 till 2012 in PHC and regional hospitals. Both figures clearly demonstrate the impressive achievements during this period. The number of PHC implementing the system jumped from 0 in 2000 to 165 in 2012. In 2012 the number of regional hospitals implementing the system reached 10 from zero in 2000.
2. Setting strategic and annual quality management plans for all levels
An annual plan is developed by every primary care center, wilayat hospital and local hospital. These plans are reviewed and supervised by quality departments in the various governorates of the Sultanate. Staff are trained on the importance and the mechanism of developing these plans in order to ensure uniqueness, accuracy and effectiveness of implementation.
3. Developing and upgrading appropriate quality monitoring tools:
   A Comprehensive Manual of Quality Assurance Standards in PHC was developed including 34 standardized checklists (Taman, AM et al, 2005). These checklists cover almost all aspects of services provided by the primary care unit like the antenatal care, infection control, x-ray, laboratory, diabetic clinic, hypertension clinic, etc... The checklists are used by the auditors to assess compliance with the standards.

4. User/Staff feedback surveys are conducted. These surveys are conducted every two years in every governorate. Figure 5 below demonstrates the number of health facilities conducting satisfaction surveys. A unified questionnaire is being used at the level of PHC. It can be seen that quality strategies are rapidly being expanded at all level.

![Figure 4: Number of PHC facilities (MoH) conducting user satisfaction survey during the period from 2000 till 2010](image)

These questionnaires are used to assess the level of satisfaction of users and staff. Figures 6, and 7 below represent a sample of the results of the staff satisfaction (PHC Staff) survey conducted in North Sharqyia in 2012 (Quality Department, North Sharqyia, 2012).
The results of these surveys are used to inform decision making on different aspects especially training and structural changes needs. At the level of tertiary hospital, a study was conducted in Khoula hospital to examine the satisfaction level of patients regarding the communication skill of nurses and doctors. The study was conducted for two weeks including weekends. On the day of discharge, all patients were asked to fill a self-administrative questionnaire to assess their satisfaction about various aspects of communications. The results were very positive. For example, around 90% of the patients agreed that nurses explained the procedure before starting, listened carefully to their concerns, and that nurses were cheerful and courteous. Similarly, more than 90% agreed that doctors explained procedure before starting, listened carefully to their concerns, and that doctors were cheerful and courteous (see figures 8 and 9).
Figure 7: Satisfaction level of patients regarding the communication skill of nurses and doctors

Figure 8: Satisfaction level of patients regarding the communication skill of nurses and doctors
5. Establishing an audit system for PHC

An ongoing audit system is established to ensure compliance with the approved quality assurance standards. As mentioned above, a comprehensive manual checklist is available covering most, if not all, services at the level of PHC. Internally trained health care workers are checking whether or not PHC facilities are complying with these standards. A comprehensive audit exercise is conducted at least once every year. In addition, a self-assessment (audit) is conducted at least once every year. The health facility is mandated to develop a corrective action plan once non-conformity is detected by the auditors. A recheck audit is conducted to ensure that the action plan was implemented and the non-conformity is rectified. Figure 8 below shows the increasing number of number of regions implementing the audit system through the period from 2000 till 2012.

![Figure 8: Number of regions implementing the audit system from 2000 to 2012](image)

**Figure 9: Number of regions implementing the quality audit during the period from 2000 till 2012**

**Capacity building**

Ensuring sustainability of the quality system through capacity building was given a high priority from the early stages of implementation. A number of actions were taken. The following is a summary of these actions:

1. Recruiting a Quality Advisor in the year 2001. The aim was to initiate, develop and lead the quality management system and to support building national capacities.
2. National capacity building in 2007- till present: 15 Omani cadres were awarded Master degrees in Quality & Patient Safety in Health Care.
3. Implementing a central program of Certified Quality Professionals in Healthcare in 2006; 21 Omani cadres were prepared to lead and implement total quality and patient safety systems in their health care organizations.

4. Sending nationals for a 6 weeks training course in quality and patient safety to University of Oklahoma: all (5 staff in total) obtained Certified Professionals in Healthcare Quality CPHQ.

**Training activities:**

Series of training activities were conducted for different levels and on different aspects. The following represent the main training activities:

a. Basics, concepts and applications of quality assurance and improvement. Figure 11 demonstrate the number of health care workers trained on basic concepts of quality.

![Figure 10: Number of health care workers trained on concepts of quality during the period from 2000 till 2012](image)
b. Behavioral and basic communication skills: figure 12 shows the progress in number of health care workers who were trained on communication skill during the period from 2000 to 2012.

![Figure 11: Number of trained health workers on communication skills during the period from 2000 till 2012](image)

![Figure 12: Number of trained auditors during the period from 2000 till 2012](image)

c. Audit training course: 832 staff were trained and certified as auditors. Figure 13 shows the steady increase in the number of trained auditors during the period from 2000 to 2012.
d. Central training project in the field of patient safety implemented (in collaboration with the World Health Organization, (WHO). The project targeted staff working in quality departments in different MoH hospitals. The aim of the project was to improve the knowledge and skills of staff on the tools and measures to improve the level of patient safety.

e. Training courses on quality improvement projects: 5 training courses were conducted in different governorates to equip staff with skills on developing, executing and implementing improvement projects. During the course, teams are formed. Each team is asked to select a priority area for improvement. Once area is selected, team members are then trained on how to define the problem, identify solutions, make targets, make action plans and follow progress. Out of the five courses, 22 projects in different fields were selected and conducted.

f. Workshops on patient safety - culture, concepts and principles were conducted: covering more than 4054 staff from PHCs and hospitals.

Implementing a quality system

The quality system was implemented in a number of facilities:

1. Quality management systems in 118 PHC facilities in 10 governorates were established maintained and consolidated (Muscat, North Sharqiya, South Sharqiya, North Batinah, South Batinah, Dhofar, Al Buraimi, Al Dakhilya and Al Dhahira, Musandam) and initiated in AL Wusta governorate.

2. Quality initiatives were started in 10 secondary hospitals (Nizwa, Sohar, Ibra, Salalah, Sur, Buraimi, Ibi, Khasab and Rustaq) and tertiary care hospitals (Khoula, Massrah, Al Nahdah, Royal).

Conducting quality activities:

Various activities were undertaken including developing key performance indicators (KPIs), expansion of appointment systems, award initiatives, a pilot project evaluating measurement tools, and survey studies:

1. Developing key performance indicators (KPI): a GCC initiative has been started in 2008 where a number of 12 performance indicators are being monitored in secondary and tertiary care hospitals (see Table 1). A monthly report is sent to a central department, the Hospital Affairs Department where these indicators are then analyzed and compared.
Table 5: List of KPIs in MoH institutions

<table>
<thead>
<tr>
<th>No.</th>
<th>Indicator Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Rate of un-planned return to operation theater.</td>
</tr>
<tr>
<td>2.</td>
<td>Rate of un-planned return to ICU within 48 hours of discharge to general ward.</td>
</tr>
<tr>
<td>3.</td>
<td>Rate of unplanned and unexpected re-admission within 28 days to same hospital.</td>
</tr>
<tr>
<td>4.</td>
<td>Cancellation rate of booked elective surgeries.</td>
</tr>
<tr>
<td>5.</td>
<td>Waiting time for routine specialty OPD appointment.</td>
</tr>
<tr>
<td>6.</td>
<td>Average length of stay patients in Accident &amp; Emergency department.</td>
</tr>
<tr>
<td>7.</td>
<td>Rate of hospital acquired infection.</td>
</tr>
<tr>
<td>8.</td>
<td>Rate of patient fall.</td>
</tr>
<tr>
<td>9.</td>
<td>Percentage of LAMA.</td>
</tr>
<tr>
<td>10.</td>
<td>Inpatients who developed one or more pressure sores during their hospitalization.</td>
</tr>
<tr>
<td>11.</td>
<td>Adverse transfusion events.</td>
</tr>
<tr>
<td>12.</td>
<td>Staff turnover rate.</td>
</tr>
</tbody>
</table>

2. Establishing an electronic incident reporting system. A study was conducted in Khoula hospital to examine the previous manual system for reporting incidents from the views of doctors and nurses. Based on the findings and recommendations of the study, the system was converted into an electronic confidential system were the name of reporter is not disclosed except to the head of quality department for analytical purposes.

3. Establishing a system for document control. Starting in the tertiary hospitals, a system was started in 2009 to ensure that documents like Standard Operating Procedure, clinical guidelines, clinical pathways, etc… are available. In addition, the document control system ensured a standardized path for writing, reviewing, validating and approving these documents.

4. Implementation of appointment systems have been expanded (99 health care facilities).

5. Implementing Best Staff Award initiative in 86 health care facilities: a list of criteria has been developed, a selection procedure approved and a mechanism for appreciation was agreed within the primary care unit.

6. Implementing the Best Institution Award initiative (Model of Excellence) in 7 governorates.

7. Pilot Project: Evaluation of the Arab Accreditation tool in 10 PHC facilities (6 in Muscat region and 4 in South Sharqiya region)
Studies and Surveys

Providing evidence, through research studies, is essential in assessing the effects of quality initiatives. Research was undertaken as follows:

1. Conducting staff satisfaction survey in 50 PHC facility (4 governorates) and 3 hospitals.

2. Conducting user satisfaction survey: 88 PHC facility and 5 hospitals. In 2010, the user satisfaction survey was 56.5% (an average statistics of one region and one regional hospital). In 2012, however, the average rate was 80% (an average of statistics of 5 governorates and 2 regional hospitals).

3. Several research and studies were conducted by the quality professionals who have been sent abroad to obtain a master degree in quality and patient safety. These research projects were implemented and carried forward by the quality professionals in their own field of work. The research areas covered different aspects related to quality and patient safety (for samples of the quality related researches abstract see).

Monitoring and evaluation

Different monitoring and evaluation strategies were put in place to evaluate the QMS at different levels. These methods range from obtaining feedback of all users of the health services to conducting yearly top management reviews. Historically it was widely believed that the perspective of the patient was not important because of the limited knowledge that patients had of what constitutes quality care and the difficulty in measuring patient views accurately and reliably. However, this thought has changed in recent years as patients, employers and health care workers have begun to play a critical role in provision of quality of care (Al-Assaf, Al Shiekh, 2004).

Below is a summary of monitoring and evaluation tools used in the MoH, Oman.

1. Surveys on user satisfaction.
2. Surveys on staff satisfaction.
3. Top Management Reviews (TMR): Top Management Review is an essential process in any quality management system. TMR is a meeting attended and headed by the top management of the hospital/governorate. During this meeting a number of topics (can be called inputs) are discussed. Examples of these topics include KPIs report, audit report presenting the major non conformities (NCRs), incident reports presenting the major incidences and main learning lessons, the progress of the quality improvement projects presenting the successes and failures with the challenges faced during implementation.
4. External revisions of QMS (WHO-Short Term Consultants, STCs).
5. Self-assessment, internal and comprehensive audit.

Table 2 below shows a summary of the different monitoring activities taking place in the MOH institutions. The results of these monitoring tools were used to varying degrees by the decision
makers. For example, user satisfaction surveys showed that many users of PHC services are not satisfied with the communication of health care providers. This has raised the need to increase the communication skills of health care workers. In addition, the results showed that they are not satisfied with the waiting time till being seen by the doctor. Initiatives were made by few governorates to implement an appointment system even for cold cases were the patient calls and book an appointment before reaching the health center. Patients who booked an appointment are given a priority over patients who walked in to the health center without taking an appointment.

Table 6: Different monitoring activities used in MoH Institutions

<table>
<thead>
<tr>
<th>Monitoring activities</th>
<th>Frequency</th>
<th>Output</th>
</tr>
</thead>
<tbody>
<tr>
<td>Self-assessment : Muscat, South Sharqiya, North Sharqiya</td>
<td>Once/twice per year (all PHC staff)</td>
<td>Mostly, all PHC staff conducted self assessment - self improvement</td>
</tr>
<tr>
<td>South Batinah, North Batinah, Dhofar Al Dakhilya, Al Dhahira and Buraimi regions</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Comprehensive audit/External audit</td>
<td>Once / year / health center</td>
<td>Assessment of PHC services and setting plan of action for the discovered problems / non-conformities</td>
</tr>
<tr>
<td>Muscat, South Sharqiya, North Sharqiya, Dhofar, North Batinah and South Batinah regions</td>
<td></td>
<td></td>
</tr>
<tr>
<td>User satisfaction surveys</td>
<td>Once /2 year</td>
<td>Dissemination of survey results to HC staff as a tool for quality improvement</td>
</tr>
<tr>
<td>staff satisfaction surveys</td>
<td>Once /2 year</td>
<td>Forward the recommendations to concerned authority for further actions</td>
</tr>
<tr>
<td>Top management reviews</td>
<td>Once / year</td>
<td>DGHS recommendations to improve the quality of HC services</td>
</tr>
<tr>
<td>Surveillance visits / Field visits</td>
<td>Once/ year</td>
<td>Assessment of the effectiveness of the quality management system at HC facilities and giving technical support</td>
</tr>
</tbody>
</table>
Challenges and SWOT analysis

Identifying and overcoming the weakness and challenges facing the quality and patient safety systems, like any other system, further accelerate the success and achievements. This chapter attempts to summarize the main challenges facing quality and patient safety system in Oman. The challenges are then followed by a SOWT analysis table summarizing the strengths, weaknesses, opportunities and threats.

Challenges

Despite the many achievements made during the previous years, there are challenges facing the quality and patient safety system in Oman. The following sections describe these challenges.

1. Automating quality and patient safety monitoring tool
   Monitoring quality and patient safety is a very essential component of any quality system. Although there were a number of tools used for monitoring, these tools were manually operated. The risk and waste linked to the manual use of monitoring tools are well known. Therefore, all efforts need to be made to ensure a cost effective monitoring system. One approach is the automation of such systems. Automation will minimize the time, efforts and cost of data collection and data analysis.

2. Ensuring commitment of decision makers at all levels
   One key factor for the success of any quality and patient safety initiatives is the direct involvement and sustained commitment of decision makers at all level. Leaders and managers at regional, wilayate level and hospital level are involved and committed to a varying degree. From a personal experience and based on the experience of staff working in different hospitals, it can be said that commitment to quality is not yet at the expected level. Sustaining top level commitment to quality is a challenge and need to be addressed to ensure that commitment doesn’t depend on personal views or interest but rather commitment is sustained regardless of persons in positions. Policies and governing mechanisms need to be directed to strengthen their commitment and involvement. For example, they should be held accountable for the performance of hospitals and directorates. Their performance must be measured against well established, measurable and updated criteria/standards/indicators.

3. Establishing an organizational chart that reflect the scope of quality and patient safety
   Quality and patient safety should be reflected in all aspects of health care system including administration, finance, clinical services, education institutes, private sectors, etc… The current organizational structure does not support its scope of work. Additionally, the quality and patient safety department supports the decision making process through its tools for monitoring quality. Thus, the department of quality and patient safety needs to be at a decision and policy making level so that all scopes of care can be involved and actions can easily be made.

4. Changing believes and concepts of quality and patient safety
   Many health care workers consider quality as a threat to their career and will restrict their freedom (Docteur and Berenson, 2009). Few decision makers expect the department of
quality and patient safety will make immediate improvements. Once more, from a personal experience, some hospital directors are looking for immediate gains of the quality system and forget that the gains of quality system may take long time. Thus, all efforts need to be made to clarify these concepts to health care workers so that their confidence, trust and commitment can be gained.

5. Allocating budget for quality and patient safety initiatives

Establishing quality and patient safety system will need financial support for its various activities and initiatives. Ensuring sustainability of these initiatives will definitely require a budget to be secured.

SWOT analysis

Table 1 gives a quick summary of the situation currently as perceived by the quality professionals in all the hospitals and the regions. These points need to be looked at closely and evaluated as they present what is important for the QMS leaders and what influences their delivery of work and what will help them to look at the future and have direction.

Table 7: SWOT analysis of current situation

<table>
<thead>
<tr>
<th>Strengths</th>
<th>Weaknesses</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Top MoH leader's Commitment &amp; support.</td>
<td>• High escalating staff turnover.</td>
</tr>
<tr>
<td>• Availability of a sustained central technical assistance</td>
<td>• No clear career pathway for quality staff.</td>
</tr>
<tr>
<td>• Trained staff on quality initiatives.</td>
<td>• Absence of clear job description.</td>
</tr>
<tr>
<td>• Qualified specialized quality professionals with master degrees.</td>
<td>• Scattered and fragmented quality and patient safety initiatives.</td>
</tr>
<tr>
<td>• Implementing—quality in most primary health care institutions</td>
<td>• Limited budget for conducting surveys.</td>
</tr>
<tr>
<td>• Existing Comprehensive Manual of Quality Assurance Standards in PHC.</td>
<td>• Misconception and believes about quality among health care workers.</td>
</tr>
<tr>
<td>• Quality &amp; patient safety initiatives with SQUH.</td>
<td>• Complexity of Health care sector in integrating QA initiatives.</td>
</tr>
<tr>
<td>• The presence of a 2050 vision health vision.</td>
<td>• Poor analysis and use of key performance indicators results.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Opportunities</th>
<th>Threats</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Strong political ministerial commitment to meet customers need.</td>
<td>• Continuously increasing customer expectations.</td>
</tr>
<tr>
<td>• Willingness of health related sectors to participate in improving health status.</td>
<td>• Limited national colleges offering higher qualifications in quality and patient safety.</td>
</tr>
<tr>
<td>• Availability of different tools for accreditation like the GCC accreditation tool, the Arab accreditation tools and Canadian accreditation tool.</td>
<td></td>
</tr>
<tr>
<td>• Increasing community empowerment.</td>
<td></td>
</tr>
<tr>
<td>• WHO Patient safety curriculum launched.</td>
<td></td>
</tr>
<tr>
<td>• Introducing quality and patient safety concepts for medical and nursing student in SQU medical and nursing colleges.</td>
<td></td>
</tr>
</tbody>
</table>

In the next chapter the scope of a Quality Management System and its core principles are discussed.
The vision

In this last chapter the Vision, Mission, Main Goals and Strategies for quality and patient safety are outlined as a way forward to meet the healthcare challenges of the future (Health Vision, 2050).

Vision statement

The Quality Assurance and Patient Safety system is to be:

"An internationally leading healthcare quality and patient safety system"

Mission statement

The Mission of the Quality and Patient Safety System is:

"Institutionalizing quality and patient safety throughout the healthcare system guided by the best international practices and standards"

Core Principles and values

The following principles and fundamentals are the guiding principles during implementation of a Quality Management System in healthcare organizations in Oman.

Customer focus

*Putting the customer first.* Health care services should be designed to meet the needs and requirements of the community and even strive to exceed customer expectations. The quality and patient safety system must use customers’ perceptions and satisfaction on a regular basis in its evaluation of healthcare services.

Leadership (commitment-participation-role model)

Through visionary and committed leadership, top management (at all levels) should create an environment where all staff are fully involved so that quality and patient safety system can operate effectively. Top management will carry out regular systematic evaluations of the suitability, adequacy, effectiveness and efficiency of the quality and patient safety system.

Teamwork

Since work is accomplished through processes and systems in which different people fulfill different functions, it is essential to involve them in the quality improvement efforts. This brings their insights to the understanding of changes that need to be made and to the effective implementation of appropriate changes, as well as to the development of ownership of the improved processes and systems.

Process approach

*Any activity or group of activities that takes an input, adds value to it, and provides an output to an internal or external customer.* Process uses an organization’s resources to provide
definitive results. Related resources must be managed as a process so that the desired result is achieved more efficiently.

**System approach to management**

*The controls that are applied to a process or a group of interacting processes to ensure that it is operating effectively and efficiently.* Interrelated processes must be managed and understood as a system so that objectives and outcomes are achieved more effectively and efficiently.

**Factual approach to decision making**

*Effective decisions are based on the analysis of factual data and information.* Data are needed to analyze processes, identify problems, and measure performance. Changes can then be tested and the resulting data analyzed to verify that changes have actually led to improvements. Therefore, a culture must be built where decisions are based on evidence rather than opinions and beliefs.

**Continual improvement**

*The quality and patient safety system has a positive approach so that it has to be directed towards continually improving the HC services ‘not just to identify outliers’.* This is achieved by emphasizing a system and process approach rather than ‘an individual approach’ reducing threats to individuals and promoting a team spirit. The quality and patient safety system will continue its improvement projects including processes that are apparently working well. There will be continuous improvement of standards established by customers and professionals.

**Mutually beneficial partnerships**

*Mutually beneficial partnerships* through relationships that balance short-term gains with long-term considerations for all that take part in providing health care services and through clear and open communication, sharing of information and future plans. Establishing joint development and improvement activities will lead to inspiring, encouraging and recognizing improvements and achievements.

**Main goals:**

The main goals of the Quality System in the 2050 Health Vision are:

1. Quality culture, monitoring and improvement will be built in every process of health care system including but not limited to administration, education, clinical practice, pharmaceutical, purchase, information system and technology.
2. The quality and patient safety system will be a center of excellence by which others are judged both regionally and internationally.
3. All health institutions will be accredited by a national accreditation system that is internationally accredited.

**Strategies**
1. **Establishing a national quality and patient safety autonomous center**

The above vision, mission and goals will be achieved through the establishment of a national quality and patient safety autonomous center. To ensure that quality and patient safety is embedded in all aspects of health care, the center must report to the top decision making authority. Otherwise, the scope of implementing quality will be restricted and activities will remain scattered and fragmented. The center will be responsible for a number of activities including:

- **Establishing quality and patient safety system in all health institutions** where quality standards are approved, quality is monitored and improved. The very common saying "a process that is not measured cannot be managed" emphasize that monitoring quality is an integral part of any quality system. The most advanced and evidence based tools for monitoring will be institutionalized in all healthcare related processes starting with the processes of high priorities. Examples of the available monitoring tools include: key performance indicators, incident reporting systems, statistical process control, auditing, quality rounds, statistical reports, satisfaction surveys (whether staff or users), etc…

Based on the results of the monitoring system, opportunities and needs will be prioritized. Once prioritized, all efforts will be directed to improve the situation. These improvements efforts will use the most advanced and appropriate quality improvement tools that were proved to be effective in health care settings. Staff at various levels will be trained to a varying degree to conduct quality improvement projects.

Establishing a reward for quality will be a driving force for all health care institutions. Like all other major rewards, the reward will hold the name of His Majesty: "Sultan Qaboos prize for Quality in HealthCare". This reward with this weight will inspire all staff and organizations to compete with each other. Additionally, innovation and creativity will be strengthened in the field of Quality and Patient Safety. In line with the vision to be internationally leady center, the ultimate aim will be to make this reward international.

- **Building Partnership and collaboration:** In line with vision, collaboration and partnership will be built with internationally recognized bodies working in the field of quality and patient safety practices and research. Collaboration with national and regional organizations/institutes is another essential strategy for the quality center in its pathway towards its vision.
- Establishing representative quality and patient safety bodies in different institutions to ensure that quality will be integrated in all aspects of the health care system including the private health sector, education, administration, research, finance, etc....
- Conducting research and studies in the field of quality and patient safety.
- Setting accreditation standards and approving polices and guidelines for approving health institutions.
Developing a mechanism through which quality documents (including polices, guidelines, pathways, etc.) can be developed, reviewed and approved.

2. **Capacity building**

Capacity building is a must for establishing any system. Therefore, a structured plan will be developed to equip health care workers with the required knowledge and skills to perform their assigned tasks. A training plan will be developed for the different categories of health workers as the training needs will vary from one group to another. Health workers will be continuously updated with the latest skills and knowledge to ensure that the quality and patient safety system in Oman becomes a worldwide center of excellence. In addition, staff working in quality departments need to be developed and qualified with higher studies like masters and PhD degrees. A Quality Training Center will be established and linked to the Quality and Patient Center to be responsible for providing training courses on quality. Additionally, the training center will be responsible for certifying the quality health professionals with higher degrees. In line with the Vision, the center will be of high standards to attract trainees from around the world.

3. **Establishing accreditation system**

Accreditation of an organization implies that the organization is complying with the preset standards. Different accreditation bodies using different standards are available worldwide. The decision to select the 'proper' accreditation body might not be as easy as it might be expected. The reason is that countries' experience in implementing the accreditation system shows opposing results. Issues of compatibility, cost and sustainability were among the main obstacles facing successful adaptation of any accreditation system (Hinchcliff et al., 2013). It is, therefore, important to locally develop a national accreditation system that is accredited and affiliated by an international accreditation body. By doing this, it would be ensured that the standards meet the needs, priorities and requirements of the national health system and at the same time assure the community and the government that the standards are internationally recognized. Further, the nationally developed accreditation system will ensure sustainability as the cost of maintaining and upgrading will be minimal compared with other systems. Once developed, all health institutions in the Sultanate (private or governmental) and at all levels will be mandated to be accredited by the national system. The Quality and Patient Safety Center will be responsible for accrediting and licensing health care institutions. In addition, the Center will be responsible for approving the quality standards, SOPs, guidelines and clinical pathways.
References


Bethesda, MD: Quality Assurance Project (for USAID).


http://www.squh.edu.om/SQUH/AboutUs.aspx last accessed 12/March/14


Oman Academic Accreditation Authority (2013). Quality Audit Report: OAAA.

Swanson et al., (2010). Toward a Consensus on Guiding Principles for Health Systems Strengthening, Published: December 21, 2010 DOI: 10.1371/journal.pmed.1000385


WHO (2006), Quality of Care: A process for making strategic choices in health systems.
Synopsis of Strategic Studies

Bibliography

Synopsis 8

Medical Equipment and Healthcare Technologies
Strategic Study
Medical Equipment and Healthcare Technologies
Strategic Study

Task Force:

- H.E. Dr Ali Talib Al-Hinai, Undersecretary for Planning Affairs
- Dr. Adhra Bint Hilal Al-Mawali

Contributors:

- Eng. Rashid Bin Hamdan Al-Hijri
- Mr. Avinash Daniel Pinto

Acknowledgements:

1. Local
   - Health Vision 2050 Team
   - Strategic Studies Review Team
   - Dr Waleed Al-Naddabi
   - Dr Sabria Nasser Al-Hashmi

2. International
   - Eng. Enrico Nunziata
   - Prof. Bassel Tawfiq
## List of Abbreviations

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>AAMI</td>
<td>Association for the Advancement of Medical Instrumentation</td>
</tr>
<tr>
<td>CM</td>
<td>Corrective Maintenance</td>
</tr>
<tr>
<td>CMMS</td>
<td>Computerised Maintenance Management System</td>
</tr>
<tr>
<td>CT</td>
<td>Computed Tomography</td>
</tr>
<tr>
<td>DGEA</td>
<td>Directorate General Engineering Affairs</td>
</tr>
<tr>
<td>DMT</td>
<td>Directorate of Medical Technologies</td>
</tr>
<tr>
<td>ECRI</td>
<td>Emergency Care Research Institute</td>
</tr>
<tr>
<td>EU</td>
<td>European Union</td>
</tr>
<tr>
<td>FTE</td>
<td>Full-Time Equivalents</td>
</tr>
<tr>
<td>HTA</td>
<td>Health Technology Assessment</td>
</tr>
<tr>
<td>HTM</td>
<td>Healthcare Technology Management</td>
</tr>
<tr>
<td>IPM</td>
<td>Inspection and Preventive Maintenance</td>
</tr>
<tr>
<td>ISO</td>
<td>Independent Service Organisation</td>
</tr>
<tr>
<td>MoH</td>
<td>Ministry of Health</td>
</tr>
<tr>
<td>MRI</td>
<td>Magnetic Resonance Imaging</td>
</tr>
<tr>
<td>OECD</td>
<td>The Organisation for Economic Co-operation and Development</td>
</tr>
<tr>
<td>OMR</td>
<td>Omani Rials</td>
</tr>
<tr>
<td>PPM</td>
<td>Planned Preventive Maintenance</td>
</tr>
<tr>
<td>R&amp;D</td>
<td>Research and Development</td>
</tr>
<tr>
<td>WHO</td>
<td>World Health Organization</td>
</tr>
</tbody>
</table>
Key Messages

The Ministry of Health in the Sultanate of Oman spent 11.1 million Omani Rials ($28.8 million) in the year 2012 on medical equipment, with an annual average spending of about 8 million Omani Rials in the past ten years (2002-2012).

MESSAGE:
The expenditure on medical equipment as share of the total budget of the Ministry of Health in the year 2012 amounted to 2.5% of the total budget which was far less in comparison to EU member states where this share was around 5%.

A simple comparison of MRI and CT scanners present in all medical institutions between the Sultanate of Oman and OECD (The Organisation for Economic Co-operation and Development) countries per million population has been made in this strategic document.

This comparison indicated that the density per capita (represented per million population) in the Sultanate of Oman was 4.4 as compared to the OECD average of 13.3 for MRI scanners, and the density per capita in the Sultanate of Oman was 6.9 as compared to the OECD average of 23.6 for CT scanners.

MESSAGE:
Oman ranks on the lower end of the spectrum of MRI and CT scanners per capita when compared with OECD countries and other countries around the world.
A preliminary situation analysis of the Ministry of Health’s equipment inventory database according to the ‘Golden Rules’ approach was performed.

This analysis revealed that the installed equipment base younger than 5 years is currently 33% according to the 2012 inventory database which is almost half (27%) less as compared to the suggested 60% ‘Golden Rules’ percentage in this category. The installed equipment base between 6 - 10 years old is currently 22% which is 8% less as compared to the suggested 30% ‘Golden Rules’ percentage in this category, and the installed equipment base older than 10 years is currently 34% which is almost double (24%) more as compared to the suggested 10% ‘Golden Rules’ percentage in this category.

MESSAGE:
It shows that a lot of attention needs to be given to the category base of equipment older than 10 years which in turn requires a lot of budget to meet the demand and approach the suggested ‘Golden Rules’ percentages.

The Health Vision 2050 for Medical Equipment and Healthcare Technologies necessitates continuous planning and management of infrastructure which is vital to strengthening the capacity of the country to be able to cope with the rapid advancements in the field.

This strategic document entails projections for the main medical equipment in terms of number which have been projected up to the year 2050.

MESSAGE:
The Ministry of Health projects to have 63 MRI scanners for the Omani population and 94 for the total population by 2050 based on total population density. In addition, a projection of 110 CT scanners for Omanis and 167 for the total population by the year 2050 was correspondingly anticipated based on total population density. The Ministry of Health also projects to have 2026 Ultrasound machines, 3781 incubators and 3781 ventilators based on the total population in Oman by the year 2050.
Introduction

The provision of equitable, reliable, efficient and cost-effective healthcare to the Omani population requires a robust system of properly managed resources. High-standards of healthcare provision cannot be achieved without healthcare technology which nowadays serves as a pillar of modern healthcare. Combined knowledge of planning, engineering, management and financial skills has become integral to the complex and diverse system of healthcare technology. Technology development in medicine has been immense with new concepts, procedures, and medical devices being used in clinical practice and medical research. The ability to embrace and integrate these advances and transcribe it appropriately with the application of engineering methods, devices and informatics in medicine has been the major task at hand.

Healthcare technologies are intended to improve the quality of healthcare delivered through earlier diagnosis, providing less invasive treatment options, and reducing hospital stays and rehabilitation times. Healthcare technology innovations are fundamentally transforming the healthcare landscape, providing new solutions to address chronic diseases and revolutionizing the way treatments are administered.

Medical devices can be classified in a number of ways to understand the broad similarities and distinctions between entities and the general risks associated with them as well as for regulatory purposes. Medical devices are also classified based on the role they play in an organisation and degree of development for regulatory purposes. These classifications should be used to guide prioritisation of medical device purchases and maintenance support.

With the steady development in healthcare practice and the massive and accelerating dependence on modern technology, and especially medical technology, the related costs (both capital and operational) have to be considered in the context of healthcare-related decision making.

Internationally, budgets and financing problems are usually constraining factors against achieving the best healthcare for a target population. The challenge will increasingly be one of finding the optimal mix of cost-effective interventions to meet the needs of growing populations with dynamic disease burdens while staying within the affordability envelopes and ensuring service sustainability. With regard to healthcare technologies generally and medical equipment specifically, this will necessitate adequately-resourced processes, systems and structures for managing the complete life-cycle of technologies and equipment: from needs assessment and planning and budgeting to formal evaluation, procurement, utilisation, maintenance, replacement and disposal, overseen by governance systems for asset-, cost-, risk- and quality management.
Situation of Medical Equipment And Healthcare Technology In Oman

Organizational Structure of the Directorate of Medical Technology (DMT) in the Directorate of General of Engineering Affairs (DGEA)

His Excellency the Minister of Health is assisted by three Undersecretaries respectively for Planning Affairs, Health Affairs, and Administrative & Financial Affairs. A number of Directorates-General and Directorates come under each of the Offices of the Undersecretaries. The Directorate General of Engineering Affairs (DGEA) functions under the Office of the Undersecretary for Administrative and Financial Affairs. The DGEA has three Directorates: Projects, Medical Equipment and Maintenance (Figure 1). It is responsible for civil-, mechanical-, electrical- and biomedical engineering and maintenance of equipment, instruments and buildings, in addition to looking after the development projects.

The DMT is striving to meet the exponentially growing needs of the Ministry and its hospitals in terms of medical technologies. Its responsibilities include:

- Managing the tendering process when acquiring medical technologies for:
  1. New healthcare projects
  2. Replacement of the old equipment
  3. Upgrading healthcare services (both software and hardware) as well as the provision of additional equipment.

- Supervising Medical Equipment Services in the periphery, their operation and the associated maintenance procedures/interventions for all medical equipment on the inventory list of Ministry of Health (MoH) hospitals.

The Directorate of Medical Technology (DMT) consists of the Medical Specifications Section, Upgrading & Receiving Section, Service and Maintenance Section and Radiation Protection Section.

![Organisational structure of the DMT](image)

**Figure 1: Organisational structure of the DMT**
Medical Specifications Section is responsible for the preparation of specifications and management of the specification database within the Directorate. It is also responsible for identifying capital equipment pre-installation requirements, preparing tender documents, and selecting the most appropriate offers. Upgrading & Receiving Section is responsible for the replacement of condemned equipment, providing equipment for upgrading of services for existing health facilities. Their job involves receiving of condemnation certificates and requests for upgrading, identifying the appropriate equipment, preparing tender documents for upgrading and replacement based on the hospitals’ requirements, verification of offers and recommendation of the most cost-effective offers. This unit is also responsible for receiving equipment ordered through different tenders throughout the Ministry. Service & Maintenance Section manages the maintenance of medical equipment throughout the Sultanate. Maintenance activities in various regions are carried out through the biomedical department of each region. In addition, this unit is also responsible for the management of various maintenance contracts for selected items of medical equipment. The unit also provides maintenance support to central clinical support units such as the central reference laboratories. Radiation Protection Section is responsible for testing and certifying all radiology equipment in operation in the country as per international guidelines and standards.

Tender Management

DMT manages tenders for medical equipment through a series of steps, which were established in order to ensure fair selection of the best offer. These steps are outlined in Box 1 but represent only that part of the process falling within the responsibility of the DMT work; additional work must be done by MoH Committees and eventually by the Ministry of Finance before approval is granted. Currently, the Tendering process is onerous and time-consuming - the process can take over 18 months to complete. These institutions have procurement systems and structures in place but the Treasury regulations currently place a limit on the maximum value for capital expenditure.

Box 1: Outline of steps for tender management of medical equipment

1. Definition of requirements (needs assessment)
2. Administrative approval (particularly for new items)
3. Issue tender specifications
4. Preliminary cost estimation (based on previous tenders)
5. Review comparative statements
6. Check and review information on tender (literature review, performance on External Quality Assurance programs)
7. Site visit for view and evaluation (as per requirement)
8. Recommendation sent to Directorate of purchases and contracts
9. MOH Medical Committee

Annual Budget and Financial Scheme

The total expenditure for the Ministry of Health for the year 2012 was around 454 million Omani Rials ($1.1 billion). The total cost of medical equipment in the year 2012 for new projects (OMR 4.38 million), upgrading (OMR 1.11 million), replacement (OMR 4.63 million) and direct purchase from regions (OMR 970 thousand) amounted to OMR 11.1 million [$28.8 million] (2.5% of the total budget).
In European Union (EU) member states, the share of medical devices in health expenditures around 5% (European Commission 2011) with the share ranging from 3% in Germany to 5% in Sweden (European Commission 2012), whereas the expenditure on medical devices as a share of National Health Expenditures in the U.S. was 5.9% in 2009.

The total cost of medical equipment purchased for various regions inclusive of projects, replacements and upgrading from 2002-2012 was OMR 77.3 million broken down as shown in Table 1 below. This means that, on average, the Ministry of Health spends around OMR 7.7 million annually on medical equipment.

<table>
<thead>
<tr>
<th>Projects</th>
<th>Upgrading</th>
<th>Replacement</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>OMR 33,532,311</td>
<td>OMR 25,639,277</td>
<td>OMR 16,176,546</td>
<td>OMR 77,324,993</td>
</tr>
</tbody>
</table>

Table 1: Expenditure on Medical Equipment from 2002-2012

Medical Equipment Services at Governorate Level and at Major Hospitals

The organisational structure is reproduced at the level of Governorates, with Biomedical sections within the Departments of Engineering Affairs incorporating the Medical Equipment Service and functioning as follows:

- A Service is placed either at the Governorate level or at the Regional Reference Hospital level, serving the Regional Reference Hospital and all the Health Centres and Extended Health Centres (Polyclinics) under that Governorate;
- The Service conducts the basic essential actions for on-going equipment management and maintenance, i.e. performing IPM procedures, responding to breakdown calls, evaluating equipment performance and need for replacement;
- The Service manages the interventions performed by the contracted third party service providers (contracts signed by the central DMT);
- The Service has public servants as well as contracted personnel working under the supervision of public servants.

At the two major Hospitals (Royal Hospital and Khoula Hospital), the situation could be considered as for the Governorate but limited to the hospital with which the Service is associated and that hospital’s satellite facilities.

Main Medical Equipment and Medical Imaging Units

There is no general guideline or benchmark regarding the ideal number of CT scanners or MRI units per population. However, if there are too few units, this may lead to access problems in terms of geographic
proximity or waiting times. If there are too many, this may result in an overuse of these costly diagnostic procedures, with little if any benefits for patients.

The Ministry of Health institutions in Oman currently have a total of 4 MRI units and 15 CT scans as detailed in Table 2 and Table 3. Table 2 lists the number of MRI and CT scanners present in the Ministry of Health and all other medical institutions. Table 3 also enumerates the number of ultrasound machines (288), echocardiograms (91), infant incubators (255) and ventilators (472) currently available for the entire population of Oman, as well as a breakdown of these medical devices in different governorates/major hospitals.

Figure 2 and Figure 3 show a diagrammatic representation of MRI and CT scanners represented by density per million population in all medical institutions in the Sultanate of Oman. At present, Oman is similar to the other Middle Eastern countries such as Saudi Arabia, Yemen and Jordan. Nevertheless, Oman ranks on the lower end of the spectrum of MRI and CT scanners per capita when compared with other countries around the world in this list.

<table>
<thead>
<tr>
<th></th>
<th>MRI scanners</th>
<th>CT scanners</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ministry of Health</td>
<td>4</td>
<td>15</td>
</tr>
<tr>
<td>Sultan Qaboos</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>University Hospital</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Armed Forces Hospital</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Royal Oman Police</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Hospital</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Diwan of Royal Court</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Royal Court</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Private institutions</td>
<td>8</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td><strong>16</strong></td>
<td><strong>25</strong></td>
</tr>
</tbody>
</table>

Table 2: List of MRI and CT scanners in MoH, other governmental and private institutions
<table>
<thead>
<tr>
<th>No.</th>
<th>Hospital/Governorate</th>
<th>Population distribution</th>
<th>MRI</th>
<th>CT Scan</th>
<th>Ultrasound</th>
<th>Echocardiogram</th>
<th>PET Scan</th>
<th>Infant Incubators</th>
<th>Ventilators</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Muscat</td>
<td>1,155,173</td>
<td>-</td>
<td>-</td>
<td>33</td>
<td>43</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>76</td>
</tr>
<tr>
<td>2</td>
<td>Al Nahdha Hospital</td>
<td></td>
<td>-</td>
<td>1</td>
<td>1</td>
<td>-</td>
<td>-</td>
<td>1</td>
<td>6</td>
<td>9</td>
</tr>
<tr>
<td>3</td>
<td>Al-Masarrah Hospital</td>
<td></td>
<td>-</td>
<td>-</td>
<td>1</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>1</td>
</tr>
<tr>
<td>4</td>
<td>The Royal Hospital</td>
<td></td>
<td>1</td>
<td>3</td>
<td>20</td>
<td>14</td>
<td>-</td>
<td>42</td>
<td>119</td>
<td>199</td>
</tr>
<tr>
<td>5</td>
<td>Khoula Hospital</td>
<td></td>
<td>2</td>
<td>2</td>
<td>12</td>
<td>1</td>
<td>-</td>
<td>56</td>
<td>65</td>
<td>138</td>
</tr>
<tr>
<td>6</td>
<td>Dhofar</td>
<td>355,396</td>
<td>1</td>
<td>2</td>
<td>27</td>
<td>1</td>
<td>-</td>
<td>11</td>
<td>31</td>
<td>74</td>
</tr>
<tr>
<td>7</td>
<td>A'Dakhiliyah</td>
<td>372,357</td>
<td>-</td>
<td>1</td>
<td>32</td>
<td>2</td>
<td>-</td>
<td>35</td>
<td>61</td>
<td>131</td>
</tr>
<tr>
<td>8</td>
<td>Al Dhahira</td>
<td>172,872</td>
<td>-</td>
<td>1</td>
<td>20</td>
<td>1</td>
<td>-</td>
<td>7</td>
<td>25</td>
<td>54</td>
</tr>
<tr>
<td>9</td>
<td>South Batinah</td>
<td>326,424</td>
<td>-</td>
<td>1</td>
<td>24</td>
<td>1</td>
<td>-</td>
<td>21</td>
<td>17</td>
<td>64</td>
</tr>
<tr>
<td>10</td>
<td>North Batinah</td>
<td>608,826</td>
<td>-</td>
<td>1</td>
<td>30</td>
<td>3</td>
<td>-</td>
<td>24</td>
<td>50</td>
<td>108</td>
</tr>
<tr>
<td>11</td>
<td>South Sharqiyah</td>
<td>245,677</td>
<td>-</td>
<td>1</td>
<td>26</td>
<td>2</td>
<td>-</td>
<td>19</td>
<td>35</td>
<td>83</td>
</tr>
<tr>
<td>12</td>
<td>North Sharqiyah</td>
<td>222,739</td>
<td>-</td>
<td>1</td>
<td>34</td>
<td>1</td>
<td>-</td>
<td>19</td>
<td>30</td>
<td>85</td>
</tr>
<tr>
<td>13</td>
<td>Musandam</td>
<td>34,576</td>
<td>-</td>
<td>-</td>
<td>10</td>
<td>1</td>
<td>-</td>
<td>7</td>
<td>10</td>
<td>28</td>
</tr>
<tr>
<td>14</td>
<td>Al Wusta</td>
<td>36,726</td>
<td>-</td>
<td>-</td>
<td>9</td>
<td>20</td>
<td>-</td>
<td>2</td>
<td>8</td>
<td>39</td>
</tr>
<tr>
<td>15</td>
<td>Al-Buraimi</td>
<td>92,235</td>
<td>-</td>
<td>1</td>
<td>9</td>
<td>1</td>
<td>-</td>
<td>11</td>
<td>15</td>
<td>37</td>
</tr>
<tr>
<td></td>
<td><strong>Total</strong></td>
<td><strong>3,623,001</strong></td>
<td><strong>4</strong></td>
<td><strong>15</strong></td>
<td><strong>288</strong></td>
<td><strong>91</strong></td>
<td><strong>0</strong></td>
<td><strong>255</strong></td>
<td><strong>472</strong></td>
<td><strong>1126</strong></td>
</tr>
</tbody>
</table>

Table 3: List of main Medical Equipment in Ministry of Health institutions (2012)
Figure 2: Total density of MRI scanners per capita in Oman, OECD and other countries around the world
Figure 3: Total density of CT scanners per capita in Oman, OECD and other countries around the world
Equipment Management System Resources

- **Human Resources**

The Directorate of Medical Technologies encompassed in the Directorate General for Engineering Affairs has significant numbers of personnel at central and governorate/major hospital levels, many of whom are contracted employees as seen in Table 4.

From the current total of 143 biomedical personnel, 31 are engineers and 112 are technicians. At present, 42 are employed as MoH personnel whilst 101 are employed on a contract basis. Of this workforce, 30 are Omani’s and 113 are expatriates.

- **Material Resources**

Significant material resources are available only in some main regions (such as Muscat Governorate and Royal Hospital). Asset management covers many aspects of the day-to-day operations of medical equipment such as planned preventive maintenance (PPM), calibration, equipment recall, hazard incidences, and acceptance testing.

Currently, there is no comprehensive and dedicated asset management system available for use by the Directorate of Medical Technologies. The only software that is being used is the Al-Shifa system which is used mainly for tendering/procurement purposes (Engineering Services in general and Medical Equipment Services in particular appear to make little use of Al-Shifa system, even for procurement purposes). As it stands, this system does not address any of the issues related to medical equipment maintenance and performance assessment.

- **Financial Resources**

At different levels of hierarchy, there are varied opinions about the current funding with different reasons. An issue facing the DMT is that the annual budget allocation falls short of the amount requested for equipment purchase, upgrading and replacement, while hospital and Governorate services have an issue about receiving insufficient allocations for purchase of spare parts. Apart from that, there is also dissatisfaction with the delays in receiving the spares once these have been requested, with added frustrations to the effect that (i) sometimes the incorrect spares are procured and (ii) hospitals/governorates are not in a position to maintain a stock of commonly needed parts. This has a direct – and negative – impact on maintenance and increases equipment downtime, with the knock-on effect of equipment not being available for clinical use.
<table>
<thead>
<tr>
<th>S. No</th>
<th>Region/Governorate</th>
<th>Designation</th>
<th>Employment type</th>
<th>Nationality</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Engineers</td>
<td>Technicians</td>
<td>MoH</td>
</tr>
<tr>
<td>1</td>
<td>DMT</td>
<td>11</td>
<td>20</td>
<td>18</td>
</tr>
<tr>
<td>2</td>
<td>Muscat</td>
<td>2</td>
<td>5</td>
<td>3</td>
</tr>
<tr>
<td>3</td>
<td>Al Nahdha Hospital</td>
<td>2</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td>4</td>
<td>Al-Masarrah Hospital</td>
<td>0</td>
<td>3</td>
<td>0</td>
</tr>
<tr>
<td>5</td>
<td>The Royal Hospital</td>
<td>4</td>
<td>12</td>
<td>4</td>
</tr>
<tr>
<td>6</td>
<td>Khoula Hospital</td>
<td>2</td>
<td>6</td>
<td>2</td>
</tr>
<tr>
<td>7</td>
<td>Dhofar</td>
<td>3</td>
<td>10</td>
<td>3</td>
</tr>
<tr>
<td>8</td>
<td>A'Dakhiliyah</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>Al Dhahira</td>
<td>2</td>
<td>5</td>
<td>2</td>
</tr>
<tr>
<td>10</td>
<td>South Batinah</td>
<td>2</td>
<td>6</td>
<td>2</td>
</tr>
<tr>
<td>11</td>
<td>North Batinah</td>
<td>2</td>
<td>11</td>
<td>4</td>
</tr>
<tr>
<td>12</td>
<td>South Sharqiyah</td>
<td>1</td>
<td>12</td>
<td>1</td>
</tr>
<tr>
<td>13</td>
<td>North Sharqiyah</td>
<td>0</td>
<td>12</td>
<td>0</td>
</tr>
<tr>
<td>14</td>
<td>Musandam</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>15</td>
<td>Al Wusta</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>16</td>
<td>Al-Buraimi</td>
<td>0</td>
<td>7</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>TOTAL</td>
<td>31</td>
<td>112</td>
<td>42</td>
</tr>
<tr>
<td></td>
<td>GRAND TOTAL</td>
<td>143</td>
<td>143</td>
<td>143</td>
</tr>
</tbody>
</table>

Table 4: Summary of biomedical personnel in various regions (2012)
[red blocks indicate data currently not available]
CHALLENGES OF MEDICAL EQUIPMENT AND HEALTHCARE TECHNOLOGY IN OMAN

Healthcare technology has become an integral and increasingly important component of the health sector in governments all over the world. However, access to medical equipment and healthcare technology appropriate to specific epidemiological needs has been a challenge all over the world and to Oman as well. While the costs of healthcare are multidimensional and very complex, the contribution of medical technologies to this overall spending is, to say the least, considerable. Looking at the trends over the past two or three decades, it is clear that this contribution will keep on increasing (this has to do with the mushrooming of high end technologies such as advanced diagnostic imaging, laboratory-based analytical techniques and cancer treatment). Even before resource ceilings are encountered, an evidence-based healthcare technology management will be needed in order to ensure optimal acquisition and utilisation of proven, cost-effective medical technologies. The challenges currently plaguing the Ministry of Health with regard to medical equipment and healthcare technologies are:

- Inadequate health service planning and budget allocation
- Limited role of the DMT in management of the overall medical equipment and healthcare technology system
- Lack of Regulatory Control over Suppliers of Medical Equipment
- Limited autonomy for major hospitals
- Lengthy tendering Process
- Long replacement times of medical equipment
- Inappropriate service and maintenance of medical equipment
- Inappropriate purchase of reagents and consumables for laboratory equipment
- Limited suppliers in the country in the field of medical technology
- Inadequate database for existing medical
- No dedicated asset management system
- Suboptimal cost analyses studies: purchase versus lease
HEALTH VISION 2050 FOR MEDICAL EQUIPMENT AND HEALTHCARE TECHNOLOGIES

HEALTH VISION 2050 is built on a foundation of expert participation locally and internationally. Overarching issues, such as equity, safety, quality of service and innovation are addressed in the vision for medical equipment and healthcare technology.

The strategic study on Medical Equipment and Healthcare Technologies has its Vision as,

“Attainment of state-of-the-art healthcare technologies and highest technological competencies.”

While its Mission is,

“Facilitating the planning, development and implementation of sustainable national healthcare technology programs and guidelines which are safe, reliable, efficient and cost-effective.”

In order to achieve the Mission and Vision of the Health Vision 2050 for Medical Equipment and Healthcare Technology, eight objectives were developed.

**Objective 1:** Develop comprehensive national policies for medical equipment and healthcare technology

**Objective 2:** Formulate regulations for medical equipment and healthcare technology

**Objective 3:** Perform an appropriate needs assessment for medical equipment and healthcare technology

**Objective 4:** Build capacity for medical equipment and healthcare technology

**Objective 5:** Develop a Health Technology Management (HTM) System for medical equipment and healthcare technology

**Objective 6:** Establish an advanced monitoring and evaluation system for medical equipment and healthcare technology

**Objective 7:** Finance medical equipment and healthcare technology
Objective 8: Support and promote research and development as part of healthcare technology innovation

THE WAY FORWARD

Objective 1: Develop comprehensive national policies for medical equipment and healthcare technology

Strategies:

i. To base policy making on the core values of the health system
ii. To establish wide-ranging policies covering all aspects of the utilization, effectiveness, and safety of healthcare technology, drugs, and supplies
iii. To ensure a mechanism for endorsement of the process by senior MoH officials
iv. To ensure the process is broadly consultative and involves participation of all major stakeholders
v. To ensure the process is transparent and decisions are reached based on evidence
vi. To review policies periodically to respond to the ever-changing field of healthcare technology and incorporate suitable modifications.

Figure 4: Phases of the life-cycle of medical devices within the national health policy
Objective 2: Formulate regulations for medical equipment and healthcare technology

![Stakeholders involved in ensuring the proper standards and safety of medical devices](image)

**Figure 5: Stakeholders involved in ensuring the proper standards and safety of medical devices**

**Strategies:**

i. To establish an autonomous regulatory body in relation to healthcare and biomedical technology to be in charge of developing national norms and standards for quality assurance and designing an accreditation system.

ii. To establish a national coordinating agency to receive and manage problem reports from all sources.

iii. To update and standardise medical equipment regulation/law in order to regulate the importation, distribution, licensing, trading and use of medical equipment.

iv. To ensure essential product representation control during the pre-market stage and advertising of the product following the pre-market stage by appropriate labelling requirements which include identification of the device, instructions for use, as well as safety- and performance-related information.

v. To introduce vendor establishment control to allow the government to be informed of what establishments are selling what devices, in order to establish contact with the vendors in case of adverse events and to inform the local vendors of their responsibility for after-sale obligations.
vi. To introduce a thorough programme of post-market surveillance which should include major components of after-sales obligations for the vendor.

vii. To carry out promotional activity by the Ministry of Health to encourage cooperation among all the stakeholders, encourage compliance and reduce burden of enforcement, through proper dissemination of the policy to the stakeholders by the regulatory authority and user education for guarding against misuse and misrepresentation of medical devices.

viii. To establish accreditation of hospitals and biomedical engineering departments.

ix. To participate in regional cooperation, as part of a recommendation, as a means for regulator-to-regulator interaction.

x. To set priorities for regulatory programme development according to needs of the Sultanate of Oman.

Objective 3: Perform an appropriate needs assessment for medical equipment and healthcare technology

Strategies:

i. To acquire appropriate baseline information on health service requirements by evaluating suitable health service delivery requirements based on epidemiological needs (disease priorities), population issues (demography, patient rate), protocols/national recommendations, internationally-recognised standards on diagnosis and treatment of different diseases and healthcare issue prioritization.

ii. To acquire appropriate baseline information on health service availability by:

   a) constructing a health service availability map which includes health service availability and accessibility, opinions on health service delivery from the target population, opinions on health service delivery from service providers.

   b) constructing a facility map which includes the facility types, numbers, conditions and current staffing levels in these facilities.

iii. To acquire appropriate baseline information on medical devices to identify what is available as well as related infrastructure and their condition by:

   a) building an adequate medical equipment inventory including status and condition.

   b) constructing an outline of health technology management infrastructure, whilst updating the existing management structure, including responsibilities.
Based on the above, projections for the main medical equipment i.e. MRI scanners, CT scanners, Ultrasound, Incubators and Ventilators in terms of quantity were formulated and tabulated in the Table 5 below. Table 6 shows the projections of MRI and CT scanners calculated only for the Omani population.

iv. To acquire appropriate baseline information on **human resources**
    a) building a staffing plan based on human resource data information
    b) building an education and training map
    c) To acquire appropriate baseline information on **finances** by assessing the budget and expenses from previous periods, current budget and the system of monitoring/controlling the budget

v. To analyse and interpret information by comparing the current inventory lists with an internationally- or regionally-recognised standard for the type of facility and/or intervention being reviewed, and assess the respective gaps

vi. To prioritise and appraise the options by:
    a) prioritising the gaps in resources which are insufficient to decide which needs should be met first and which will be met later
    b) setting targets for operations for the coming year based on the goals of the management team and the health-care facilities
    c) preparing an operational plan to be integrated into the overall plan for healthcare technology
    d) appraising the various options by weighing the evidence carefully implementing the options by use of an action plan and timetable, including a plan for resource allocation
### Table 5: Medical Equipment Projections for Health Vision 2050 of the Main Medical Equipment for total population

(Projections for MRI & CT scanners calculated for total population based on OECD average)

<table>
<thead>
<tr>
<th>Governorate</th>
<th>MRI 2012</th>
<th>MRI 2050</th>
<th>CT Scan 2012</th>
<th>CT Scan 2050</th>
<th>Ultrasound 2012</th>
<th>Ultrasound 2050</th>
<th>Incubators 2012</th>
<th>Incubators 2050</th>
<th>Ventilators 2012</th>
<th>Ventilators 2050</th>
</tr>
</thead>
<tbody>
<tr>
<td>Muscat</td>
<td>3</td>
<td>28</td>
<td>6</td>
<td>49</td>
<td>67</td>
<td>356</td>
<td>99</td>
<td>666</td>
<td>190</td>
<td>666</td>
</tr>
<tr>
<td>Dhofar</td>
<td>1</td>
<td>9</td>
<td>2</td>
<td>16</td>
<td>27</td>
<td>221</td>
<td>11</td>
<td>376</td>
<td>31</td>
<td>376</td>
</tr>
<tr>
<td>Al Dhakiliyah</td>
<td>0</td>
<td>10</td>
<td>1</td>
<td>18</td>
<td>32</td>
<td>287</td>
<td>35</td>
<td>561</td>
<td>61</td>
<td>561</td>
</tr>
<tr>
<td>Al Dhahira</td>
<td>0</td>
<td>5</td>
<td>1</td>
<td>8</td>
<td>20</td>
<td>123</td>
<td>7</td>
<td>212</td>
<td>25</td>
<td>212</td>
</tr>
<tr>
<td>S. Batinah</td>
<td>0</td>
<td>9</td>
<td>1</td>
<td>16</td>
<td>24</td>
<td>214</td>
<td>21</td>
<td>363</td>
<td>17</td>
<td>363</td>
</tr>
<tr>
<td>N. Batinah</td>
<td>0</td>
<td>16</td>
<td>1</td>
<td>29</td>
<td>30</td>
<td>339</td>
<td>24</td>
<td>631</td>
<td>50</td>
<td>631</td>
</tr>
<tr>
<td>S. Sharqiyah</td>
<td>0</td>
<td>7</td>
<td>1</td>
<td>12</td>
<td>26</td>
<td>163</td>
<td>19</td>
<td>304</td>
<td>35</td>
<td>304</td>
</tr>
<tr>
<td>N. Sharqiyah</td>
<td>0</td>
<td>6</td>
<td>1</td>
<td>11</td>
<td>34</td>
<td>169</td>
<td>19</td>
<td>363</td>
<td>30</td>
<td>363</td>
</tr>
<tr>
<td>Musandam</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>2</td>
<td>10</td>
<td>38</td>
<td>7</td>
<td>106</td>
<td>10</td>
<td>106</td>
</tr>
<tr>
<td>Al Wusta</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>2</td>
<td>9</td>
<td>55</td>
<td>2</td>
<td>70</td>
<td>8</td>
<td>70</td>
</tr>
<tr>
<td>Al Buraimi</td>
<td>0</td>
<td>2</td>
<td>1</td>
<td>4</td>
<td>9</td>
<td>61</td>
<td>11</td>
<td>129</td>
<td>15</td>
<td>129</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>4</td>
<td>94</td>
<td>15</td>
<td>167</td>
<td>288</td>
<td>2026</td>
<td>255</td>
<td>3781</td>
<td>472</td>
<td>3781</td>
</tr>
</tbody>
</table>
Table 6: Equipment Projections for MRI & CT Scanners for only Omani population (based on OECD average) for Health Vision 2050

<table>
<thead>
<tr>
<th>Governorate</th>
<th>MRI – only Omani’s</th>
<th>CT Scanners – only Omani’s</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>2012</td>
<td>2050</td>
</tr>
<tr>
<td>1 Muscat</td>
<td>3</td>
<td>13</td>
</tr>
<tr>
<td>2 Dhofar</td>
<td>1</td>
<td>5</td>
</tr>
<tr>
<td>3 Al Dhakiliyah</td>
<td>0</td>
<td>9</td>
</tr>
<tr>
<td>4 Al Dhaheira</td>
<td>0</td>
<td>4</td>
</tr>
<tr>
<td>5 S. Batinah</td>
<td>0</td>
<td>8</td>
</tr>
<tr>
<td>6 N. Batinah</td>
<td>0</td>
<td>12</td>
</tr>
<tr>
<td>7 S. Sharqiyah</td>
<td>0</td>
<td>5</td>
</tr>
<tr>
<td>8 N. Sharqiyah</td>
<td>0</td>
<td>4</td>
</tr>
<tr>
<td>9 Musandam</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>10 Al Wusta</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>11 Al Buraimi</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>4</strong></td>
<td><strong>63</strong></td>
</tr>
</tbody>
</table>

Objective 4: Build capacity for medical equipment and healthcare technology

I. Building infrastructure capacity

Strategies:

i. To upgrade the Directorate of Medical Technologies at the national level in the Ministry of Health to Directorate General level to enhance development and financial, human and material resources

ii. To build and strengthen infrastructure capacity for medical equipment and healthcare technology by:
   a) establishing an appropriate unit for healthcare technology in all governorates
   b) improving design and development of buildings hosting biomedical equipment in order to improve effectiveness, efficiency and safety
   c) improving coordination with other ministries and agencies for cost-saving purposes
iii. To develop an appropriate organisational structure at different levels within the country involved in the implementation of the healthcare technology

II. Building human resources capacity

Strategies:

i. To develop the educational infrastructure to allow qualified technical personnel to be created within the country, by including universities in human resource planning to develop formal degree programmes and provide continuing education for technical personnel.

ii. To support the management personnel in providing leadership to set department policies, provide budget recommendations, supervise technical staff, arrange for training, set priorities for the department activities and administer the overall programme.

iii. To promote good clinical practice during operation of healthcare technology through self-study, training and workshops.

Objective 5: Develop a Health Technology Management (HTM) system for medical equipment and healthcare technology

Management in healthcare technology involves four main phases (Figure 6):

I. Procurement and Commissioning management
II. Medical equipment inventory management
III. Medical equipment maintenance programme management
IV. Decommissioning of medical devices

Figure 6: Overview of the main steps involved in the Health Technology Management Cycle
I. **Procurement and Commissioning management**

*Strategies:*

i. To re-engineer administrative processes and restructure the tendering system concerned with the procurement process by following Bailey’s “five rights” of public procurement:
   
   a) *Right product or service*
   
   b) *Right quality*

   c) *Right price*

   d) *Right quantity*

   e) *Right time and place*

ii. To estimate future procurement needs for health technologies by building an asset management system to track equipment status and include an estimate of the useful life of each asset

iii. To set guidelines for establishing/limiting the numbers of ‘big-ticket’ items are (example: “Certificate of Need” mechanism by World Health Organisation {WHO})

iv. To develop a system of e-procurement for the future by using electronic data interchanges and web-based bidding

v. To ensure ethics in procurement of medical devices by:
   
   a) forming a corporate code of conduct or declaration of values in promoting good practices and high standards

   b) developing protocols for declaring conflicts of interest and tracing accountability

   c) introducing antifraud or anticorruption software

vi. To provide autonomy and decentralisation in procurement of medical equipment to large hospitals

vii. To establish a system for assessing procurement performance through measuring the achievements against the objectives by setting indicators for the procurement process.

II. **Medical equipment inventory management**

*Strategies:*

i. To update and standardise the current medical equipment inventory at the national level and regional level

ii. To adapt and follow risk assessment inventory inclusion criteria using algorithms and models, such as Fennigkoh and Smith’s model, Wang and Levenson’s model or the AAMI’S risk model.

iii. To use an appropriate identification numbering and labelling system, such as sequential numbering, coded numbering, barcodes
iv. To have an adequate system of inventory management following three stages of Initial data collection, Information update and Annual audit/review

v. To consider the ‘Golden Rule’ approach (Table 7, Table 8; Figure 7) for assessing overall asset status in terms of age since the current inventory list assumes a 5-year lifetime for medical equipment/health technologies. While this does provide an indication as to the percentage of equipment in different phases of the life-cycle, it is overly simplistic in its approach. While there is no definitive set of age boundaries, the ‘Golden Rule’ method does provide a more rational approach to assessment of asset age and prediction of likely lifetimes (and therefore timing of replacements).

a) Equipment that is up to 5 years old reflects the current state of technology and offers opportunities for economically reasonable upgrade measures.
b) Equipment which is between 6 - 10 years is still fit for use, but already requires replacement strategies to be developed. In our opinion the group "6 to 10 years" should not be more than 30 percent of the total installed base.
c) Equipment older than 10 years is no longer state-of-the-art. It is out-dated and should not be more than 10 percent of the total installed base. Replacement is essential.

From these rules and the experience of studies into the age profile of medical equipment, a set of "Golden Rules" should be used as a guideline for investment policies.

<table>
<thead>
<tr>
<th>Asset age profile</th>
<th>“Golden Rules” approach (%)</th>
<th>“Golden Rules” approach for MoH inventory database (%)</th>
<th>Difference (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt; 5 years</td>
<td>60</td>
<td>33</td>
<td>-27</td>
</tr>
<tr>
<td>6-10 years</td>
<td>30</td>
<td>22</td>
<td>-8</td>
</tr>
<tr>
<td>&gt; 10 years</td>
<td>10</td>
<td>34</td>
<td>+24</td>
</tr>
</tbody>
</table>

Table 7: Age profile of "Golden Rules" approach and “Golden Rules” approach for MoH inventory database
<table>
<thead>
<tr>
<th>Governorate/Hospital</th>
<th>&lt; 5 years</th>
<th>6-10 years</th>
<th>&gt; 10 years</th>
<th>Error/NA</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Muscat (n)</td>
<td>3196</td>
<td>1261</td>
<td>1579</td>
<td>358</td>
<td>6394</td>
</tr>
<tr>
<td>(% 49.98 19.72 24.70</td>
<td>5.60</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2 Royal Hospital (n)</td>
<td>2924</td>
<td>1470</td>
<td>1205</td>
<td>835</td>
<td>6434</td>
</tr>
<tr>
<td>(% 45.45 22.85 18.73</td>
<td>12.98</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3 N. Al Batinah (n)</td>
<td>1613</td>
<td>1140</td>
<td>1895</td>
<td>1069</td>
<td>5717</td>
</tr>
<tr>
<td>(% 28.21 19.94 33.15</td>
<td>18.70</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4 S. Al Batinah (n)</td>
<td>571</td>
<td>293</td>
<td>366</td>
<td>558</td>
<td>1788</td>
</tr>
<tr>
<td>(% 31.94 16.39 20.47</td>
<td>31.21</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5 Al Wusta (n)</td>
<td>168</td>
<td>573</td>
<td>386</td>
<td>258</td>
<td>1385</td>
</tr>
<tr>
<td>(% 12.13 41.37 27.87</td>
<td>18.63</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6 Al Dhakiliyah (n)</td>
<td>909</td>
<td>557</td>
<td>1001</td>
<td>168</td>
<td>2635</td>
</tr>
<tr>
<td>(% 34.50 21.14 37.99</td>
<td>6.38</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7 Al Buraimi (n)</td>
<td>1452</td>
<td>609</td>
<td>1248</td>
<td>1</td>
<td>3310</td>
</tr>
<tr>
<td>(% 43.87 18.40 37.70</td>
<td>0.03</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8 S. Sharqiyah (n)</td>
<td>1862</td>
<td>267</td>
<td>2715</td>
<td>851</td>
<td>5695</td>
</tr>
<tr>
<td>(% 32.70 4.69 47.67</td>
<td>14.94</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9 N. Sharqiyah (n)</td>
<td>1149</td>
<td>1045</td>
<td>769</td>
<td>255</td>
<td>3218</td>
</tr>
<tr>
<td>(% 35.71 32.47 23.90</td>
<td>7.92</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10 Musandam (n)</td>
<td>445</td>
<td>540</td>
<td>449</td>
<td>323</td>
<td>1757</td>
</tr>
<tr>
<td>(% 25.33 30.73 25.55</td>
<td>18.38</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>11 Al Dhahira (n)</td>
<td>689</td>
<td>282</td>
<td>681</td>
<td>36</td>
<td>1688</td>
</tr>
<tr>
<td>(% 40.82 16.71 40.34</td>
<td>2.13</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12 Dhofar (n)</td>
<td>2805</td>
<td>3568</td>
<td>6145</td>
<td>1049</td>
<td>13567</td>
</tr>
<tr>
<td>(% 20.68 26.30 45.29</td>
<td>7.73</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>17783</td>
<td>11605</td>
<td>18439</td>
<td>5761</td>
<td>53588</td>
</tr>
</tbody>
</table>

Table 8: Inventory age classification of MoH installed equipment according to 'Golden Rules' approach
(calculated from the installation date to endpoint of August 2014)
Figure 7: Comparison of age profile of installed equipment between (a) the 'Golden Rules' approach and (b) ‘Golden Rules’ approach for MoH inventory database on installed equipment.
vi. To implement equipment spare parts inventory to ensure safe and effective function of medical equipment. This inventory can also assist in estimating the annual maintenance costs of the medical equipment stock.

vii. To enhance the main inventory with other inventories that could be implemented in support of or related to healthcare technology such as Workshop tools and test equipment inventory, Industrial and hospital equipment items inventory, Safety equipment inventory, Radioactive and hazardous materials and waste inventory etc.

viii. To utilise the medical inventory as a useful tool for forecasting and developing budgets, planning and equipping a technical workshop, determining required staffing, identifying training needs, managing service contracts, planning for spare parts and consumables orders, developing replacement and disposal policies and goals, developing purchasing goals, planning for disasters and emergencies, performing risk analysis, management and mitigation, helping to identify potential benefits in standardising equipment.

III. Medical equipment maintenance programme management

It is essential for all the Ministry of Health healthcare facilities to implement an updated maintenance programme for medical equipment. An effective medical equipment maintenance programme (Figure 8) consists of:

1- Adequate planning for a maintenance programme
2- Appropriate management for the maintenance programme
3- Proper implementation of the maintenance programme

Figure 8: Elements of an effective equipment maintenance programme
1- Adequate planning for a maintenance programme

**Strategies:**

i. To design a maintenance inventory by identifying and selecting medical devices from the medical equipment inventory that need to be included in the maintenance programme by the clinical engineering department

ii. To consider providing autonomy to large hospitals to enable them to plan and implement their maintenance programme

iii. To consider the variety of methodologies available for implementation of a maintenance programme, such as:
   a) establishing service contracts with device manufacturers, independent service organisations (ISOs), or a combination of both.
   b) establishing some level of management and technical capability within the health-care organisation to manage these methodologies
   c) deciding which services should be provided by which combination of internal and external service providers, based on the capacity of the facility and its staff

iv. To consider in advance the financial, physical and human resources necessary to properly execute the intended maintenance activities

2- Appropriate management for the maintenance programme

After the maintenance programme has been planned adequately, it is crucial to manage the programme in an effective and economical manner by following the aspects of:

i. **Financial management for the maintenance programme**

ii. **Personnel management for the maintenance programme**

iii. **Operational management of the maintenance programme**

iv. **Performance monitoring of the maintenance programme**

v. **Performance improvement of the maintenance programme**
Strategies:

1. **Financial management for the maintenance programme**
   a) to monitor costs:
      - by accurately documenting all of the time and expenses associated with maintenance activities
      - by recording the information on a work order document, followed by entry into the computerised maintenance management system (CMMS)
   b) to manage the budget:
      - by assigning costs of (unexpected and expensive) repair separately from inspective and preventive Maintenance (IPM) work, to allow for accurate cost accounting and future budgeting for IPM and more accurate repair accounting
      - by considering adjustment of the maintenance budget to reflect acquisition of new equipment or removal of existing equipment (as this affects costs associated with both IPM and Corrective Maintenance {CM})
ii. **Personnel management for the maintenance programme**

a) to provide support to the maintenance programme’s human resources so that programme objectives are achieved
b) to match skills of the technical personnel to the work assignments to promote efficiency
c) to monitor external service vendors (equipment manufacturers and independent service organisations) by:
   d) to ensure suitable training for technical personnel involved in maintenance
      - providing training **inside** the health-care organisation:
      - providing training **outside** the health-care organisation
e) to monitor productivity of internal and outsourced technical personnel on a regular basis

iii. **Operational management of the maintenance programme**

a) To use the medical device manufacturer’s IPM procedure manual as a baseline, and develop or change IPM procedures based on inputs from biomedical equipment technicians and/or other organisations who own the equipment
b) To set IPM frequency as specified by the manufacturer of the equipment in the maintenance manual; and consider regulatory environment, physical environment, level of user training, reliability of the equipment, frequency of use, extent of wear the equipment receives during normal use, and the number and types of technical staff available before changing the inspection frequency
c) To schedule appropriate maintenance by:
   - choosing the most appropriate method of scheduling maintenance in a particular health-care facility
   - having a prioritisation scheme so that CM resources are directed towards the most critical needs
   - measuring the workloads created by scheduled IPM to help identify areas where adjustment may be needed
   - allowing for work to be assigned manually by management personnel or automatically by the computerised maintenance management system
   - working towards creating a system where IPM technicians can focus on the work at hand without interruption
d) To prioritise maintenance work based on different methodologies
   - **Risk-based prioritisation**
   - **Mission-based prioritisation**
iv. **Performance monitoring of the maintenance programme**

Performance measurement is significant in effective management of the maintenance programme for monitoring and identifying opportunities for improvement.

a) To monitor performance over time and investigate any significant trends through performance indicators:

- **Completion rate of assigned IPM**
- **Equipment location rate**
b) To subscribe to a benchmarking service that will support detailed performance monitoring (for example, AAMI’s *Benchmarking Solution* which includes FTE counts, or ECRI’s *Biomedical Benchmark*)

v. **Performance improvement of the maintenance programme**

Performance improvement is critical for every part of the maintenance programme with the ultimate goal of enhancing patient care in the facilities, and entails the following steps:

a) **To identify opportunities for improvement** – This can be done through meticulous and careful performance monitoring

b) **To identify best practices** - This can be done by identifying actions that have been accepted within the profession as leading to improved performance, through clinical engineering literature and collaboration with professional colleagues

c) **To improve performance** – Performance improvement projects should be based on the best practices with every aspect of the performance selected for improvement being closely monitored until the desired level of performance is achieved.

3- **Proper implementation of the maintenance programme**

A proper implementation of the medical equipment maintenance programme is critical to ensuring optimal equipment functionality.

*Strategies:*

i. To use correct and appropriate procedures for equipment maintenance and performing IPM activities as defined prior to execution of the inspection or maintenance work (after reviews of each type of equipment or model)

ii. To perform efficient troubleshooting for corrective maintenance to verify failure of the device and determine the origin, as well as selecting the appropriate level of maintenance (component level, board level, device or system level) for each situation based on availability of financial, physical and human resources, and the urgency of a particular repair request.
iii. To be aware of the factors affecting equipment failures, which include electrical power issues, interaction of medical devices with other utility systems, physical environmental factors such as temperature and humidity and age and condition of the health-care facility

iv. To carry out adequate reporting actions as planned for IPM and CM procedures

v. To consider safety aspects during implementation of the maintenance programme through:

IV. Decommissioning of medical devices

Decommissioning is the process of condemning equipment when it is no longer safe, or of use, and taking it out of service. This will be centred on the life expectancy of the medical device based on type of equipment and the type of technology as will be detailed in the asset management system.

Strategies:

i. To utilise the asset management system effectively to determine which medical equipment has reached end of its natural life, and which medical equipment need replacing

ii. To establish replacement of medical devices based on proper replacement policy

iii. To establish procedures for:
   a) assessing whether medical equipment has reached the end of life and condemning it
   b) physically disposing of the device safely and promptly
   c) ensuring removal of the medical equipment off the health service records
   d) triggering replacement, so that the provision of service can continue

iv. To arrange regularly for auctioning of viable items or scrap to recover money for the Ministry of Health

v. To ensure that health facilities are able to cope with stocks of condemned equipment and create special storage sites within their grounds

Objective 6: Establish an advanced monitoring and evaluation system for medical equipment and healthcare technology

For a proper system of follow-up and control, the Ministry of Health needs a mechanism to advise on selection, use and evaluation of health technology. Linking knowledge with action is one of the greatest challenges of the global health system. This linkage is often achieved through innovations, which usually start with basic research that is translated into new health technologies. These technologies must be delivered to the system appropriately. Health technology assessment (HTA) provides a basis for priority
setting and informed decision making, and has become a key tool for supporting the core functions of an effective global health system.

**Health Technology Assessment (HTA)** is the systematic evaluation of properties, effects, and/or impacts of health technology. Its chief purpose is to inform technology-related policy-making in health care, and thus improve the uptake of cost-effective new technologies and prevent the uptake of technologies that are of doubtful value for the health system.

Health technology regulation, health technology assessment and health technology management are all linked together and are complementary functions to ensure the appropriate introduction and use of medical devices. The Ministry of Health can rely on health technology assessment to provide a policy approach that is accountable for its decisions to the population. The biggest challenge however is not to find information, but rather to develop the capacity to use HTA information.

---

**Figure 10: Complementary functions enabling the best use of healthcare technology**

---

**Strategies:**

i. To establish a unit of health technology assessment (HTA) within the DMT to provide recommendations on public policies regarding medical devices (based on the needs of the population and the national priorities)

ii. To strengthen the health system by ensuring the central role of evidence-based decision-making, both on the level of service delivery/community intervention as well as for planning and policy-making
iii. To find solutions to lower and balance costs of establishing and maintain HTA functions and capabilities
iv. To develop the appropriate use of HTA by linking it to the resource capacity of the country through
v. To allocate health technology assessment focal points (located in the national research organisation, universities, etc.) for advancing the use of HTA for good governance in policy- and decision-making. The basic role of the HTA focal point would be to develop awareness of health technology assessment and increase the uptake and use of HTA within the country

**Objective 7: Finance medical equipment and healthcare technology**

The pace of health technology development is outpacing the health systems' ability to effectively operationalize it. Health technology and its management are therefore leading priorities for policy makers, all of which rely on adequate financing of healthcare technology. In order to have a smooth, effective system for medical equipment and healthcare technology, the Ministry of Health needs to plan and allocate budgets, as well as follow an appropriate system of financial management (Figure 11).

![Figure 11: Overview of the financial management steps](image)
Synopsis of Strategic Studies

Strategies:

i. To prioritise healthcare technology needs based on the available budget

ii. To translate the operational plan into monetary terms by:
   a) considering the financial resources required for implementation of the operational plan at the national and regional levels
   b) considering the financial resources required for the costs of planned equipment management activities
   c) proper budgeting as a financial planning tool to ensure accurate forecasts of expenditure during operational activities (direct operational expenditure and indirect operational expenditure)

iii. To ensure proper accounting for medical equipment and healthcare technology to assess whether the financial resources have been used efficiently and productively, which will in turn provide financial statements for planning and decision-making

iv. To monitor financial flows using financial monitoring tools such as:
   a) regular and systematic variance reports to identify trends, monitor procedure and prioritise variances to avoid financial constraints and negative operational results
   b) performance ratios to make comparisons year on year, reveal trends in the development of direct and indirect operational expenditure, identify trends in the development of different types of income and measure productivity gains/losses

v. To have a proper system of financial reporting for medical equipment and healthcare technology by communicating results and recommending actions

vi. To effectively make sound financial decisions and take appropriate action based on analysis of funds available, financial management tools, and economic concepts which should be taken into account. This basically involves three steps:
   a) Analysing financial data and making financial decisions
   b) Taking action for the following year and set a realistic and well-studied five-year plan showing population needs and expected price changes due to inflation and other international and local factors
   c) Monitoring progress with financial management activities

vii. To allocate and improve financial resources for capacity development programs in order to better respond to training needs at national and regional levels
Objective 8: Support and promote research and development for medical equipment and healthcare technology innovation

Strategies:

i. To build R&D capabilities needed to drive innovation
   a) transform R&D infrastructure to meet changing healthcare facility needs
   b) attract, motivate and mobilise the best talent
   c) develop innovative products/healthcare technologies that offer benefits over existing therapies

ii. To develop solutions appropriate to the local needs in healthcare technology in the Sultanate of Oman, as well as lessen the dependence on imports

iii. To improve productivity and performance through appropriate research on maintenance and implementation techniques

iv. To support the use of research evidence in developing health policy by:

v. To introduce a progressive approach to disseminate knowledge and skills associated with HTA by:
   a) raising awareness by attending workshops to become familiar with the concept, methods and results of HTA, and participating in HTA and policy networks
   b) improving individuals’ capability in accessing, assessing, applying and contextualising the HTA for the country setting
   c) building self-sufficiency in the knowledge and skills by capacity building with individuals in the country through mentorships, distance education, in-situ graduate study or post-doctoral work

vi. To ensure ethical considerations for medical device R&D by setting guidelines and measures.
REFERENCES

2. ADVAMED (Advanced Medical Technology Association), "What is Medical Technology?". 2009.