



**THE CASE FOR INVESTMENT
IN PREVENTION AND CONTROL OF
NON-COMMUNICABLE DISEASES IN
OMAN**



سلطنة عمان
وزارة الصحة
Sultanate of Oman
Ministry of Health

مجلس الصحة
لدول مجلس التعاون
Gulf Health Council



UN INTERAGENCY
TASK FORCE ON NCDs



@un_ncd



World Health
Organization





THE CASE FOR INVESTMENT IN PREVENTION AND CONTROL OF NON-COMMUNICABLE DISEASES IN OMAN

Prepared by

Ministry of Health Oman
United Nations Development Programme
Gulf Health Council
World Health Organization
Secretariat of the UN Inter-Agency Task Force on NCDs

March 2021



مجلس الصحة
لدول مجلس التعاون
Gulf Health Council



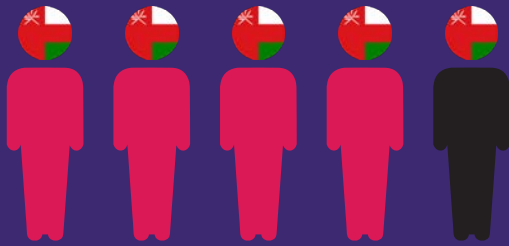
Why invest?



MORE THAN 4,800 OMANIS DIE EVERY YEAR FROM THE FOUR MAIN NON-COMMUNICABLE DISEASES (NCDS). ALL NCDS CAUSE

72%

OF ALL DEATHS IN OMAN.



NEARLY ONE IN FIVE ADULTS ARE DYING FROM NCDS BEFORE THE AGE OF 70.

<70 YEARS



NCDS COST OMAN OMR 1.1 BILLION (US\$ 2.8 BILLION) EVERY YEAR, EQUIVALENT TO

3.59% OF GDP IN 2019.

THIS IS HIGHER THAN THE FORECASTED ECONOMIC CONTRACTION IN OMAN DUE TO COVID-19 (2.8% IN 2020).

OF THE MAIN NCDS,
CARDIOVASCULAR DISEASE CAUSES
THE MOST DEATHS EVERY YEAR...



36%

FOLLOWED BY **CANCER...**



11%

AND **DIABETES.**



8%

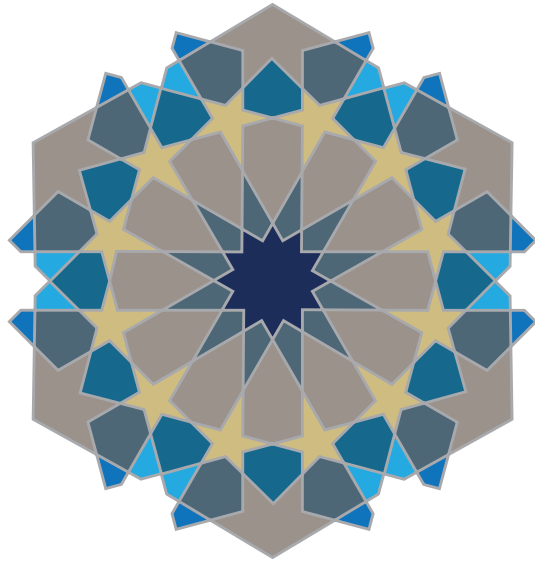
OF ALL DEATHS IN OMAN.

Investing now

IN FOUR POLICY PACKAGES THAT
target salt consumption, tobacco use, and
physical inactivity, and scaling up clinical
interventions that target CVD and diabetes
WILL



OR (US\$ 1.8 BILLION) IN ECONOMIC LOSSES BY **2034**.
THESE ECONOMIC BENEFITS SIGNIFICANTLY OUTWEIGH THE COSTS
(198 MILLION OMR) OF IMPLEMENTATION.



CONTENTS

Acknowledgements	9
Abbreviations	10
Executive summary	11
1. INTRODUCTION	17
<hr/>	
2. NON-COMMUNICABLE DISEASES (NCDs) AND RISK FACTORS IN OMAN	26
<hr/>	
3. SITUATION ANALYSIS	33
Health system and reforms	34
NCD governance	34
Multisectoral coordination	34
Strategy and planning	35
Local government	35
Health financing	36
Implementation status of measures modelled under the investment case	36
<hr/>	
4. METHODS	47
Component 1: Estimating the economic burden of NCDs	49
Component 2: Return on investment analysis	52
Institutional context analysis	54
<hr/>	
5. RESULTS	57
1. Economic burden assessment	58
2. Return on investment analysis	61
3. Twenty-year period extended return on investment analysis	66
<hr/>	
6. CONCLUSION & RECOMMENDATIONS	73
<hr/>	
Annex 1. NCDs and COVID-19	80
Annex 2. Estimated current coverage of NCD interventions to be costed within the OneHealth Tool	83
Annex 3. Health tax modelling	85
Annex 4. Innovative policy solutions to enhance diets in Oman	86
Annex 5. 2017 Joint Programming Mission recommendations and progress	91
<hr/>	
Bibliography	96

DISCLAIMER

© United Nations Development Programme and the World Health Organization, 2021

Some rights reserved. This work is available under the Creative Commons Attribution-NonCommercial-ShareAlike 3.0 IGO licence (CC BY-NC-SA 3.0 IGO; <https://creativecommons.org/licenses/by-nc-sa/3.0/igo>).

Under the terms of this licence, you may copy, redistribute and adapt the work for non-commercial purposes, provided the work is appropriately cited, as indicated below. In any use of this work, there should be no suggestion that WHO or UNDP endorses any specific organization, products or services. The unauthorized use of the WHO or UNDP names or logos is not permitted. If you adapt the work, then you must license your work under the same or equivalent Creative Commons licence. If you create a translation of this work, you should add the following disclaimer along with the suggested citation: "This translation was not created by the World Health Organization (WHO) or the United Nations Development Programme (UNDP). Neither WHO nor UNDP are responsible for the content or accuracy of this translation. The original English edition shall be the binding and authentic edition".

Any mediation relating to disputes arising under the licence shall be conducted in accordance with the mediation rules of the World Intellectual Property Organization (<http://www.wipo.int/amc/en/mediation/rules>).

Suggested citation. Elmusharaf K., Roberts E., Chestnov, R., et al. (2021) Prevention and Control of Non-Communicable Diseases in Oman: The Case for Investment. Geneva: UNDP, WHO, UNIATF, GHC.

Cataloguing-in-Publication (CIP) data. CIP data are available at <http://apps.who.int/iris>.

Sales, rights and licensing. To purchase WHO publications, see <http://apps.who.int/bookorders>. To submit requests and queries on rights and any other licensing arrangements, see <http://www.who.int/about/licensing>.

Third-party materials. If you wish to reuse material from this work that is attributed to a third party, such as tables, figures or images, it is your responsibility to determine whether permission is needed for that reuse and to obtain permission from the copyright holder. The risk of claims resulting from infringement of any third-party-owned component in the work rests solely with the user.

General disclaimers. The designations employed and the presentation of the material in this publication do not imply the expression of any opinion whatsoever on the part of WHO or UNDP concerning the legal status of any country, territory, city or area or of its authorities, or concerning the delimitation of its frontiers or boundaries. Dotted and dashed lines on maps represent approximate border lines for which there may not yet be full agreement.

The mention of specific companies or of certain manufacturers' products does not imply that they are endorsed or recommended by WHO or UNDP in preference to others of a similar nature that are not mentioned. Errors and omissions excepted, the names of proprietary products are distinguished by initial capital letters.

All reasonable precautions have been taken by WHO and UNDP to verify the information contained in this publication. However, the published material is being distributed without warranty of any kind, either expressed or implied. The responsibility for the interpretation and use of the material lies with the reader. In no event shall WHO or UNDP be liable for damages arising from its use.

Graphic design by Zsuzsanna Schreck.

ACKNOWLEDGEMENTS

The authors express their sincere gratitude to the Ministry of Health of Oman, the national team that supported the data collection and analysis and the stakeholders who took the time to be interviewed and share their views during the visit. The contributions of Dr Shadha Al Raisi, Dr Najla Al Lawati, Dr Ali Gharbal, Dr Nada Al Sumri, Dr Jawad Al Lawati, Dr Salima Al Maamari, Dr Huda Al Siyabi, Saleh Al Shammakhi, and Ibtisam Al Ghammari at the Ministry of Health in Oman, are particularly appreciated.

The investment case is made possible by the financial and technical support received from the Gulf Health Council (GHC). GHC representatives provided key contributions by reviewing all deliverables, participating in project planning, and organizing meetings with Omani officials. The publication also greatly benefited from the intensive advice and contributions of Dr Yahya Al Farsi and Nawaf Al Bali, and the overall guidance of Dr Suleiman Aldakheel, all with the GHC. Dr Khalifa Elmusharaf, University of Limerick, carried out the economic analysis assisted by Brian Hutchinson, RTI International. Dr Elmusharaf wrote this report together with Emily Roberts, Roman Chestnov, Johanna Jung, Dr. Elfatih Abdelraheem, Daniel Grafton and Dudley Tarlton of the United Nations Development Programme, Giuseppe Troisi of the UN Interagency Task Force on NCDs and Slim Slama, Ayoub Aljwaldeh, Fatimah El-Awa, and Nasim Pourghazian of the WHO Eastern Mediterranean Regional Office.

The contributions of the WHO Country Office in Oman and the Ministry of Health in organizing the joint UN visit and Oman's ministries and national institutions in providing materials to inform this report are also gratefully acknowledged. The contributions of Dr. Jean Jabbour, WHO Representative for Oman, Dr. Lamia Mahmoud, Public Health Specialist in WHO Oman, and Dr Said al Lamki, Director General of Primary Health Care, are particularly appreciated.

The investment case was conducted under the overall guidance of Dudley Tarlton with the HIV, Health and Development Team, United Nations Development Programme; Slim Slama, Regional Advisor of the Non-communicable Diseases Prevention Programme at the WHO Regional Office for the Eastern Mediterranean; and Nick Banatvala, Head of the Secretariat of the United Nations Inter-Agency Task Force on the Prevention and Control of Non-communicable Diseases.

ABBREVIATIONS

COPD	chronic obstructive pulmonary disease
COVID-19	coronavirus disease
CRD	chronic respiratory diseases
CVD	cardiovascular disease
DALY	disability-adjusted life-year
DSA	designated smoking areas
FAO	Food and Agriculture Organization of the United Nations
GCC	Gulf Cooperation Council
GDP	gross domestic product
GHC	Gulf Health Council
GATS	Global Adult Tobacco Survey
GYTS	Global Youth Tobacco Survey
IMF	International Monetary Fund
MI	myocardial infarction
MOH	Ministry of Health
MPOWER	monitor tobacco use and prevention policies; protect people from tobacco smoke; offer help to quit tobacco use; warn people about the dangers of tobacco; enforce bans on tobacco advertising, promotion and sponsorship; raise taxes on tobacco [WHO package]
NCD	non-communicable disease
NGO	nongovernmental organization
OMR	Omani Rial
STEPS	WHO STEPwise approach to surveillance
UHC	Universal Health Care
UHIP	United Health Insurance Policy
UNDP	United Nations Development Programme
UNFPA	UN Population Fund
UNIATF on NCDs	United Nations Inter-Agency Task Force on Non-communicable Diseases
WHO	World Health Organization

EXECUTIVE SUMMARY

Non-communicable diseases (NCDs) caused 72% of all deaths in Oman in 2017.¹ The premature death, morbidity and disability associated with NCDs are more than a health issue – they negatively affect socio-economic development and long-term fiscal sustainability of government and public services.

Overview

As in many parts of the world, NCDs in Oman are causing a surge in costs expended by the Government to provide healthcare, early retirement benefits, social care and welfare support needs. Moreover, NCDs contribute to reduced economic productivity when people in the workforce die prematurely and work at lower capacity due to illness. NCDs are exacerbated by COVID-19 and vice versa. NCDs and their risk factors – behavioural, environmental and metabolic² – increase, to varying degrees, susceptibility to COVID-19 infection and the likelihood of severe and fatal outcomes. NCDs therefore contribute to worse outcomes from COVID-19 including overwhelmed health systems, which, in turn, threaten to disrupt access to lifesaving NCD services.

This report results from Oman's engagement in 2016 with the United Nations Inter-Agency Task Force on the Prevention and Control of Non-communicable Diseases which concluded with recommended actions to implement the United Nations Political Declaration on NCDs. Oman's Ministry of Health then made it a priority to conduct the NCD investment case presented here, which provides evidence that NCDs reduce economic output and that Oman would benefit from investing in three intervention packages that reduce exposure to behavioural risk factors (tobacco use, unhealthy diet and physical inactivity). It also examines investments in key clinical interventions for the most prevalent NCDs – cardiovascular diseases and diabetes. The findings show that addressing NCDs is a matter of urgency to ensure significant social and economic returns.

Beyond the policy packages modelled, the investment case discusses a range of issues that affect health and sustainable development in Oman. These include air pollution, the food system and urban design (see **Recommendations #2 and #4**), implementation of other cost-effective interventions such as bans on trans-fats and health taxes on sugar (see **Table 2**) and other health-harming products, and integrated responses to NCDs and COVID-19 (see recommendations and **Annex 1**). The policy and clinical interventions analysed in this investment case represent critical first actions needed to fundamentally reverse NCD trends in Oman. The responsibility for action, as well as the benefits that come from it, fall beyond the health sector alone.

1 Total number of deaths due to NCDs from Ministry of Health, 'Facts 2017 from Birth and Death Notification System', 2017. Proportional mortality of NCD deaths adjusted based on the World Health Organization, Oman NCD Country Profile, 2018.

2 This includes metabolic risk factors such as overweight and obesity, behavioural risk factors such as alcohol and tobacco use as well as physical inactivity, and environmental risk factors such as air pollution (Annex 1).

Main findings

1 NCDs cost the Oman economy 1.1 billion OMR (US \$2.8 billion), equivalent to 3.59% of its 2019 GDP.

These annual costs include a) 609,339,498 OMR (US\$ 1.6 billion) in healthcare expenditures, and b) 485,767,070 OMR (US\$ 1.3 billion) in lost productive capacities due to premature mortality, disability, and workplace losses. The productivity losses from current NCDs account for 44% of all NCD-related costs – indicating that NCDs impede development in Oman beyond health. Multisectoral engagement is required for an effective response, and other sectors benefit substantially from supporting NCD investments.

2 Cardiovascular disease had the greatest impact on the economic burden of NCDs in Oman, 65% of the total burden (707 million OMR).

Indirect costs, including reduced workforce participation and loss in national productivity, contributed more than direct healthcare spending to the total CVD burden (58% and 42% respectively).

3 In 2017, more than 4,800 people died in Oman due to the four main NCDs, with 18% dying between the ages of 30 and 70.

In 2017, the leading cause of NCD deaths in Oman was cardiovascular disease, which accounted for an estimated 36% of all deaths in the country, followed by cancer, diabetes and chronic respiratory diseases, which accounted for 11%, 8% and 2% of deaths, respectively.³

3 “Data from Ministry of Health, ‘Facts 2017 from Birth and Death Notification System’, 2017

By acting now, the Government of Oman can reduce the burden of NCDs. The investment case findings demonstrate that investing in four cost-effective and proven policy and intervention packages would, **over the next 15 years (by 2034):**

1

Save 671 million OMR (US\$ 1.8 billion) in economic output losses.

The NCD prevention measures stimulate economic growth by ensuring that fewer people drop out of the workforce due to premature mortality and miss days of work due to disability or sickness.

2

Save 18,724 lives and reduce the incidence of disease.

Enacting the CVD and diabetes clinical intervention package would prevent the most deaths (8,623) followed by the salt reduction package (6,680). More than 90% of the total mortality averted for all interventions would be premature deaths averted (17,258 people <70 years of age).

3

Provide economic benefits 671 million OMR that significantly outweigh the costs (198 million OMR) of implementation.

Each of the best-buy intervention packages is associated with benefits outweighing the costs. Salt reduction has the highest return-on-investment (8.6:1), followed by tobacco control (4.8:1), CVD and diabetes clinical interventions (2.3:1), and diet and physical activity awareness (2:1). An extended 20-year analysis shows that the returns-on-investment continue to increase to 16.6, 10.9, 3.8 and 3.7 for the intervention packages, in the same order as listed above.

Recommendations

1 > Invest and scale-up

Invest in new and scale-up current cost-effective clinical and population-based interventions, enhancing efficiency in the health sector and public sector fiscal sustainability.

4 > Innovate

Implement novel policy approaches and test innovative solutions to increase utilization of existing services and incentivize healthy behaviour.

2 > Leverage fiscal policy

Increase taxes on health-harming products and shift subsidies from health-harming products to health-promoting ones. Reinvest tax revenue into the health sector.

5 > Build back better

Ensure that prevention and control of NCDs is a central element of the COVID-19 response and recovery.

3 > Engage and collaborate

Strengthen multisectoral, whole-of-government and whole-of-society action on NCDs and increase public awareness of NCDs and their risk factors.



'We cannot afford to miss this precious window of opportunity to leapfrog towards SDG target 3.4 for all, with the help of the WHO best buys and other recommended interventions for the prevention and control of NCDs.'

H.E. Dr. Ahmed Mohammed Obaid Al Saidi,
Health Minister of the Sultanate of Oman





INTRODUCTION

This report provides an overview of the current context of NCDs in Oman, describes the model used to estimate the NCD burden and policy benefits, and offers recommendations to improve NCD prevention and control. It discusses current levels and patterns of tobacco and salt consumption, physical inactivity, dietary patterns, and the existing prevalence of metabolic risk factors within the population.

INTRODUCTION

Oman has made considerable steps to improve NCD prevention and control. The Ministry of Health launched a multi-sectoral plan on the prevention and control of NCDs in 2018, aiming at reducing the premature deaths caused by such diseases by 25% by the year 2025. [2] This aligns with the United Nations Sustainable Development Goals target 3.4 to “reduce by one third premature mortality from non-communicable diseases.”[3] Under the Ministry of Health, Oman has organized a Multi-sectoral National Committee for Non-Communicable Diseases to establish cooperation across Ministries and to engage civil society and international non-governmental organisations.

The Joint Mission of the United Nations Inter-Agency Task Force on the Prevention and Control of Non-communicable Diseases (UNIATF on NCDs) to Oman in 2016 found that NCDs cause around 68% of all deaths in Oman; the modelling under this report finds that in 2017, NCDs accounted for 72% of all deaths with the four main NCDs alone – cancer, cardiovascular diseases, diabetes and chronic respiratory diseases – accounting for 57% of deaths. Cardiovascular disease is the leading cause of death in Oman, followed by cancers and diabetes, and nearly one in five adults die from NCDs before the age of 70. [4]

The impact of NCDs on human health is clear, but this is only one part of the story. NCDs also result in high health-care costs as well as productivity losses. When individuals die prematurely, the labour output they would have produced in their remaining working years is lost. In addition, people who have a disease are more likely to miss days of work (absenteeism) or to work at a reduced capacity while at work (presenteeism). NCDs are estimated to cost over US\$ 30 trillion from 2011 to 2030, representing 48% of 2010 global GDP. [5] For individuals and governments, spending to treat health problems that could otherwise have been prevented can mean significant opportunity costs, including reduced investment in education, transport projects or other forms of human or physical capital that can produce long-term returns.

The COVID-19 pandemic is exacerbated by NCDs in Oman as elsewhere, adding to the urgency with which they must be addressed. In response to the pandemic, the Ministry of Health of Oman has provided information and updates on COVID-19 to the public.⁴ NCDs and their risk factors – behavioural, environmental and metabolic⁵ – increase both susceptibility to infection and the likelihood of severe symptoms and death. People living with NCDs are also at risk of adverse health due to disruption of prevention and treatment services for NCDs. The prevention and control of NCDs must therefore be a central element of the COVID-19 response and recovery.

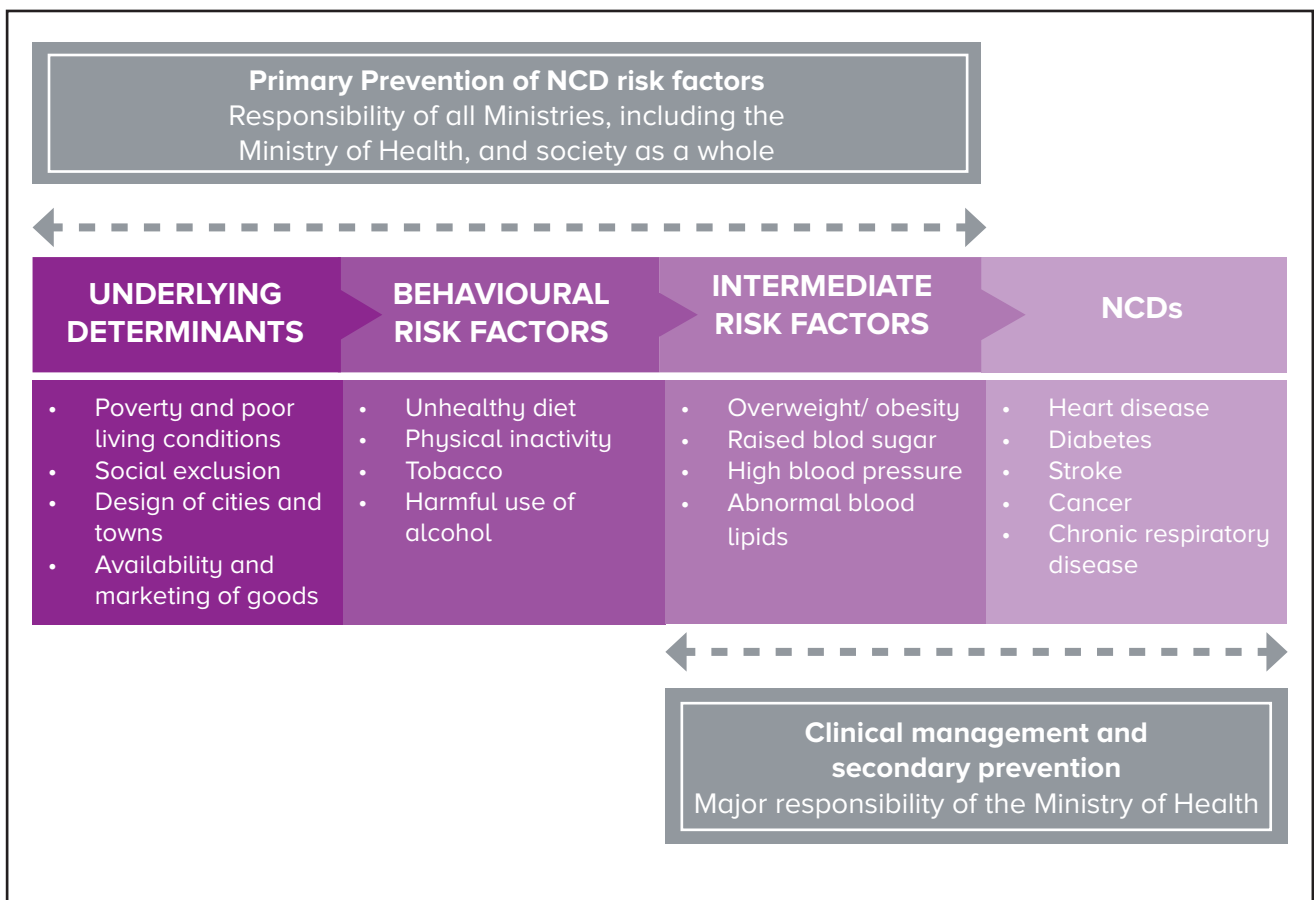
4 The Ministry of Health of the Sultanate of Oman website can be accessed here with updates <https://www.moh.gov.om/en/-/moh-alert-corona-virus-disease-covid-1-2>

5 This includes metabolic risk factors such as overweight and obesity, behavioural risk factors such as alcohol and tobacco use as well as physical inactivity, and environmental risk factors such as air pollution.

Annex 1 discusses interactions between NCDs and COVID-19 with integrated actions the Omani government can take. The 2016 UNIATF visit to Oman resulted in recommended actions in line with the Framework for Action to implement the United Nations Political Declaration on NCDs of the WHO Regional Committee for the Eastern-Mediterranean. **Annex 5** outlines the recommendations made during the 2016 UNIATF visit and Oman’s progress.

High human and economic costs of NCDs highlight the need to reduce their burden in Oman. The risk of developing NCDs can be reduced by modifying four types of behaviour (tobacco use, harmful use of alcohol, unhealthy diet and physical inactivity) and metabolic risk factors such as high blood pressure and cholesterol. According to the World Health Organization, at least 80% of premature heart disease, stroke, and diabetes and 40% of cancers can be prevented by eliminating risk factors. [7] Reducing risk for NCDs is possible through a healthy diet, regular physical activity and avoidance of tobacco products. Reducing people’s exposure to environmental risks, such as outdoor air pollution, can also reduce deaths and disability from NCDs. **Figure 1** illustrates the determinants and risk factors that drive the development of NCDs, many of which are beyond the control of the health sector alone.

Fig. 1. Determinants of NCDs and responsibilities for response



WHO developed a menu of highly cost-effective policy options, referred to as ‘best buys’, and an additional set of cost-effective interventions to assist Member States to reduce the NCD burden. [8] These interventions are laid out under the Global Action Plan for the Prevention and Control of Non-communicable Diseases 2013–2030. These best buys were updated at the 2017 World Health Assembly and include measures to reduce behavioural and metabolic risk factors known to lead to NCDs as well as clinical interventions to prevent and treat disease.

Despite the strong evidence of their cost-effectiveness, WHO best buys remain under-implemented globally. This is partly due to the hidden costs of NCDs (i.e. the economic impact) often being overlooked. Therefore, quantifying the costs of interventions to prevent and control NCDs, as well as their returns on investment, has been a high-priority request from Member States. Investment cases are designed to help countries make their own economic rationale for action to prevent and control NCDs.

The investment case models the health and economic costs of NCDs as well as the potential gains from scaled-up action, over five and 15 years. It compares two scenarios:

1. the **STATUS QUO**, in which no new policies are implemented, and current coverage levels remain in place, and
2. the **INVESTMENT SCENARIO**, where cost-effective policies and clinical interventions are scaled up over the next 15 years.

The investment case estimates the economic and health benefits from implementing the four recommended policy packages over five and 15 years. The analysis uses the WHO OneHealth Tool, an epidemiology-based population model developed by United Nations partners.

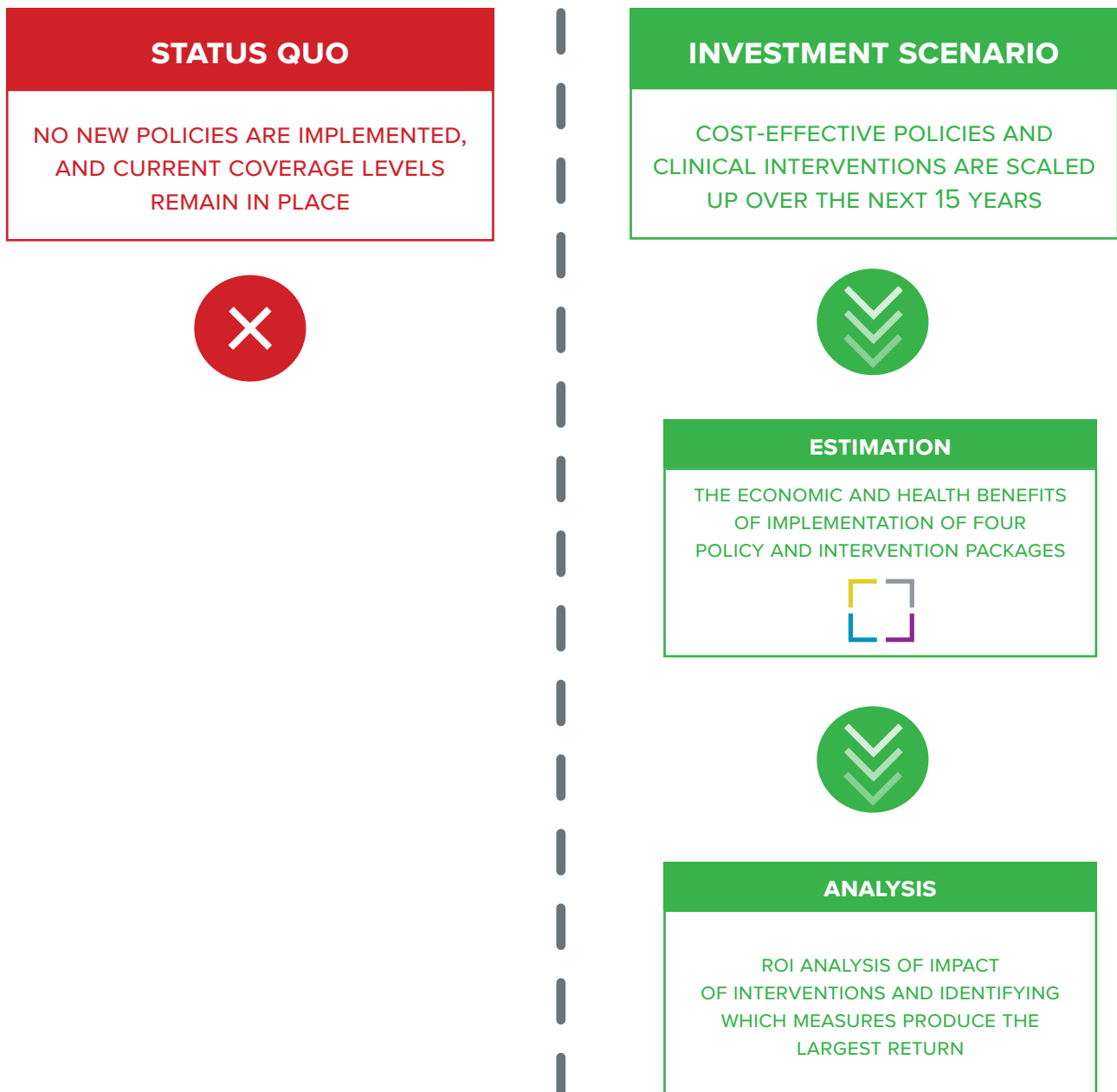


‘Day by day, we gain more knowledge on the crucial relation between communicable diseases and NCDs, and become more insightful regarding new long-term morbidities in those infected with COVID-19. Hence, it is important to leverage this pandemic as a catalyst towards ensuring a multisectoral approach in addressing both communicable and non-communicable diseases.’

H.E. Dr. Ahmed Mohammed Obaid Al Saidi,
Health Minister of the Sultanate of Oman

The investment case model

The investment case models the health and economic costs of NCDs as well as the potential gains from scaled-up action, over five and 15 years. It compares two scenarios:



The investment case identifies which measures can produce the largest health and economic returns for Oman. It analyses the following four packages of interventions and policies:



This report provides an overview of the current context of NCDs in Oman, describes the model used to estimate the NCD burden and policy benefits, and offers recommendations to improve NCD prevention and control. It discusses current levels and patterns of tobacco and salt consumption, physical inactivity and the existing prevalence of metabolic risk factors within the population. The **Situation Analysis** outlines the health system and institutional arrangements in Oman and details the current implementation level of evidence-based policies and clinical interventions. The **Methods** section describes the development of the model, how it estimates the NCD burden and how it predicts the economic and health benefits of policy implementation. The **Results** section describes the outcomes of the model, while the **Conclusion** section further discusses the findings and the recommendation section offers suggestions specific to the context of Oman. The report also includes **five Annexes** to provide further guidance on effective NCD prevention and control measures to support Oman sustain improvements in population health.



'It's therefore not a question of whether countries can afford to implement the best buys, but whether they can afford not to. We have all the pieces to save lives we just have to put them into place. The question is, will we? It's a question we must answer with the decisions we make today, and every day.'

Tedros Adhanom Ghebreyesus,
Director-General, WHO

Photo credit: © Achilli Family via Flickr





NCDS AND RISK FACTORS IN OMAN

This section provides an overview of the most prevalent behavioural risk factors for NCDs in Oman: tobacco use, high salt intake, poor diet and physical inactivity. It also discusses the prevalence of metabolic risk factors, including raised blood pressure, high cholesterol, obesity and diabetes; it reviews environmental risk factors as well.

NCDS AND RISK FACTORS IN OMAN

NCDs and associated risk factors are prevalent in Oman. Most of the population is either overweight or obese (65.5%) and more than a third of the population reports insufficient physical activity. More than half of the population in Oman is not eating enough fruits and vegetables and smoking is seen in around 7% of adults. Metabolic risk factors such as high blood pressure, high cholesterol, high fasting blood glucose and obesity are also common in Oman.⁶

Tobacco use

Tobacco use is one of the major health concerns globally and leads to more than 8 million deaths every year. Tobacco consumption in any form is known to lead to a wide range of diseases and health conditions, including various types of cancer, heart disease, stroke, lung disease, diabetes, and chronic obstructive pulmonary disease (COPD). Based on the results of the NCD risk factors STEPS survey conducted in Oman between January and April 2017, 7.1% of adults in the country (aged 18 and over) smoke tobacco and the majority of them (83%) do so daily. [9] Tobacco use was found to be much higher amongst men than women. Based on the results of the 2017 survey, it stands at 14.3% and 0.5%, respectively.



Photo credit: © Lars Plougmann via Flickr

The 2017 STEPS survey also found that the majority of daily smokers smoke manufactured cigarettes (86%) at an average rate of about 8.6 cigarettes per day. However other forms of tobacco products are also used, including shisha (water pipe); hand-rolled cigarettes; pipes; and cigars, cheroots and cigarillos. [9]

The STEPS survey indicates that the majority of Omani residents start to smoke at the average age of 20 years. Nonetheless, there has been a substantial increase in the number of smokers among Omani youth between 2010 and 2016, as indicated by the results of the

⁶ Although diabetes is a noncommunicable disease itself, it is also a risk factor for other NCDs, such as cardiovascular disease and cancer.

two latest Global Youth Tobacco Surveys (GYTS).⁷ In 2010 around 3.3% of students (13–15 years of age) used tobacco in some form (4.9% of boys and 1.7% of girls); [10] however, by 2016, their number increased to 6.3% (9.2% of boys and 4% of girls). [11] Among the factors likely contributing to a nearly 50% spike are incomplete ban of tobacco advertisement and insufficient awareness raising efforts. Based on the findings of the two GYTS, the exposure to anti-tobacco media messages among the youth decreased from over 81% in 2010 to 63% in 2016, while the reach of tobacco promotion activity remained at about the same level.

Second-hand smoking poses another serious concern. In particular, among youth, the number of children (13–15 years) exposed to second-hand smoke at home stands at close to 12%, and is as high as 39% in the case of outdoor public places. [11]

Physical inactivity

Physical activity is defined as any bodily movement that requires energy expenditure. Physical inactivity (lack of physical activity) has been recognized as the fourth leading risk factor for global mortality, contributing to 6% of deaths globally. Additionally, physical inactivity is projected to be the main cause for approximately 21–25% of breast and colon cancers, 27% of diabetes and 30% of ischemic heart disease. [12]

The 2017 STEPS survey found that 38.3% of the Omani population reported insufficient physical activity (insufficient being less than 150 minutes of exercise per week). Women were less likely to engage in physical activity compared to men, with 50.7% and 71.8% reporting sufficient exercise, respectively. Higher levels of physical inactivity were observed among adolescents. [9] Earlier assessments estimated that up to 80% of adolescents in schools do not physically exercise on a regular basis. [13]



Photo credit: © World Bank via Flickr

Dietary risk factors

Dietary risk factors include but are not limited to high consumption of salt and sugar, consumption of trans-fats, and low consumption of fruits and vegetables.

⁷ The GYTS 2016 & GYTS 2010 factsheets can be accessed here https://nccd.cdc.gov/GTSS/rdPage.aspx?rdReport=OSH_GTSS.ExploreByLocation&rdRequestForwarding=Form

WHO recommends to reduce sugar intake to no more than 10% of total energy intake for both adults and children and suggests a further reduction to 5%.⁸ [14] Oman has a high level of sugar intake, which is particularly prevalent among youth. More than half of adolescents in schools drink at least one soft (sugar-sweetened) drink per day. [13] One 330ml can (standard size) of sugar-sweetened beverage often has more than 30 grams of sugar. Based on FAO estimates, the total daily supply of sugar in Oman was around 64 grams⁹ per capita in 2017, which exceeds the WHO-recommended norm. [15]

Excess salt consumption also poses a severe health risk as it contributes to high blood pressure and increases risk for heart disease and stroke. For these reasons WHO recommends no more than 5g of salt per day. WHO Member States set a goal to reduce the global population's salt intake by 30% by 2025. [16] Based on the results of the 2017 STEP survey, over 25% of the Omani population always or often add salt or salty sauce to their food before eating or as they are eating and over 19% always or often eat processed food that is high in salt. Mean salt intake in the country is estimated at 10 g per person per day which is two times higher than the WHO-recommended norm. [1]

Trans-fats are detrimental to health and should not be consumed or produced in any manner. Consumption of trans-fats is estimated to lead to 500,000 annual deaths globally from cardiovascular disease. In 2018, WHO released a plan to eliminate trans-fats from the food supply. [17] In 2014, Oman had already coordinated a plan to reformulate the nutrition quality of the food chain that included elimination of trans fats in the food supply, in line with WHO recommendations. [18]

WHO recommends 400g of fruits and vegetables per day (five servings). [19] Furthermore, data from the STEPS survey showed that the mean number of servings of fruit and vegetables consumed per day in Oman were 2.2 and 2.5, respectively, with 62.6% consuming less than five servings of fruits and vegetables per day.

Metabolic risk factors

High levels of metabolic risk factors – such as raised blood pressure, raised body mass index (BMI) and raised blood lipid levels – significantly increase the risk of having a cardiovascular event.

The 2017 STEPS survey found that 65.5% of the Omani population is either overweight (35.1%) or obese (30.4%). Around 40% of men are overweight compared to 30% of women, but obesity is more common amongst women, with 39% of women and 23% of men being obese. [9]

High blood pressure and cholesterol levels are similarly prevalent. In 2017, 27.5% of the population had raised blood pressure (33.1% men and 21.5% women) and 34.5% high cholesterol levels (29.5% men and 39.9% women).

8 On a 2,000-calorie daily diet, 10% would be 50g of sugar per day and 5% would be 25g of sugar per day (1 gram of sugar has 4 calories)

9 According to FAO, 23.29 kg of sugar is supplied in Oman per capita per year. This is roughly equivalent to 63.8 g per capita per day. <http://www.fao.org/faostat/en/#data/FBS>

Furthermore, based on the STEPS survey results, diabetes, as defined as raised fasting blood glucose¹⁰ was observed in around 11.5% of adults, with similar rates among males (11%) and females (12%). Out of the six WHO regions, the Eastern Mediterranean Region, of which Oman is part of, had the highest diabetes prevalence in 2014 (13.7%), which is more than 5% higher than the second most prevalent region.¹¹ Diabetes prevalence in the Eastern Mediterranean Region has more than doubled since 1980 when the rate was 5.9%. [20] As overweight and obesity are the strongest risk factors for type 2 diabetes, this puts the 65.5% of the population in Oman that is overweight or obese at higher risk.

Environmental risk factors

Climate conditions: Oman is a tropical desert country with scarce water resources and a climate characterised by very high temperatures. In summer, the heat can easily reach 40 °C in Muscat, which increases the risk of heat-related morbidity and mortality. Particularly vulnerable are people with chronic respiratory conditions, cardiovascular diseases, and people suffering from diabetes. [21] The high yearly temperatures also make Oman a challenging setting for outdoor physical activity, as exercising in the heat puts additional stress on the body.

Ramadan during the summer months poses the need for further health considerations, considering individuals are fasting throughout the day, especially for those working or exercising in the hot weather.

Air pollution: Air pollution is a mixture of pollutants, of which the fine fraction of particulate matter [PM2.5] is the prime concern for health. Increased exposure to air pollution is related to an increased risk for certain NCDs, such as ischaemic heart disease, stroke, chronic obstructive pulmonary disease, and cancer. PM2.5 exposure is strongly associated with mortality and morbidity including impaired lung function in children. It may also affect birth outcomes. [22]

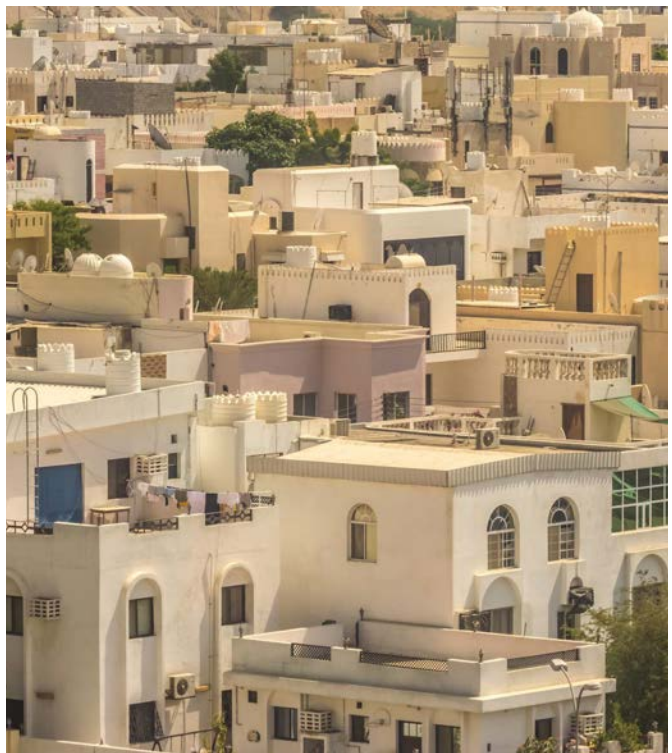


Photo credit: © Andrew Moore via Flickr

10 2017 STEPS survey reported percent of population with fasting blood glucose level ≥ 7.0 mmol/L OR currently on medication for raised blood glucose. Fasting blood glucose levels of 7.0 mmol or more is used as diagnostic criteria for diabetes.

11 The second most prevalent region was the South-East Asia Region with 8.6% of the population having diabetes in 2014.

Available estimates by the WHO indicate that the air quality in Oman is not healthy as the concentration of the PM_{2.5} in both urban and rural areas exceeds the WHO's recommended maximum of 10 µg/m³ by nearly a factor of four. [23] Data from the WHO Platform on Air Quality and Health states that exposure to air pollution kills more than 900 people each year in Oman. [24] The air quality is negatively affected by crude oil production, as well as industrial and transport emissions. This is particularly evident in coastal areas where the combination of high population, industrial concentration and unfavourable natural conditions for pollution dispersal aggravate air pollution problems. [25]

Availability and affordability of nutritious foods: Oman's food security is dependent on imports and citizens' diets have changed rapidly over the past several years, coinciding with Oman's economic development. In the Eastern Mediterranean Region, food consumption patterns have shifted towards more processed foods and animal products, and less fruits and vegetables. This coincides with a decrease in fibre intake and an increased intake in sugar, sodium, and unhealthy fats (saturated fats and trans-fats). [26]

Innovative approaches to support healthy diets such as prohibiting marketing of unhealthy foods to children, increasing food and beverage taxes, and food labelling align with Oman's food system goals and Oman's National policy for Diet, Physical activity and Health. For example, taxes on sugar-sweetened beverages (SSBs) as seen in the UK, [27] taxes on junk food like those seen in Mexico [28] and indicating nutritional facts on food menus as seen in Scotland. [29] Health taxes can help reduce consumption of health-harming products (see **Annex 3**) and innovative approaches to promote healthy eating patterns also include interventions in schools, grocery stores, restaurants and local markets, as well as mass media campaigns (see **Annex 4**).

Urban development: Purposeful urban planning can incentivize people to form healthier habits. For instance, by strengthening access to urban/community gardens and fresh food markets, governments can make it easier for citizens to enjoy balanced and nourishing diets, including fruits and vegetables, and less salt and sugar. [30] The WHO European Healthy Cities "Active City" Framework aims to increase physical activity through mobility systems and built environments which encourage walking and cycling for practical purposes (e.g. work, school and leisure.) [31]

Oman, along with the other GCC states, is one of the most urbanised countries in the Region. Over 85% of Omani population is urban, and this percentage is only expected to grow. Yet, the landscape in many of the country's cities and city districts is not conducive to healthy lifestyles as it is characterised by car-centric infrastructure and lack of safe walking and cycling spaces. This contributes to the burden of NCDs as it discourages physical activity and enforces an increasingly sedentary lifestyle on the population. [32]

Photo credit: © yurawhite via Freepik





3

SITUATION ANALYSIS

This section reviews Oman's institutional and governmental arrangements to combat NCDs and summarizes national efforts to implement WHO-recommended best buy and cost-effective interventions to reduce the burden of NCDs.

HEALTH SYSTEM AND REFORMS

The health system in Oman aims at providing universal health coverage for both nationals and non-nationals. Omani citizens enjoy free access to healthcare offered at public facilities while foreign populations receive subsidized care. The Government owns and/or operates over 80% of all hospitals and employs the majority of the healthcare workforce. [33] Migrants working in Oman are typically covered by employment-based health insurance, yet some may not have health coverage or face barriers in accessing health services. To address this the United Health Insurance Policy (UHIP) was launched in 2017 to introduce mandatory medical insurance aimed to cover 2 million private sector workers including expatriates as well as visitors along with any spouses and children. [34]

The health provider network has received considerable investment from the Government, which resulted in increased number of healthcare facilities [33] and improved accessibility (in particular that of primary healthcare facilities). In 2017, the number of hospital beds per 10,000 people was 14.7, while the number of medical doctors per 10,000 stood at 19.6. [23] This is slightly less than in some other GCC countries, including Kuwait and Saudi Arabia.

NCD GOVERNANCE

Multisectoral coordination

Oman has a Multi-sectoral National Committee for Non-Communicable Diseases, under the guidance of the Undersecretary for Planning Affairs for the Ministry of Health, which works to reinforce the cooperation between related ministries in the area of NCDs including those of Commerce & Industry, Agriculture & Fisheries, Education, Information, Sports Affairs, Regional Municipalities & Water Resources as well as the Supreme Council for Planning. The Supreme Council for Planning also forges links with civil society and international non-governmental organisations. On the regional level, Oman is a member of the Gulf Health Council (GHC) which has a specific committee established to address NCDs, including sub-committees on diabetes, cardiovascular disease and cancer.

The national NCD committee has identified six key strategic action areas aligned with the national NCD strategy including: governance, community mobilization, reorienting health services, building human resources, partnership, and monitoring and evaluation. On the international level, in December 2019, Oman hosted the Global NCD Meeting where 550 delegates from more than one hundred countries were represented and gathered to discuss ways to accelerate progress towards SDG target 3.4.

Strategy and planning

In 2014, the Ministry of Health of Oman adopted a long-term strategy for the country's health, titled "Health Vision 2050" as well as national five-year health development plans. The Health Vision 2050 envisages improvement of financing mechanisms, better coordination and

supervision of the health system, and strengthening of the health services coverage, scope, and quality. It also highlights the importance of promoting healthy lifestyles and acknowledges the high socio-economic burden that NCD risk factors put on Omani population. Among the guiding principles stipulated by the “Health Vision 2050” are universal coverage, rights- and evidence-based approach, quality and efficiency. [35]

Oman also developed, in accordance with WHO recommendations, a national integrated plan for prevention and control of NCDs for the 2016–2025 period. The plan outlines activities and defines objectives in six strategic areas: governance, policy development, and healthcare financing; supportive environment and community mobilization; reorienting health services; development of human resources and individual skills for health; international partnership and cooperation; and national system for monitoring, evaluation, and surveillance of NCDs. [36] Moreover, dedicated NCD strategies include the Oman National Policy for Diet, Physical Activity and Health.; National Strategy for Cancer Control; and the National Non-Communicable Diseases Screening Programme complemented by its operational and management screening guidelines.

Box 1. Update from UNIATF mission (see Annex 5)

During 10–12 of April, 2016 the UN Inter-Agency Task Force on NCDs completed a Joint Programming Mission in Oman. The following agencies participated in the mission: the Food and Agriculture Organization of the UN (FAO), UN Development Programme (UNDP), UN Population Fund (UNFPA), UNICEF and WHO. The Joint Mission met with His Highness Sayyid Fahd bin Mahmood al Said, Deputy Prime Minister for the Council of Ministers, the Ministry of Health, the Parliament of Oman (Majlis Daula and Majlis Shura) and the National Committee on NCDs, as well as NGOs, academic institutions, private sector representatives, and other stakeholders. After the assessment of NCD prevalence, prevention and control measures, UNIATF gave recommendations of action to the Sultanate of Oman. These recommendations are outlined in Annex 5, along with the status of each. In summary, Oman is making considerable improvements scaling up national NCD control. The Sultanate of Oman continuously revisits NCD goals and strategies, updating them to ensure adherence with public health recommendations that will lead to a healthy future for the people of Oman.

Local government

In the past years, Oman has been enacting a decentralisation policy in accordance with the Health Vision 2050 which involves gradual transfer of management and responsibility for regional health services to officials and institutions at the provincial level. The decentralisation is expected to contribute to a higher efficiency of the healthcare system and a more needs-based service design and provision. The National Plan for Prevention and Control of NCDs 2016–2025 also emphasizes community-centric approach to address the risk factors of NCDs.

Health financing

Oman’s current health expenditure totalled 3.85% of GDP in 2017, or around US\$ 588 per year for each citizen. The major share of the health spending came from domestic general government health expenditure which stood at close to 88% of the current health expenditure in 2017 and comprised 7.6% of the general government expenditure. [37] Between 2014 and 2017, there was an increase in the share of out-of-pocket expenditure on health in healthcare financing – from 5.8% to 6.7%. This was likely caused by rising healthcare needs of the population and insufficient coverage of the existing social health protection mechanisms. Both of these issues are addressed in the country’s “Health Vision 2050,” which emphasises the broadening of both the scope of health services provided and the inclusiveness and equity of the health delivery schemes.

The National Plan for Prevention and Control of NCDs 2016–2025 contains provisions for mobilising additional funding sources to support information and awareness-raising activities to combat NCDs and their risk factors.

IMPLEMENTATION STATUS OF MEASURES MODELLED UNDER THE INVESTMENT CASE

Tables 1 and 3 outline current implementation levels of interventions modelled under the investment case. These include WHO-recommended ‘best buys’, or highly-cost-effective measures, as well as some cost-effective measures. The tables draw attention to areas that need to be strengthened and scaled up to achieve 100% coverage.

Table 1. Implementation status of population-based policies and interventions

TOBACCO	
Intervention	<i>Monitor tobacco use/prevention policies</i>
Current state of implementation	Oman has recent and representative data on tobacco use for both adults and youth. A nation-wide STEPS Survey was conducted in 2017, resulting in estimates of current and daily tobacco uses and tobacco smoking among adults and children over 15 years of age. [9]

TOBACCO

Intervention *Protect people from tobacco smoke*

Current state of implementation

Public places have been smoke-free since 2009, with the exception of some cafes which have designated smoking areas (DSAs), which remains a hurdle. Moreover, the ban on smoking in public areas has noted a significant drawback in its implementation regarding waterpipe cafes. Although it is banned by law, municipalities don't enforce the law and create parallel laws to allow waterpipes indoors.

However, a non-profit organisation, the Nizwa Healthy Lifestyle Project, helps develop tobacco prevention plans and is launching an initiative to create smoke-free zones, such as in local markets. [38]

Intervention *Offer to help quit tobacco use: mCessation*

Current state of implementation

The Ministry of Health (MOH) does not offer any cessation services to smokers, though physicians can prescribe nicotine replacement therapy (NRT) as an outside prescription to smokers who are willing to quit smoking. Nevertheless, NRT is available at Sultan Qaboos University Hospital in Muscat. [39]

Intervention *Warn about danger: Warning labels*

Current state of implementation

The law mandates that health warnings appear on cigarette packaging and that the warnings cover at least 50% of the total display area on the front and the back. However, no requirements exist with regards to placing health warnings on the top of the pack. It is further mandated that any warning includes a photograph or a graphic. [40]

Intervention *Warn about danger: Mass media campaign*

Current state of implementation

The WHO NCD Progress Monitor 2020 concluded that Oman does not meet the WHO recommendations with regards to the anti-tobacco mass-media campaigns. [41] There have been no large-scale mass-media campaigns recently.

TOBACCO

Intervention *Enforce bans on tobacco advertising*

Current state of implementation

Bans on advertising, sponsorship, and promotion are partially implemented, according to the WHO NCD Progress Monitor 2020. Advertisement of tobacco products on both national and international television, radio, and newspapers is not allowed in Oman, along with billboard advertisement and advertisement at point of sale. Promotional discounts on tobacco products are also banned. There is also a ban on smokeless tobacco products (chewing and sniffing) and e-cigarettes since 2015.

However, there is no ban on appearance of tobacco products and brands in TV and/or films and no ban on tobacco product display at point of sale. Tobacco sales on the internet and through vending machines are both allowed, and the tobacco industry can sponsor and contribute to events and social activities, which creates opportunities for the tobacco industry to engage in indirect promotion of its products.

Intervention *Enforce youth access restriction*

Current state of implementation

The current law “Activating Bylaw on Regulation of Smoking at Enclosed Places, Art. 9” prohibits the sale of tobacco products to children under the age of 18. [42] At the same time, the existing regulation does not restrict the sale of tobacco products based on location, which implies the possibility of tobacco product distribution near schools, playgrounds, and educational facilities. [43]

Intervention *Raise taxes on tobacco*

Current state of implementation

Excise taxes and price have not been raised to meet the WHO recommended levels. Despite the seemingly high cost, insurance and freight import duty rates (150% on tobacco products), custom duties are fairly low accounting for 12.5% of the retail price, as of June 2019. Taking into account the excise tax, this amounts to total tax share of 62.5% of retail price, as of June 2019, falling short of the 75% recommendation by WHO. Oman imposed an excise tax rate of 100% (on the net-of-tax price and 5% VAT will be applied in the near future based on the sum of the net-of-tax-price and the excise tax) [44] on tobacco products including cigars, cigarettes, cigarillos, water pipe tobacco, and other tobacco products. [45]

Intervention *Plain packaging of tobacco products*

Current state of implementation

Plain packaging of cigarettes is not mandated by law. [40]

PHYSICAL INACTIVITY

Intervention *Awareness campaigns to encourage increased physical activity*

Current state of implementation

According to the WHO NCD Progress Monitor 2020, Oman meets the WHO recommendations regarding public education and awareness raising campaigns on physical activity. The Government of Oman ran a one-year physical activity promotion campaign between 2016 and 2017 under the slogan “Health begins with one step.”[46] Every October, the country also celebrates Oman Physical Activity Day, during which a series of events are held aimed at promoting healthy lifestyles and sports. In addition, the national school health programme is implemented to encourage healthy behaviours among youth. In cooperation with the WHO, the Ministry of Health set a target of decreasing the amount of people that do not partake in sufficient exercise by 10 percent in 2017. Further efforts are needed to improve awareness about the importance of physical activity, in particular among women, as they report higher obesity levels, greater prevalence of sedentary lifestyle, and to overcome any social taboos around women exercising as well.

Intervention *Brief advice as part of routine care*

Current state of implementation

As part of the ninth five-year health development plan, the Directorate of Primary Health Care is focusing on risk factors including physical activity as part of the Strategic Agenda for the Country Cooperation Strategy with the WHO. [47]

SODIUM

Intervention *Surveillance*

Current state of implementation

Oman launched a National Nutrition Survey in 2017 to monitor diets to evaluate the dietary patterns and nutrition status of women of childbearing age and children under 5 years of age. [48] The 2017 STEPS Survey also reported salt intake and salt consumption patterns (such as adding salt to foods and eating processed foods high in salt).

Harness industry for reformulation

Intervention

Current state of implementation

The MOH, in collaboration with the the Oman Flour Mills, one of the main suppliers of bread in the Sultanate, launched voluntary interventions to reduce sodium content in bread items by 20% in 2016. In December 2019, the Omani standard specification for bread was released by the Ministry of Commerce which limits the amount of salt to 5% in flat bread and 1% in other types of bread (e.g. sliced bread, french bread). This is an obligatory standard with fines for violation. [49] The salt reduction interventions were also extended to cheese products. [38] Sodium reduction should be further pursued in order to meet the NCD target of reducing sodium intake by 30% as well as contributing to the 25% reduction in high blood pressure. [50]

SODIUM

Intervention *Adopt standards: front-of-pack labelling*

Current state of implementation

The labelling requirements for food were reported to be minimal in 2014 and did not contain nutritional information. [51]

Intervention *Adopt standards: strategies to combat misleading marketing*

Current state of implementation

According to the WHO NCD Progress Monitor 2020, Oman fully meets the WHO recommendations with regards to restricting marketing to children.

Intervention *Knowledge: education and communication*

Current state of implementation

According to the WHO NCD Progress Monitor 2020, Oman fully meets the WHO recommendations with regards to educating and raising awareness among the population. In 2019, the Ministry of Health signed an agreement with AlJisr Foundation for National Nutrition Awareness campaigns to reduce consumption of salt, sugar and fat.

Intervention *Environment: salt-reduction strategies in community-based eating spaces*

Current state of implementation

A number of locally driven initiatives, such as the Healthy Restaurants Initiative, were undertaken in the past years, under one of which several restaurants have volunteered to pilot locally developed guidelines for healthy food options that are low in salt, fat, and sugar. [52]

In addition, the updated Appendix 3 to WHO's Global Action Plan for the Prevention and Control of Non-communicable Diseases 2013–2020 contains two effective interventions (with cost-effectiveness ratios >100 international dollars per DALY averted in low- and middle-income countries) on trans-fat and sugar, respectively. [53]

Table 2. Current state of policies for trans-fat and sugar in Oman

TRANS-FAT	
Intervention	<i>Eliminate industrial trans-fat by developing legislation to ban their use in the food chain</i>
<p style="background-color: #27ae60; color: white; padding: 2px 5px; margin-bottom: 5px;">Current state of implementation</p> <p>In 2014, the Sultanate of Oman initiated a plan to eliminate trans-fat in the food supply as part of a plan to improve nutrition in the food chain. [18] In 2015 the GCC Standard Organization also released a regulation on trans-fats. [54] No more than 2% of total fat is permitted in oils and margarine spreads and no more than 5% in other foods, including those sold to restaurants. Trans fats are also required to be declared on the nutrition label and the quantity must be identified. The Ministry of Commerce is currently in the process of releasing a ministerial decree to ban importation, production and marketing of partially hydrogenated oil.</p>	
SUGAR	
Intervention	<i>Reduce sugar consumption through effective taxation on sugar-sweetened beverages</i>
<p style="background-color: #27ae60; color: white; padding: 2px 5px; margin-bottom: 5px;">Current state of implementation</p> <p>Effective since October 2020, sugar-sweetened beverages (SSBs) containing any form of sugar or sweeteners are subject to 50% sugar excise tax. [55] This is in addition to the excise tax Oman implemented in June 2019, namely, 100% on energy drinks and a 50% excise tax on carbonated drinks. [45]</p>	

The WHO’s Global Action Plan for the Prevention and Control of Non-communicable Diseases 2013–2020 lists multiple clinical interventions for cardiovascular diseases and diabetes.

Table 3 lists a selection of those most relevant to this analysis included in the modelling.

Table 3. Implementation status of clinical interventions for cardiovascular disease and diabetes

SCREENING	
Intervention	<i>Screening for risk of cardiovascular disease and diabetes</i>
<i>Current state of implementation</i>	
<p>In 2010, the Ministry of Health published the first edition of the Operational and Management Guidelines for the National Non-Communicable Diseases Screening Programme, acknowledging the screening of NCDs as one of the top priorities of the Ministry. Accordingly, Oman runs a national screening programme that targets all Omani citizens aged 40 years and older who were not previously diagnosed with diabetes, hypertension, or chronic kidney diseases. The programme screens for diabetes, hypertension, chronic renal impairment, obesity and hypercholesterolemia. The basic screening procedures have been integrated into the package of services offered at primary health care institutions and a special registration form and electronic module have been introduced for record-keeping purposes. The programme in 2018 reached 31,479 individuals over 40. Patients are invited from the community through the means of advertisement or re-directed from other institutions.</p> <p>However, some surveys found that knowledge levels of NCDs and their risk factors were comparatively low among certain population groups, which is likely to affect the utilization of screening services and adherence to regular screening routine. In particular, one 2012 survey found inadequate knowledge of coronary heart disease among the majority of respondents, [125] while a 2017 survey concerned with measuring awareness and perception of hypertension concluded that the knowledge of symptoms, risk factors, and prevention strategies needs to be improved among females and middle age groups. [57]</p>	
TREATMENT	
Intervention	<i>Treatment for those with high absolute risk of cardiovascular diseases and diabetes (>30%)</i>
<i>Current state of implementation</i>	
<p>According to the WHO NCD Progress Monitor 2020, Oman fully meets the recommendations with regards to the provision of drug therapy/counselling to prevent heart attacks and strokes, as well as guidelines for management of CVD and diabetes. [41]</p> <p>All facilities in Oman have uninterrupted availability of medications for management of diabetes, asthma, hypertension, raised cholesterol, amongst other conditions. There are national guidelines for management of diabetes, hypertension and asthma that are used throughout care and integrates primary, secondary and tertiary care. The Shifa system, an electronic system linked with PHC, records patient information.</p>	

CARDIOVASCULAR DISEASE

Intervention *Treatment of new cases of acute myocardial infarction with aspirin*
Treatment for those with established cerebrovascular disease and post-stroke

Current state of implementation

According to the WHO NCD Oman Country Profile, the number of essential NCD medicines reported as “generally available” in 2017 was 10/10 (the list includes aspirin, statin, angiotensin converting enzyme inhibitor, thiazide diuretic, long-acting calcium channel blocker, metformin, insulin, beta-blocker, bronchodilator and a steroid inhalant). [1]

DIABETES

Intervention *Standard glycaemic control*

Current state of implementation

According to the WHO NCD Oman Country Profile, the number of essential NCD technologies reported as “generally available” in 2017 was 6/6. The list includes blood sugar measurement devices. [1] According to the 2017 STEPS Survey 87.9% of those diagnosed with diabetes were taking prescribed diabetic medications.

The Gulf Executive Plan to Combat Diabetes 2016-2025 includes goals to improve the quality of health services provided to patients with diabetes and to strengthen the means of monitoring and evaluation. [59]

Intervention *Retinopathy and neuropathy screening, and photocoagulation (used to treat retinopathy) and preventive foot care*

Current state of implementation

Under the Operational and Management Guidelines for the National Non-Communicable Disease Screening Programme, Oman implements some primary prevention measures, including the provision of medication for diabetes at Governorate level at no costs. However, there are high patient default rates especially for annual screening among diabetics. Patient compliance for diabetic retinopathy screening needs to be improved and follow-up management needs to be strengthened to help reduce the burden of diabetic eye complications. [60]

For diabetic neuropathy, regional diabetic foot care initiatives have been established, such as the Gulf Diabetic Foot Working Group. [61]



‘The clock is ticking. We must act now to achieve SDG target 3.4 by 2030 with the help of all.’

H.E. Dr. Ahmed Mohammed Obaid Al Saidi,
Health Minister of the Sultanate of Oman

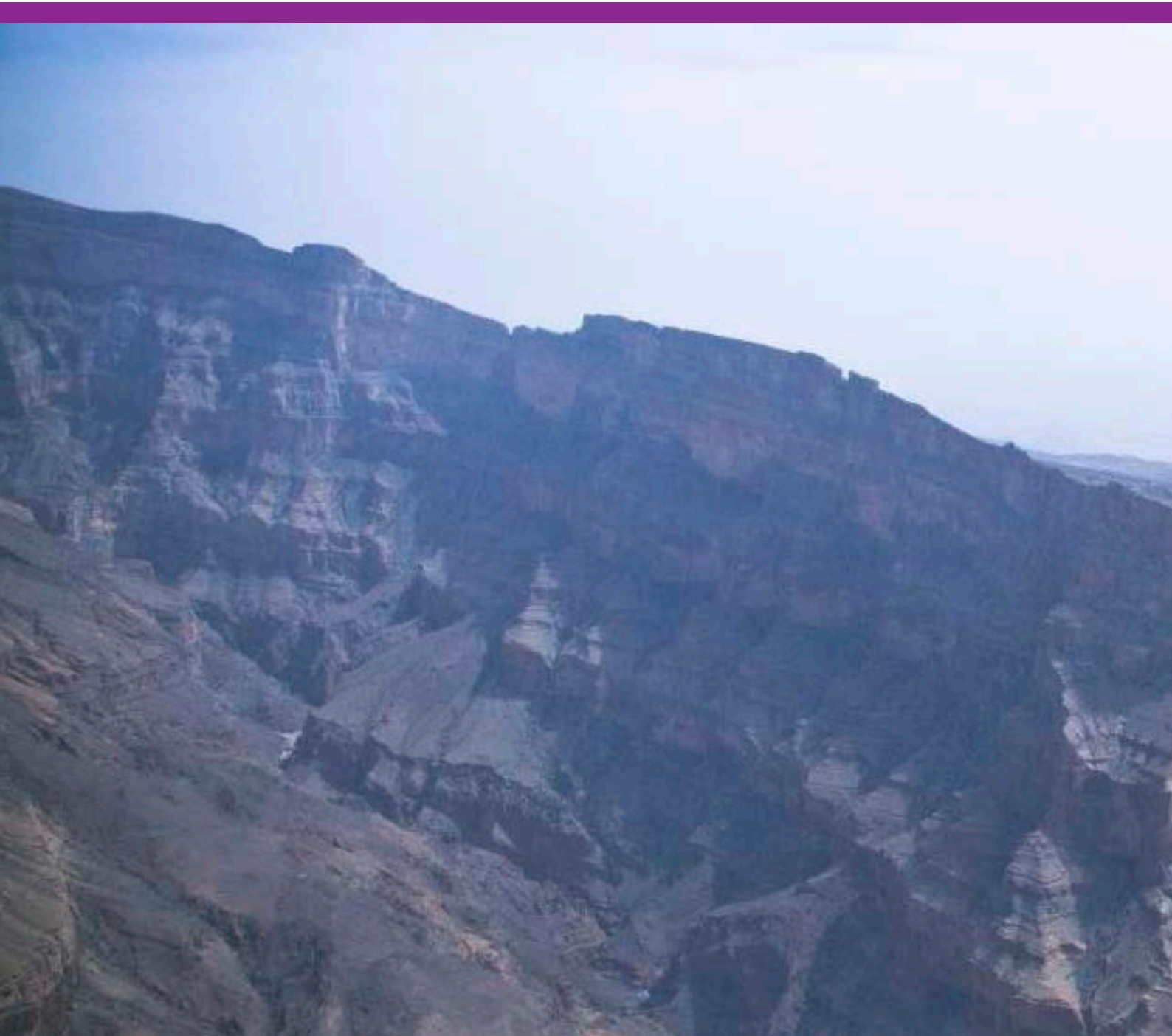


Photo credit: © Omar Chatriwala via Flickr





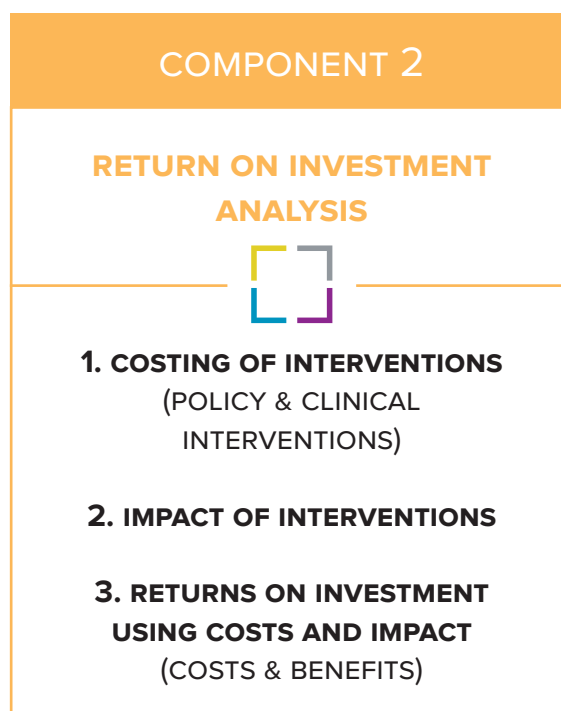
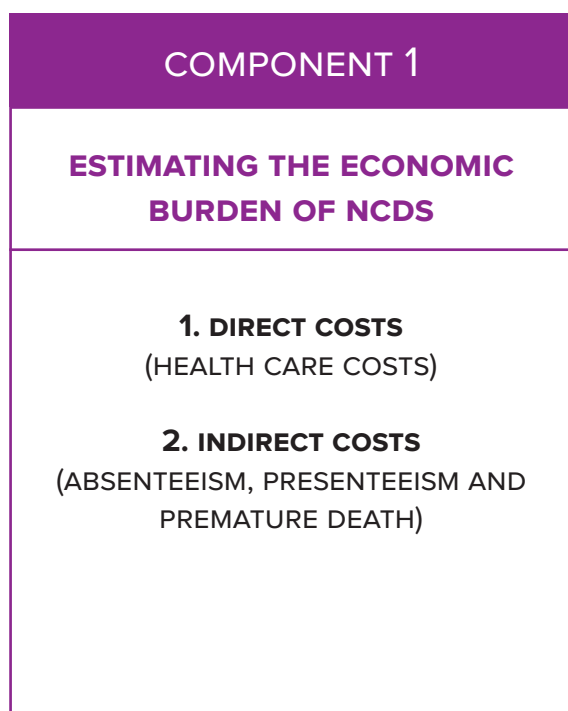
METHODS

This section outlines the different methods and economic models applied at different stages of the economic analysis.

A multiagency, multidisciplinary team comprising staff from the United Nations Development Programme, the World Health Organization, the UN Interagency Task Force on NCDs, the Gulf Health Council and the Ministry of Health undertook data collection and analysis in Qatar to complete the NCD investment case modelling, which was complemented by an institutional and context analysis. The team consisted of health economists, epidemiologists and social development and public health experts. Intensive follow up (described below) was undertaken to collect, validate and analyze the data.

The approach consisted of a desk review of materials, interviews with policy-makers across sectors and institutions, and collation and analysis of data. Further data analysis took place over subsequent months. This NCD investment case is one of six to be carried out in Gulf Cooperation Council Countries during 2019–2021. The work also benefited from a peer review and a methodological review by Research Triangle Institute International, as well as a quality assurance review by David Tordrup (Triangulate Health Ltd).

Economic analysis



Component 1: Estimating the economic burden of NCDs

The starting point for the investment case is doing an analysis to determine the current and projected economic burden of NCDs. This requires assessing both the direct and indirect costs of NCDs using a cost of illness approach. The cost of illness component reveals the extent to which NCDs are affecting Oman economic growth, by calculating the cost of illness which was lost due to NCDs in 2019. Direct and indirect costs are calculated independently of each other, and then added to calculate the total cost of NCDs to Oman economy. WHO and the United Nations Development Programme developed the NCD economic burden model, which provides estimates of the current direct and indirect costs of NCDs.

a. Calculating the direct costs

Direct costs are those in the health system. These are represented by government and private health spending on medical staff salaries, equipment and procedures such as diagnosis and distribution of treatment for cardiovascular diseases, cancers, diabetes mellitus, and chronic respiratory diseases. The total health expenditure on each of these four NCDs was calculated by multiplying the estimated average medical cost per patient by the estimated number of patients using the health services, both inpatient and outpatient. The average medical cost per patient for each of the four NCDs include the cost of consultations, diagnostics, and medications and it was estimated based on the local, regional and international literature and adjusted to current prices using the Oman consumer price index. The number of patients using the health services was estimated based on the annual health statistics, Oman Ministry of Health, 2018 (Table 4).

Table 4. Data used for calculating the direct costs of NCDs in Oman in 2019

NCDs	Average cost per patient in 2019*		Estimated number of patients using the health services in Oman in 2019	
	Cost OMR	Data source	Number	Data source
Diabetes	1,264	(Rabha, 2019)	135,255	Health statistics, Oman MOH, 2018
Cardiovascular disease	2,616	(Bahrain estimation used proxy for Oman, 2016)	99,544	Health statistics, Oman MOH, 2018
Cancer	4,566	Oman local data, 2015) ¹²	4,464	Health statistics, Oman MOH, 2018
Chronic respiratory disease	871	(Guarascio, 2013)	99,097	Health statistics, Oman MOH, 2018

Sources: [62] – [64]

*Includes inpatient and outpatient services

12 <https://gulfnews.com/world/gulf/oman/oman-spent-more-than-dh5724m-on-cancer-medicine-in-2015-1.1675885>

b. Calculating the indirect costs

In our analysis, indirect costs are those associated with reduced workforce participation and the resulting reduction in national productivity, i.e. the costs of absenteeism, reduced capacity at work, i.e. presenteeism, and the economic losses due to premature deaths caused by NCDs. These costs were computed with the human capital approach. The indirect costs were computed as follows:

Missed working days and working at reduced capacity

In this section, we detail the methods used to estimate the productivity losses due to absenteeism (missed working days) and presenteeism (working at reduced capacity) due to NCDs with the human capital approach. The fraction of the workforce in Oman with NCDs was estimated by applying the prevalence rates of the diseases to population figures and relevant economic indicators, such as unemployment rates and labour force participation rates. Then, the number of unproductive days worked was determined by applying rates of productivity loss derived from the academic literature.

The lost economic output to the Oman economy as a consequence of absenteeism and presenteeism was estimated as described below:

- ^ First, we estimated the number of people of working age (15–64 years) with NCDs based on data collected from Oman Statistical yearbook 2019, Oman Ministry of Health statistics, 2018, Oman STEPS survey 2017, and estimates from the Institute for Health Metrics and Evaluation.
- ^ We then multiplied the size of the working-age population with NCDs by the rate of participation in the labour force and employment to determine the prevalence of NCDs in workers. Similarly, the number of deaths from NCDs was multiplied by the rate of participation in the labour force and employment to estimate the number of workers who died from NCDs. The number of deaths was subtracted from the number of workers with prevalent NCDs to estimate the number of workers who survived despite their illness.
- ^ The figures for productivity losses associated with specific diseases (**Table 5**) were multiplied by the number of surviving workers to estimate the total number of unproductive days that resulted from NCDs.
- ^ In the final step, GDP per worker was multiplied by the total number of unproductive working days.

Table 5. Rates of absenteeism and presenteeism due to common health complications associated with the four main NCDs

	Absenteeism rate* Reduction in working days (%)	Presenteeism rate Working at reduced capacity	Labour force participation rate reduction
Hypertension	0.6% (Mitchell RJ, 2011)	3.7% (Wang PS, 2003)	2% (Barnay, 2006)
Stroke	6.3% (Mitchell RJ, 2011)	3.7% (Wang PS, 2003)	18% (Barnay, 2006)
Acute MI	1.3% (Mitchell RJ, 2011)	3.7% (Wang PS, 2003)	11% (Barnay, 2006)
Diabetes	0.3% (Salman, 2019)	0.5% (Bommer C, 2017)	10% (Barnay, 2006)

*Based on the number of days worked per year in Oman (212 days)

Sources: [65] – [69]

Premature deaths (before the age of 70)

The loss of GDP due to premature death of workers was estimated by using the human capital approach. This assumes that forgone economic output is equivalent to the total output that would have been generated by workers through their life until reaching retirement age. In this method, all future potential income lost by a worker who dies during his or her working lifetime is calculated from the number of working years lost between the age at death and the age at which the deceased employee would have reached the average retirement age. Productivity losses due to premature deaths were calculated as the product of the total working years lost in all age groups multiplied by the labour force participation rate, age-specific employment rate and GDP per worker.

The total number of deaths was based on information from the Oman Birth and Death Notification System in 2017. The proportional mortality due to NCDs was adjusted based on the WHO NCD Country Profile, 2018. Distribution by age groups and gender was based on Institute for Health Metrics and Evaluation (IHME) 2017 estimations.

Component 2: Return on investment (ROI) analysis

Step 1: Estimating the costs of policy and clinical interventions

The return on investment is a performance measure used to evaluate the efficiency of health care investment. It compares the magnitude and timing of benefits from health interventions directly with the magnitude and timing of investment costs. The return on investment is the ratio of the discounted (present) value of the benefits to the investment costs. Future benefits are discounted since a unit of currency in the future is worth less than a unit today owing to the time value of money.

A return on investment analysis, based on a spreadsheet model developed by WHO, provided estimates of the economic gains that accrue from investing in the set of cost-effective interventions analyzed. The method used is the NCD return on investment model developed in 2015 for use by the UNDP/WHO Joint Programme on NCD Governance, using the OneHealth Tool and WHO Costing Tool. More detail on the use of these tools is available from the OneHealth Tool Manual [70] and is discussed in detail in the UNDP/WHO guidance note for investment cases for preventing and controlling NCDs. [71]

Costs of policy and clinical interventions were calculated using the WHO Costing Tool for NCD prevention and control. This identifies, quantifies and values each resource required for the intervention as follows:

- ^ For each policy intervention, the WHO Costing Tool costs human resources, training, external meetings, mass-media campaigns (e.g. television and radio time, newspaper ads) and other miscellaneous equipment needed to enact policies and programmes.
- ^ Each policy intervention contains assumptions, set by WHO experts, about the quantity of inputs required to implement and enforce it – the Tool estimates the quantity of resources needed at the national, regional and district levels.
- ^ The costs of clinical interventions were calculated using the WHO Costing Tool, which has built-in functionality that works out expected costs of clinical interventions.
- ^ For each clinical intervention, the WHO Costing Tool estimates the cost of primary care visits, ancillary care visits, lab and diagnostic tests, and drugs for the total number of NCD cases expected to be covered each year.
- ^ Current and target coverage of clinical interventions was estimated based on the WHO estimated value in the WHO database. In general, current coverage was estimated to be 5% and expected to reach 80% by 15 years. [126]
- ^ For each clinical intervention, the WHO Costing Tool considers input data points such as the salaries of medical staff and the quantities of drugs and supplies needed, as well as their prices.

- ^ Each clinical intervention contains assumptions, set by WHO experts, about the quantity of inputs required to provide it. The unit costs for resource items are taken from the WHO-CHOICE database and from available local data.
- ^ In the absence of local data, default data based on global estimates was used for the computations.

Step 2: Estimating the impact of interventions

To determine the overall impact of the set of interventions in terms of productivity measures were assessed using the following steps:

- ^ The One Health Tool was used to assess the benefits of implementing and scaling up policy and clinical interventions by modelling the number of disease cases averted, healthy life-years gained, and lives saved over 15 years. Local data from the STEPS in Oman fed into the tool to determine the prevalence of risk factors disaggregated by age and gender.
- ^ Data on the amount by which NCDs reduce worker productivity were incorporated, as noted for the NCD economic burden model. Since interventions reduce the projected incidence of ischemic heart disease and stroke, there is an associated increase in the number of healthy life-years of the population.
- ^ By considering the increase in healthy life-years, GDP per employed person and the reduction in rates for absenteeism and presenteeism, an increase in GDP can be determined, attributed to the value of avoided absenteeism and presenteeism.
- ^ By considering the labour force participation rate in Oman and the projected number of deaths avoided, the increase in labour force participation resulting from avoided deaths was calculated. An increase in economic output was therefore attributed to the value of avoided mortality.
- ^ The projected economic gains from implementing the cost-effective interventions were therefore the value of avoided presenteeism, the value of avoided absenteeism and the value of avoided mortality.
- ^ Following Stenberg et al, [72] we estimated the social benefit of improved health by applying a value of 0.5 times GDP per capita to each healthy life-year gained from the interventions to estimate the intrinsic value of longevity. We used the net present value approach to future social value, with 3% discounting.

Step 3: Calculating the returns on investment

The return on investment for Oman was reached by comparing the impact of the interventions with the total costs of setting up and implementing the interventions. This was calculated using the net present value approach to future costs and economic gains, with 3% discounting.

Institutional context analysis

The economic analysis was complemented by an institutional context analysis conducted by the Investment Case team during a UN mission to Oman during 24–27 February 2020. The institutional context analysis was based on discussions with representatives of the following institutions:

- ^ Ministry of Health
- ^ Ministry of Education
- ^ Ministry of Commerce
- ^ National Center of Information and Statistics
- ^ Ministry of Municipalities
- ^ MOH's Centre of Studies & Research
- ^ WHO in Oman
- ^ Shura council
- ^ State council

During these meetings, members discussed NCD prevalence and risk factors, as well as current prevention and control measures in Oman. Additional discussions included how NCDs impact the Oman Health Vision 2050, as well as the National Multisectoral Plan on NCDs and the roles of various sectors and stakeholders in supporting a strengthened whole-of-government NCD response in the Sultanate of Oman and implementing investment case findings. The valuable insights gained from these discussions are incorporated throughout this report and informed its findings and conclusions.

Photo credit: © Marc Veraart via Flickr





RESULTS

This section assesses the economic burden of NCDs before summarizing the component parts of the return on investment analysis – including health benefits, economic benefits and total costs – and discussing the return on investment for each package of interventions.

1. Economic burden assessment

a. Direct costs

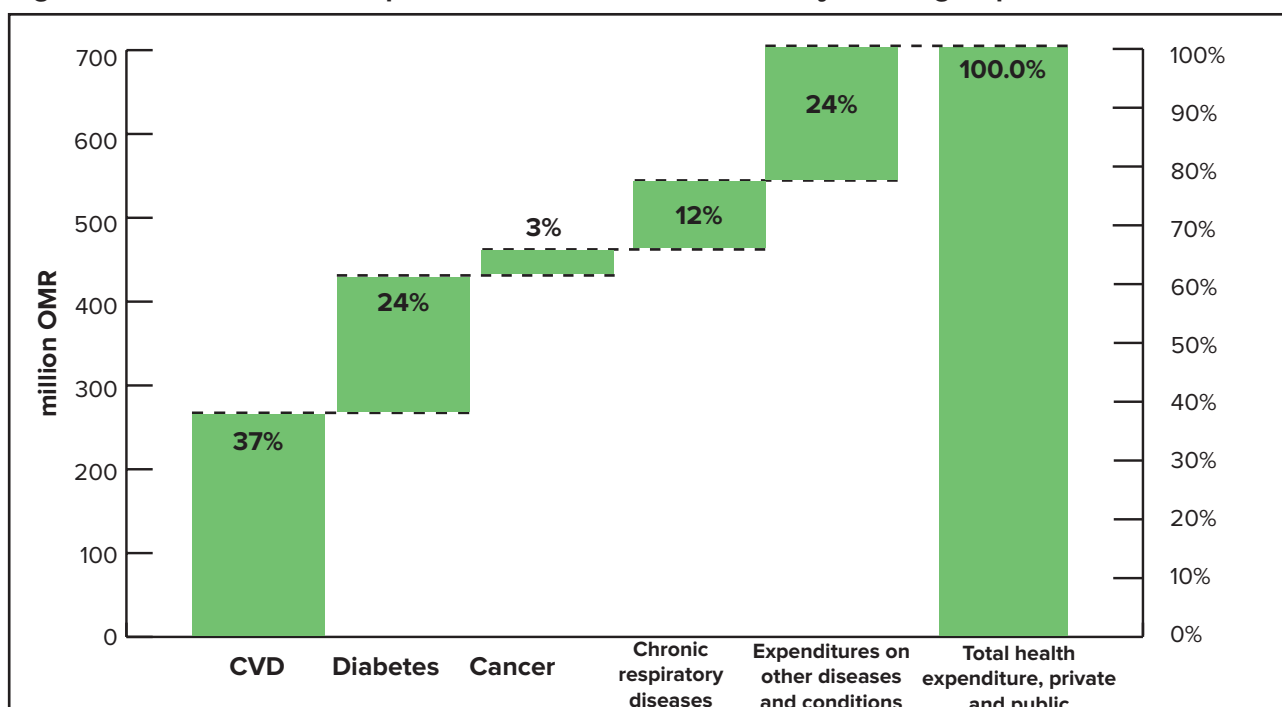
The estimate of the direct costs of the economic burden considered the total health expenditure which includes the government health-care expenditure and the private health-care expenditure (out-of-pocket, voluntary and other health insurance schemes), and excluded non-health care costs such as transport.

Total healthcare expenditures for Oman in 2018 was 801,392,978 OMR (US\$ 2.1 billion). Government health expenditure was 707,630,000 OMR (US\$ 1.87 billion) and accounted for 88.3% of the total healthcare expenditures.

National Health Account data in Oman are not available at the disease subgroup account level by NCD. Our estimates suggest that the government spent 538,046,777 OMR (US\$ 1.4 billion) on the four major NCD groups under study, so that more than 76% of all government health expenditure is attributable to the four disease groups. We estimated that private healthcare costs of the four major NCD is 71,292,721 OMR (USD 200 million). The total healthcare expenditures on these four major NCD groups is 609,339,498 OMR (US\$ 1.6 billion). This proportion is quite different from other international estimates which, based on average numbers from nine countries, found that the four major NCDs were responsible for 30% of health care expenditure. [73]

CVD accounted for the major share (36.8% of total health expenditure in Oman in 2019), at 294,891,556 OMR (US\$ 776 million), followed by diabetes which accounted for 24.2% of total health expenditure, at 193,614,687 OMR (US\$ 510 million). Total spending on chronic respiratory diseases and cancers was estimated at 97,750,666 OMR (US\$ 257 million) (12.2%), and 23,082,588 OMR (US\$ 60 million) (2.9%), respectively.

Fig. 2. Oman Total Health Expenditure in 2019 on the four major NCD groups



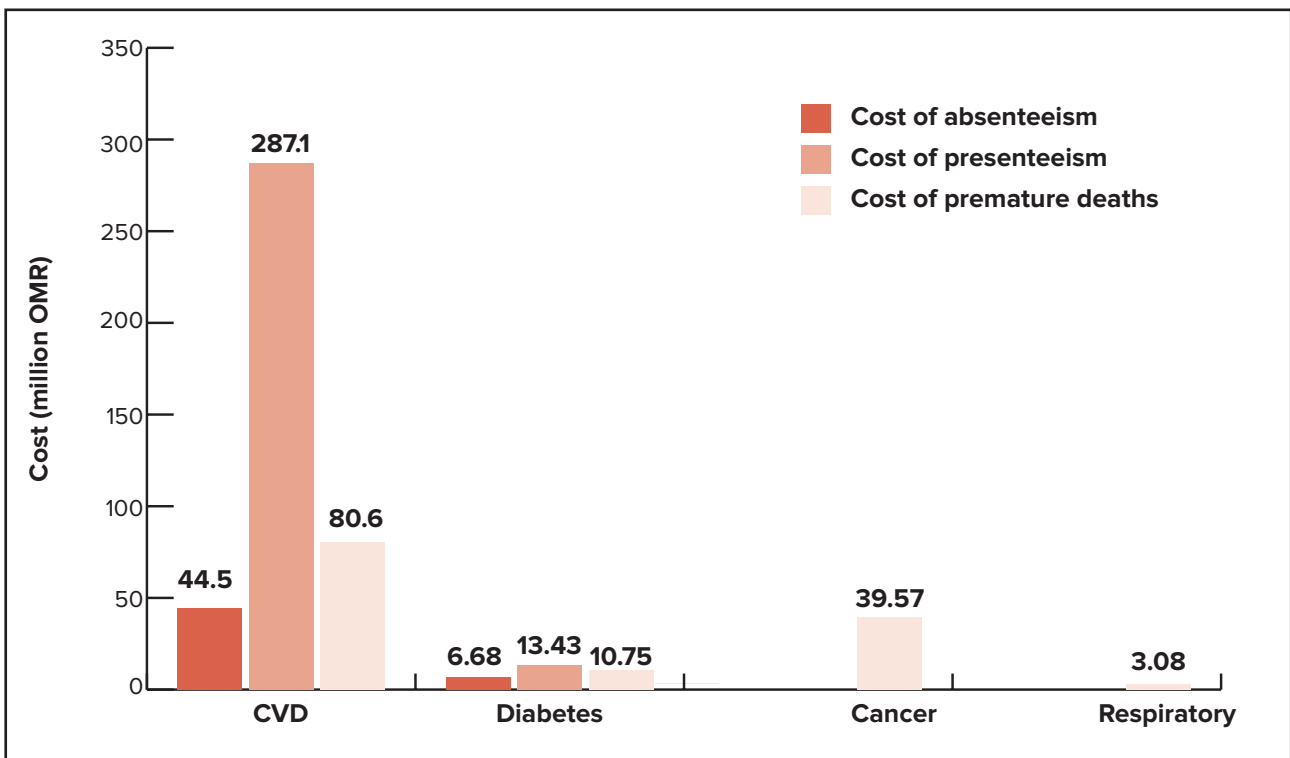
b. Indirect costs

For Oman, indirect economic losses caused by NCDs were modelled from reduced labour force participation, increased absenteeism and presenteeism and losses caused by premature death.

The calculation of absenteeism and presenteeism is based on the surviving workforce. **Figure 3** shows the results for 2019. They could only be calculated for cardiovascular diseases and for diabetes because data are lacking on the impact of cancer and chronic respiratory diseases for these parameters. The cost of absenteeism resulting from cardiovascular diseases was an estimated 44,477,122 OMR (US\$ 117 million). For presenteeism, the corresponding calculation found that the burden is 287,122,928 OMR (US\$ 756 million). For diabetes, the cost of absenteeism was an estimated 6,684,184 OMR (US\$ 18 million). For presenteeism, the corresponding calculation found that the burden is 13,429,134 OMR (US\$ 35 million).

The cost of premature deaths was computed by considering the total output that would have been generated by workers during their lives before retirement. The total cost of premature deaths was estimated to be 134,053,703 (US\$ 353 million). The loss was the highest for cardiovascular diseases, at 80,642,651 OMR, followed by cancer, at 39,574,966 OMR.

Fig. 3. Cost of absenteeism, presenteeism and premature death due to NCDs in Oman, 2019

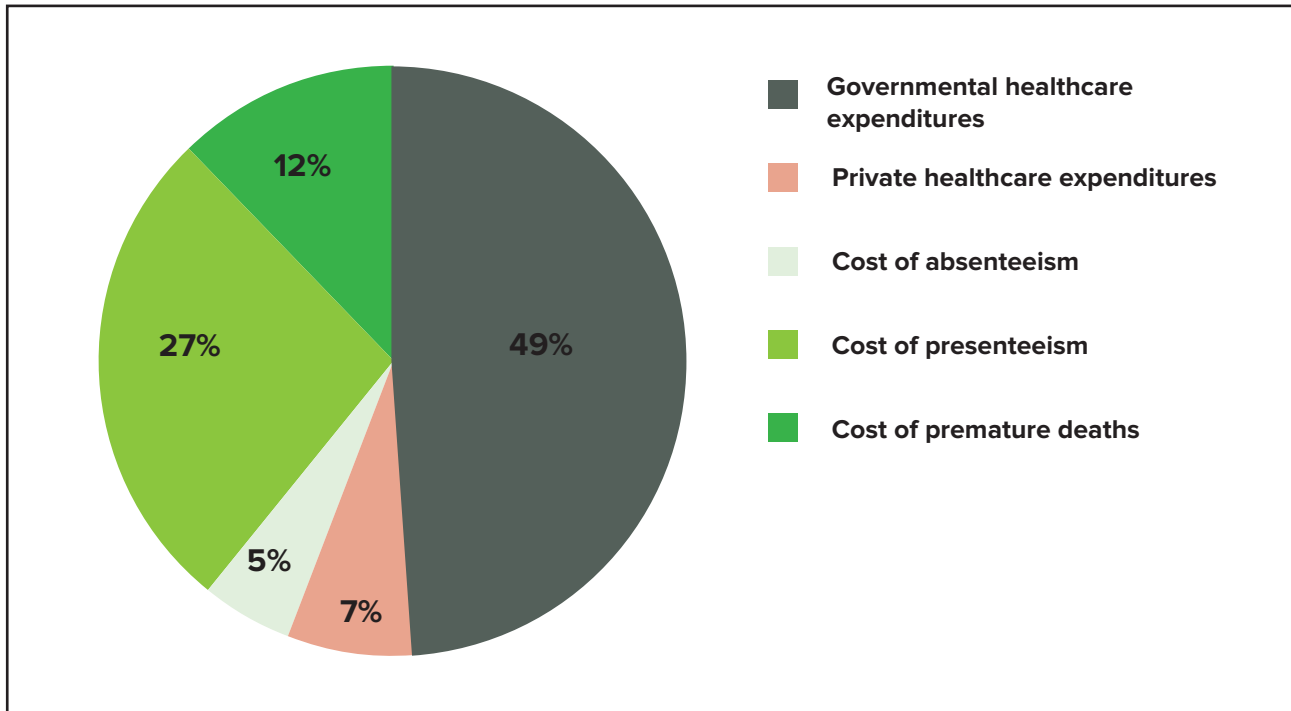


c. Total economic costs

Table 6 summarizes the total direct and indirect costs of NCDs in Oman. The total health care spending on the four main NCDs in 2019 was already 609,339,498 OMR (US\$ 1.6 billion) but additional losses to the economy (absenteeism, presenteeism, premature deaths) brought the total economic burden of NCDs to 1,095,106,568 OMR (US\$ 2.9 billion), of which 55.6% was direct costs and 44.4% indirect costs. This would be even larger if the costs of absenteeism and presenteeism could be estimated for cancer and chronic respiratory diseases. The estimated total burden of NCDs on the economy of Oman is equivalent to 3.59% of GDP in 2019.

Table 6. Economic burden of NCDs in Oman in 2019, Omani Riyal

Cost	Cardiovascular diseases	Diabetes	Cancer	Chronic respiratory diseases	Total	Per GDP
Direct cost						
Government	260,389,244	170,961,769	20,381,925	86,313,838	538,046,777	1.77%
Private	34,502,312	22,652,918	2,700,663	11,436,828	71,292,721	0.23%
Total direct cost	294,891,556	193,614,687	23,082,588	97,750,666	609,339,498	2%
Indirect cost						
Absenteeism	44,477,122	6,684,184	No data	No data	51,161,306	0.17%
Presenteeism	287,122,928	13,429,134	No data	No data	300,552,062	0.99%
Premature death	80,642,651	10,754,805	39,574,966	3,081,281	134,053,703	0.44%
Total indirect cost	412,242,701	30,868,122	39,574,966	3,081,281	485,767,070	1.59%
Total burden	707,134,257	224,482,810	62,657,554	100,831,947	1,095,106,568	3.59%

Fig. 4. Structure of the economic burden of NCDs in Oman, 2019

2. Return on investment analysis

a. Costs of intervention

The costs of intervention were estimated for the period 2020–2034. **Table 7** shows the costs for each of the first five years of this period and the five-year and 15-year totals.

The cardiovascular disease clinical interventions produced the largest estimated costs. Treating people who have cardiovascular diseases and diabetes costs 1,174,746 OMR (US\$ 3 million) in the baseline year and increases to 6,429,652 OMR (US\$ 17 million) in 2024. Implementing the entire cardiovascular disease and diabetes clinical intervention package over the five-year scale-up period would cost 19,143,647 OMR (US\$ 50 million).

The total costs for the tobacco package based on MPOWER guidelines are 5,861,394 OMR (US\$ 15.2 million) for five years and 16,089,977 OMR (US\$ 42 million) for 15 years. The physical activity awareness interventions would cost an estimated 7,058,799 OMR (US\$ 18 million) in five years and the salt reduction package, 12,786,481 OMR (US\$ 33 million).

Table 7. Estimated costs of policy and clinical interventions, 2020–2034, Omani Riyal

Intervention package	2020	2021	2022	2023	2024	Total for 5 years	Total for 15 years
Policy interventions							
Tobacco control	1,249,402	1,195,651	1,105,252	1,205,837	1,105,252	5,861,394	16,089,977
Salt reduction	2,990,120	2,558,026	2,449,090	2,394,622	2,394,622	12,786,481	37,161,146
Diet and physical activity awareness	959,360	1,433,309	1,470,382	1,550,597	1,645,151	7,058,799	33,706,155
Clinical interventions							
CVD and diabetes clinical intervention	1,174,746	2,508,794	3,858,100	5,172,354	6,429,652	19,143,647	168,649,137
Total	6,373,629	7,695,780	8,882,824	10,323,409	11,574,678	44,850,320	255,606,414

b. Health benefits

All interventions significantly reduce the number of lives lost to causes related to cardiovascular diseases over 15 years (**Table 8**). Cardiovascular disease and diabetes clinical interventions and salt interventions have the greatest impact in terms of mortality averted (8,623 and 6,680 lives saved, respectively), followed by tobacco interventions (1,862 lives saved) and diet and physical activity awareness (1,559 lives saved). More than 92% of deaths averted are premature deaths (<70 years).

Each set of interventions also adds healthy life-years to the population. The cardiovascular disease clinical interventions and tobacco and salt reduction packages prevent strokes and cardiovascular events, and thus individuals avoid disabling states (such as partial paralysis from stroke) that can increase pain and suffering, reduce mobility and impair speech and thought. Thus, the largest gains in healthy life-years are achieved with the salt reduction intervention (49,803 healthy life-years gained), the cardiovascular disease and diabetes clinical interventions (44,313 healthy life-years gained), the tobacco interventions (12,292 healthy life-years gained), and the diet and physical activity awareness interventions (10,566 healthy life-years gained).

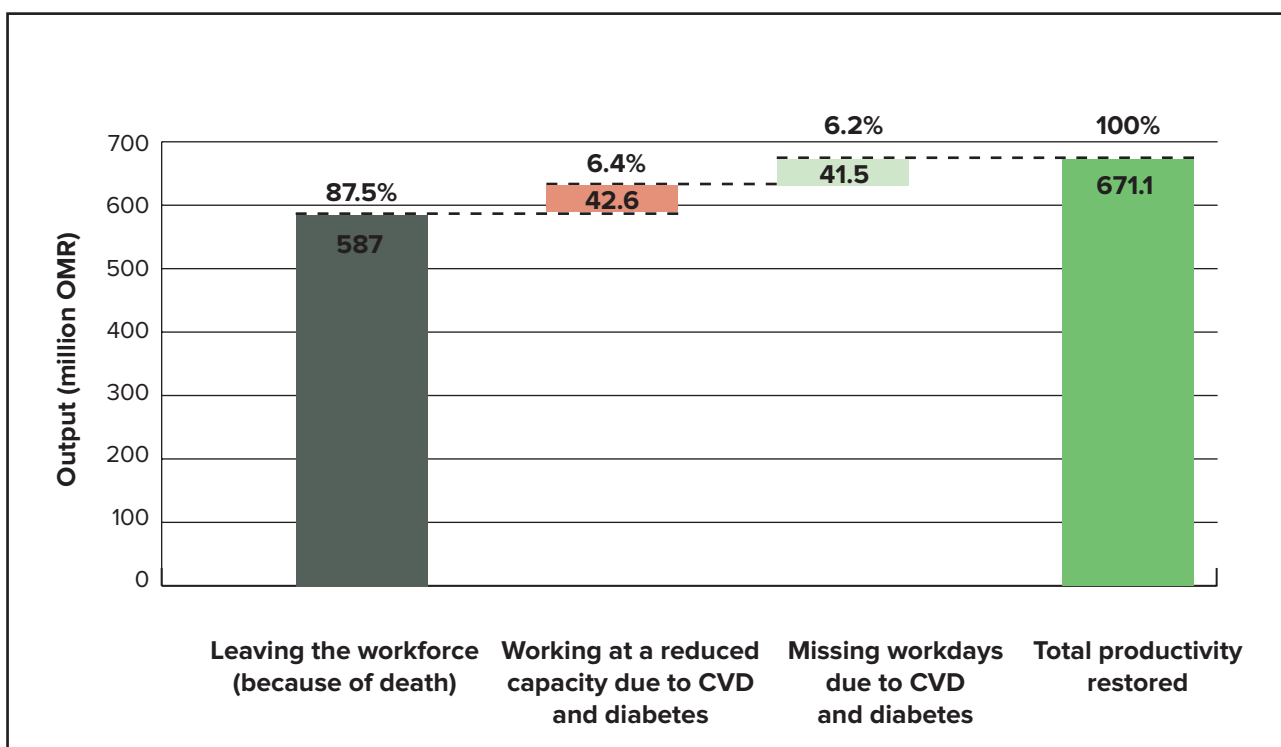
Table 8. Estimated health benefits over a 15-year time horizon, 2020–2034

Intervention package	Strokes averted	Acute IHD averted	Mortality averted (total deaths, includes premature deaths)	Mortality averted (premature deaths)	Healthy life-years gained
Tobacco control	2,332	1,605	1,862	1,598	12,292
Salt reduction	6,361	7,693	6,680	5,943	49,803
Diet and physical activity awareness	2,049	1,326	1,559	1,444	10,566
CVD and diabetes clinical intervention	6,398	4,388	8,623	8,273	44,313
Total	17,140	15,012	18,724	17,258	116,974

c. Economic benefits

The NCDs included in this analysis reduce the labour workforce and productivity through premature deaths, fewer days of work (absenteeism) and reduced productivity while at work (presenteeism). **Fig. 5** demonstrates the labour productivity gains that would result from the prevented deaths and disease cases over 15 years, described in **Table 8**.

Fig. 5. Recovered economic output expected from interventions for tobacco, physical inactivity, salt and cardiovascular diseases primary prevention over 15 years



The combined recovered economic output from both the clinical and the policy intervention packages in net present-value terms would be 671,127,918 OMR (US\$ 1.8 billion) in labour productivity gains over the 15-year period or equivalent to 2.2% of Oman’s 2019 GDP over 15 years.

The highest labour productivity gains are derived from reduced premature deaths (87.5% of recovered economic output), followed by reduced presenteeism and reduced absenteeism (6.4% and 6.2% of recovered economic output, respectively).

d. Social benefits of increased years of healthy life

Healthy life-years gained is a measure in health economics. It expresses the additional number of years of life that a person lives in a healthy condition as a result of receiving a treatment or avoiding a disease. It is a health expectancy indicator which combines information on mortality and morbidity. It is common when estimating the benefits of improved health to put a value on being alive (see methods section for details). We estimated that the combined social value from both the clinical and the policy intervention packages in net present-value terms would be 283,315,399 OMR (US\$ 745 million) over the 15-year period.

The highest social benefits are derived from the monetary value of healthy life-years gained as a result of full implementation of salt reduction package.

Table 9. Social value of the investment over 5- and 15-years

Intervention package	5 years		15 years	
	OMR	US\$	OMR	US\$
Tobacco control	1,126,395	2,964,197	29,625,243	77,961,165
Salt reduction	6,927,090	18,229,184	121,653,732	320,141,401
Diet and physical activity awareness	1,045,988	2,752,600	25,494,629	67,091,129
CVD and diabetes clinical interventions	3,786,700	9,965,000	106,541,795	280,373,145
Total	12,886,173	33,910,982	283,315,399	745,566,840

e. Return on investment

Comparing the costs and benefits of each package of interventions shows that all the NCD prevention interventions at the population level for risk behaviour included in the analysis – for tobacco control, salt reduction and increasing physical activity – have returns on investment greater than 1 OMR for each 1 OMR invested over 15 years (**Table 10**).

Table 10. Costs, benefits and return on investment at five and 15 years, by intervention package (in OMR, not including social value)

Intervention package	5 years			15 years		
	Total discounted costs	Total productivity benefits	ROI	Total discounted costs	Total productivity benefits	ROI
Tobacco control	5,537,548	1,480,010	0.27	13,297,103	63,809,732	4.80
Salt reduction	12,101,152	8,749,587	0.72	30,613,930	264,482,541	8.64
Diet and physical activity awareness	6,681,179	1,306,989	0.20	26,556,959	53,421,235	2.01
CVD and diabetes clinical interventions	17,693,197	9,041,456	0.51	127,599,638	289,414,410	2.27
Total	42,013,076	20,578,042		198,067,630	671,127,918	

ROI= return on investment

The salt reduction package has the highest return on investment of any intervention: for 1 OMR invested in the salt reduction package, the expected return is 8.6 OMR for 15 years. Tobacco control also produce a high return on investment over 15 years (4.8), as does the physical activity package (2).

The package of clinical interventions is estimated to provide a return on investment of 2.3 OMR per 1 OMR invested. Although highly effective and resulting in the most lives saved (8,623 total deaths averted, see **Table 8**), the clinical interventions entail the highest costs of medical treatment necessary under clinical interventions. Further, these treatment options (treatment, secondary prevention after acute events and other) have low potential to increase labour force participation after stroke, myocardial infarction and diabetes. These two factors keep the ROI for the clinical interventions from being higher.

Adding the values of social benefits (see sub-section ‘d’ on page 64) due to increased years of healthy life to the total productivity values increases the return on investments as described in **Table 11**.

Table 11. Costs, benefits and return on investment at five and 15 years, by intervention package (including social value)

Intervention package	5 years			15 years		
	Total discounted costs	Total productivity + social benefits	ROI	Total discounted costs	Total productivity + social benefits	ROI
Tobacco control	5,537,548	2,606,405	0.47	13,297,103	93,434,975	7.03
Salt reduction	12,101,152	15,676,677	1.30	30,613,930	386,136,273	12.61
Diet and physical activity awareness	6,681,179	2,352,977	0.35	26,556,959	78,915,864	2.97
CVD and diabetes clinical interventions	17,693,197	12,828,156	0.73	127,599,638	395,956,205	3.10
Total	42,013,076	363,464,215		198,067,630	954,443,317	

ROI= return on investment

The Sultanate of Oman requested a 20-year extended analysis to align with national strategies that end in year 2040. **Table 12** below shows the results of this analysis and that the returns on investment continue to increase until 2040.

Table 12. Costs, benefits and return on investment at 20 years without and with social value (in OMR)

Intervention package	20 years				
	Total costs	Total productivity benefits	ROI	Total productivity + social benefits	ROI
Tobacco control	16,819,522	182,744,128	10.9	257,504,509	15.3
Salt reduction	39,033,976	646,067,943	16.6	908,607,715	23.3
Diet and physical activity awareness	41,585,100	154,201,107	3.7	218,674,813	5.3
CVD and diabetes clinical interventions	211,255,211	794,430,740	3.8	1,072,383,162	5.1
Total	308,693,809	1,777,443,918		2,457,170,199	



‘Stakeholders beyond government also share responsibility and can contribute in creating an environment conducive to preventing and controlling NCDs’

H.E. Dr. Ahmed Mohammed Obaid Al Saidi,
Health Minister of the Sultanate of Oman

Photo credit: © Marc Veraart via Flickr





CONCLUSION & RECOMMENDATIONS

Investing in four proven and cost-effective intervention packages (best buys) can significantly reduce the burden of cardiovascular disease as well as cancer, chronic respiratory disease and diabetes.

CONCLUSION

The four major NCDs impede Oman's efforts to increase efficiency in the health sector, and therefore its efforts to achieve fiscal balance. They also hinder the country's broader development priorities of increasing human capital and strengthening inclusive economic growth. NCDs are a leading health and development challenge in Oman, and they are making the COVID-19 pandemic worse and vice versa. Addressing NCDs and COVID-19 together can reduce the health and economic burdens of both.

The findings from the investment case model show that the four main NCDs cost the Oman economy 1,095,106,568 OMR (US\$2.9 billion), equivalent to 3.59% of its 2019 GDP. Cardiovascular disease contributes the most to the economic burden of NCDs in Oman at 65% of the total burden or 707,134,257 OMR. Cardiovascular disease is followed by diabetes, chronic respiratory diseases and cancer. Government healthcare spending was equal to 49% of the total economic burden, followed by presenteeism (27%), premature death (12%), private health expenditure (7%) and absenteeism (5%).

Investing in four proven and cost-effective intervention packages (best buys) can significantly reduce the burden of cardiovascular disease as well as cancer, chronic respiratory disease and diabetes. Furthermore, these best buys can increase people's life expectancy and quality of life while decreasing the burden on the national economy and accelerating economic growth. Thus, these investments contribute to the overall socio-economic development of the country.

Prioritizing investing in the salt reduction and tobacco control packages would lead to the greatest returns. Even these strong returns outlined in this report understate the case for increased investment, as they consider only the economic benefits of improved health outcomes. They do not account for the significant additional revenue that would come from the recommended increases in excise tax rates on health-harming products including tobacco, alcohol and sugar-sweetened beverages, that can be significantly higher than the costs needed to implement the recommendations (see **Annex 3**).

Summary of main findings

The economic modelling considers baseline coverage levels for each intervention and assumes a significant but realistic scale-up of coverage levels. The main findings regarding the intervention packages are as follows:

**OVER 15 YEARS, INVESTING IN ALL FOUR
COST-EFFECTIVE INTERVENTION
PACKAGES WOULD...**



**PREVENT NEARLY
19,000
DEATHS**



**ADD ALMOST
117,000
HEALTHY LIFE-YEARS TO
PEOPLE IN OMAN**

OVER 15 YEARS, THE PACKAGES FOR SALT REDUCTION AND TOBACCO CONTROL HAVE THE HIGHEST RETURNS-ON-INVESTMENT (ROI)


	YIELD FOR EVERY OMR	TOTAL COST OF POLICY PACKAGE (MILLION OMR)	TOTAL BENEFIT (MILLION OMR)
SALT REDUCTION INTERVENTION	8.6	31	264
TOBACCO CONTROL	4.8	13	64
DIET & PHYSICAL ACTIVITY AWARENESS	2.0	27	53
CVD & DIABETES CLINICAL INTERVENTIONS	2.3	128	289

OVER 20 YEARS, THE PACKAGES YIELD RETURNS ON INVESTMENT

	YIELD FOR EVERY OMR	TOTAL COST OF POLICY PACKAGE (MILLION OMR)	TOTAL BENEFIT (MILLION OMR)
SALT REDUCTION INTERVENTION	16.6	39	646
TOBACCO CONTROL	10.9	17	183
DIET & PHYSICAL ACTIVITY AWARENESS	3.7	42	154
CVD & DIABETES CLINICAL INTERVENTIONS	3.8	211	794

RECOMMENDATIONS

The analysis drew attention to specific areas that need to be strengthened and scaled up to implement the WHO-recommended cost-effective NCD preventive and clinical interventions. The following actions would help Oman reap significant health and economic benefits from scaled-up investments to reduce NCDs and continue to be a regional leader in non-communicable diseases:

1  **Invest in cost-effective clinical and population-based interventions, enhancing efficiency in the health sector and overall public sector fiscal sustainability.** Since the packages to reduce tobacco and salt consumption largely provide the greatest returns on investment, scaling up tobacco control and effective salt reduction initiatives should be of high priority.

To strengthen tobacco control, Oman can develop a robust strategy to combat illicit trade and ratify the Protocol to Eliminate Illicit Trade in Tobacco Products. [39] Oman can also implement and enforce stronger policies to protect youth, by restricting the sale of tobacco products near schools and playgrounds, and banning all tobacco sponsorship including those targeting students. Oman can also fully implement a comprehensive ban on tobacco advertisement and promotion, by banning the appearance of tobacco products and brands in TV and/or films; banning tobacco product display at point of sale; and banning tobacco sales on the internet and through vending machines.

Oman can also adopt codes of conduct for public servants to keep tobacco industry lobbyists, like the Oman Working Group, a taskforce of the Middle East Tobacco Association, from interfering with tobacco control laws and initiatives. Oman should strengthen smoking bans in public places, including by banning all designated smoking areas. If politically not immediately feasible, Oman may decide to first scale up initiatives that create smoke-free zones such as the Nizwa Healthy Lifestyle Project in the Souq. Regarding cafes that serve shisha, the Muscat municipality and the Ministry of Industry and Commerce should work together to harmonize national and municipal legislation on waterpipes indoors and designated smoking areas. To strengthen cessation services, Oman can offer a national quit line for tobacco users and expand the number of clinics providing cessation services, including nicotine replacement therapy. Oman should also implement plain-packaging, following the successful example of the Kingdom of Saudi Arabia. Australia's experience in defeating the tobacco industry's attempts to block plain packing shows that the industry has – at best – a weak case for litigation. [74]

To further reduce salt consumption, Oman can scale up the MOH programme to reduce salt in bread and cheese by working with other food manufacturers and reducing sodium in other products high in salt (such as processed foods like packaged snacks, e.g. chips, canned goods and frozen meals). Oman can also invest in initiatives such as food labelling where food products and menus in restaurants are required to declare nutrient levels including sodium. Front-of-pack labelling systems could also be considered, such as traffic light systems where

the calories and certain nutrients (like salt) are displayed on the label as red, yellow, or green. [75] Oman can also develop regulations or guidance for industry to reduce the amount of sodium in processed foods. For example, many countries including Canada, Australia and the United Kingdom, have issued voluntary targets for industry to reduce sodium in processed foods for multiple products. [76] These actions would help Oman meet global NCD targets of reducing salt intake by 30% while also contributing to the 25% reduction in high blood pressure.

Interventions to increase physical activity are crucial, considering that a third of the population in Oman does not engage in sufficient physical activity. Oman should continue and scale up its national and local awareness programmes, school programmes and sports initiatives, engaging civil society and particularly targeting women who report higher rates of physical inactivity than men. Oman can also ensure that physicians are trained to provide brief advice as part of routine physician care. Beyond these two WHO best buy interventions included in the economic model, Oman can strive to implement additional policy options under the WHO's Global Action Plan for the Prevention and Control of Noncommunicable Diseases 2013–2020. [77]

2 >

Increase taxes on health-harming products (tobacco, alcohol, sugar-sweetened beverages) and shift subsidies from health-harming products (e.g. polluting fuels) to health-promoting ones.

Using fiscal measures to address NCDs, whether by increasing tax rates on health-harming products or reducing subsidies for them, represents a promising approach to finance scaled-up action on NCDs. Increasing taxes on health-harming products is one of the most effective measures a government can take. Doing so reduces the consumption of such products, thereby improving population health and reducing associated costs, while increasing government revenue for national development priorities and improving the health system. Effective 'health taxes' require ministries of finance and health to work together and benefit from broader whole-of government support. The Sultanate of Oman could also inform the public on how the revenue will be spent; countries such as the Philippines announced in advance how tax revenues would be earmarked towards expanding universal health coverage, thereby gaining overwhelming public support for the tax increases.

Tobacco: At a current rate of around 62.5% of retail price, Oman has room to increase tobacco taxes to at least the WHO-recommended 75% of the retail price. [78] Oman implemented a 100% excise tax rate on tobacco products including cigars, cigarettes, cigarillos, water pipe tobacco, and other tobacco products. [45] Still, a pack of the most sold brand of cigarettes in Oman costs \$2.60, which is cheaper than a pack in Bahrain, the United Arab Emirates, Qatar and the Kingdom of Saudi Arabia. [79]


Alcohol: Oman has a 100% excise tax rate on alcohol. [45] Even though alcohol consumption is barely prevalent due to local laws, alcoholic beverages can still be purchased and consumed in certain designated areas. A specific excise tax on the percentage of ethanol can help reduce consumption of alcoholic beverages with high alcohol content while generating revenue. [80]

Sugar-sweetened beverages (SSBs): In 2019, Oman implemented a 100% excise tax rate on energy drinks and a 50% excise tax on carbonated drinks. [45] In addition, as of October 2020, sugary and sweetened beverages are subject to an excise tax of 50%. WHO recommends an excise tax based on sugar content or volume. [81] Modifying the tax structure to the amount of sugar or size of the beverage can help encourage consumers to choose smaller beverages with less sugar, while still generating revenue.¹³ [27] In 2016 the cost of a one litre Coca-Cola in Oman was \$0.48 in 2010 USD. This was the same as in Bahrain, but \$0.23 less than in Saudi Arabia, \$0.66 less than in Qatar, and \$0.97 less than in Kuwait. [82]

Junk food tax: The Ministry of Health has been researching a junk food tax that would increase prices on junk food from 125-500%. [38] Mexico successfully implemented an 8% tax on junk food items like sweet breads, ice creams, other items. The tax was associated with a reduction in taxed foods purchases by around 5%. [28] A junk food tax may help reduce consumption of unhealthy foods and thus reduce risk factors for NCDs.

Value-added tax: In 2018 Oman agreed to introduce a VAT at a rate of 5% as outlined in the GCC Unified Agreement, to come into effect starting April 2021. [83], [84] All food items will be subject to this tax rate, except for some essential commodities for which Oman may apply a zero-rate on approved items by the GCC Financial and Economic Cooperation Committee. It is important that the 0% tax rate is only applied to health-promoting foods such as fruits and vegetables, and not health-harming products like salt and sugar.

Fossil fuels: In Oman, oil and gas are primary energy sources and electricity is heavily subsidized. Renewable energy in Oman could offer another source of energy, while benefitting the environment and providing potential economic benefits. [85] Oman developed a National Renewable Action Plan to supply 30% of energy with renewable sources. [86] As Oman moves forward with renewable energy, reductions in fossil fuel subsidies can help to finance full implementation of the recommended policies discussed in this report. Doing so can also be expected to deliver additional health benefits from reduced exposure to air pollution.

3  **Engage and collaborate by strengthening multisectoral, whole-of-government and whole-of-society action on NCDs. Fully finance the national NCD plan and increase public awareness of NCDs and their risk factors.** As the cause and effects of NCDs are not limited to health, the health sector should not be the only sector to respond to these chronic ailments. A whole-of-government and whole-of-society approach is needed for effective prevention and control of NCDs and their risk factors. The Multi-sectoral National Committee for NCDs could strengthen coordination among its members (health and other sectors) by 1) expanding membership of the committee to include the Ministry of Finance and lawmakers, 2) adopting an annual workplan aligned with the national NCD strategy and prioritizing cost-effective interventions (WHO best buys), and 3) adopting codes conduct and declaration of interest forms to prevent industry interference.

¹³ The UK has successfully introduced a tiered excise tax structure based on sugar content to discourage consumers from purchasing drinks with high quantities of sugar. <https://doi.org/10.1017/S1368980018003324>

As recommended by the 2016 Joint UNIATF Mission, a high-level health council should be established to ensure sustainability and leadership of the NCD committee. The committee should regularly meet to discuss progress and barriers to implementing effective NCD policies and discuss potential solutions. The committee can also advocate for more funding for the national NCD strategy as no significant allocations have been earmarked to support its implementation. Earmarking revenue from health taxes could be a potential source of funding. The importance placed on Oman's NCD committee can be an example for similar committees in other GCC countries.

Oman can increase the number and intensity of media campaigns to spread awareness of NCD prevalence and how reducing NCD risk factors can help minimize risk for development of NCDs and their related health complications. Oman can introduce new national mass media campaigns to spread awareness of the health-harming effects of tobacco and the importance of healthy diets, while expanding the social marketing and mass media campaigns to promote physical activity (launched in 2016 [46]) and the 2020 National Nutrition Campaign. [48] Campaigns may prioritize women in physical activity campaigns and programmes as they are more likely to be obese and may be influenced by social taboos about women exercising. Oman should engage civil society on the progress of NCD policies and share success stories with the public to strengthen support. Oman can also keep the public updated on the status of NCD prevention and control programmes by updating government websites and sharing through social media platforms.

4



Implement novel policy approaches and test innovative solutions to increase utilization of existing services and incentivize healthy behaviour.

In addition to adopting the best buys and modelled interventions, Oman can benefit from applying innovations in key areas.

Urban planning to promote health: Purposeful urban planning can incentivize healthier habits (e.g. through access to urban/community gardens and fresh food markets, and mobility systems which encourage walking and/or cycling), which is particularly relevant for Oman that has a high urbanization rate of over 85%. In December 2019, Muscat joined the Bloomberg Partnership for Healthy Cities. This initiative aimed at making the city fully walkable in 2020, by re-designing five key areas. [87] Other cities can join the partnership to ensure better access to recreational and walk zones among its residents.

Behavioural nudges towards healthy choices: Under the Ministry of Education's leadership, public schools can adopt innovative measures (see Annex 4) such as pre-ordering for school meals with embedded nudges to prompt children to consume healthier food and changing food placement and labels in school cafeterias to encourage healthy eating. School food menus can include nutrition information highlighting salt, fat, and sugar content. Schools can also ensure responsible food marketing towards children which encourages healthy food choices such as fruits and vegetables and discourages consumption of unhealthy items. The Ministry of Sport has realized several sport complexes in the country, targeting 15 to 25-year-old men. The initiative is worth expanding to include adult men, women and the elderly.

Food environment: Addressing access and availability to healthy food is key to a holistic approach to health. Innovative approaches include encouraging local food markets, and incentivizing consumption of health-promoting foods (see Annex 4 for more details). Oman can also prioritize engagement with the agriculture sector to discourage production of tobacco and sugar and support the cultivation of health promoting foods such as fruits and vegetables. For instance, Oman’s Ministry of Agriculture and Ministry of Health are planning a project to produce carrot and papaya in North Batina to supply the school and local markets. Such projects could be replicated and scaled if successful. Breastfeeding initiatives (Baby Friendly Hospital Initiatives) should be continued and strengthened: breastfeeding is currently mandatory in all public hospitals which is planned to be expanded to private providers. Exclusive breastfeeding is however limited by short maternity leave period (currently 50 days), which should be extended to enable mothers to breastfeed their children for a longer, more appropriate time.

5 >

Build back better to ensure that prevention and control of NCDs is a central element of the COVID-19 response and recovery (see Annex 1 for more details). [88] COVID-19 is another major reason to address NCDs urgently.

NCDs and their risk factors, to varying degrees, increase susceptibility to both COVID-19 infection and more severe outcomes. At the same time, impacts from the pandemic on health systems and prevention approaches threatens to stall progress on NCDs. People living with or at risk of NCDs face significant disruptions in access to prevention and treatment services for NCDs. The NCD-COVID 19 double pandemic is a major cost to health and well-being as well as to the economy, with each issue causing similar economic devastation.¹⁴ There are initial steps Oman can take to ensure NCDs and COVID-19 are addressed together, both in the immediate response and in longer-term efforts to rebuild. These include:

- ^ Ensure NCDs and NCD health and development experts are represented on COVID-19 taskforces [89] to support sensitization of actors and integration of NCDs into immediate and longer-term responses.¹⁵ Ensure COVID-19 experts are represented on NCD coordination mechanisms in turn.
- ^ Optimize regional and global coordination and information sharing on the nexus of NCDs and COVID, leveraging existing key platforms for example the GCC joint operations room for COVID-19.
- ^ Different sectors review the WHO and UNDP NCD sectoral briefs to analyze how their COVID-19 response and recovery can be sensitive to NCDs and to further integrate NCDs into longer-term development work including efforts for universal health coverage and the SDGs (see Annex 1 of this document for further details).

14 3.59% of GDP burden due to NCDs, and 2.8% GDP contraction forecasted due to COVID-19 according to the International Monetary Fund, Real GDP growth, IMF Data Mapper

15 For example, many governments have been cognizant of the implications of social isolation on physical and mental health and have allowed people to take exercise outside for a short period during the movement restriction.



ANNEXES

ANNEX 1: NCDs AND COVID-19

Prevention and control of NCDs is of increased importance during the COVID-19 pandemic. [88] In addition to an increased vulnerability to severe outcomes from COVID-19, patients with NCDs suffer from disruption of or limited access to NCD prevention and treatment services. [90] A recent WHO survey across 155 countries found that the majority of countries are encountering disruptions to the delivery of NCD services, correlating with the severity of the COVID-19 outbreak. [91] Oman has initiated nationwide lockdowns during this pandemic as well as imposing a 14 day quarantine for incoming foreign travellers. [92] It has also developed guidelines in response to the pandemic with measures on reorienting services for those with NCDs. Further, Oman is using a tracing system and established telemedicine clinics in all governorates which follow up with patients. The department of NCDs has also conducted two assessments to measure the impact of re-orientation of services on patients following up in NCD and psychiatric clinics.

Interactions between NCDs and COVID-19

Persons with NCDs are more vulnerable to developing severe illness of or dying from COVID-19, with diabetes, cancer, chronic respiratory disease or cardiovascular diseases being key risk factors for adverse outcome. [93], [94] In addition, smoking, [95] alcohol consumption, [96] obesity, [97] and exposure to air pollution. [98] This strong interconnection between NCDs and COVID-19 highlights the necessity to integrate considerations for NCDs into the pandemic response on all levels.

Oman scores 5.19 in the UNDP-developed NCD/COVID-19 Vulnerability Index, indicating a vulnerability to COVID-19 due to NCDs and risk factors higher than for the average high-income country. The Index is a weighted average of the normalized prevalence indicators for a set of NCDs and risk factors with established links to COVID-19.¹⁶

Compared to other GCC countries, Oman fares better in the factors linked to obesity, overweight and air pollution, but worse in cardiovascular function, putting Omanis at increased risk for severe COVID-19 disease progression. The key NCD-related factors driving vulnerability to COVID-19 in Oman, indicated in the Index Breakdown (**Fig. 6**) are cardiovascular diseases, obesity and overweight, and diabetes. The vulnerability to COVID-19 caused by these conditions in is compounded by the fact that men – who are about twice as likely as women to suffer from severe COVID-19 – make up over 66% of the Omani population.

Recommendations & governance strategy

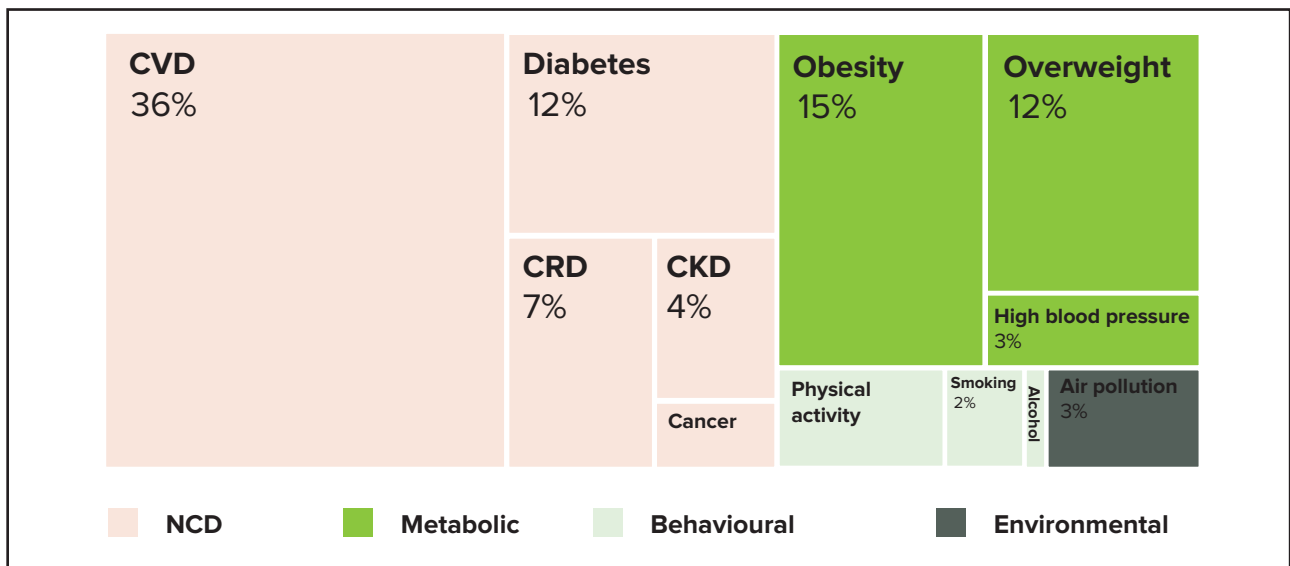
Addressing NCDs as risk factors for COVID-19 contraction and severity is crucial for reducing the pandemic's strain on the healthcare system and economy. Oman should communicate the elevated vulnerability of affected individuals. The government of Oman should also devise policies to encourage a healthy lifestyle and reduce exposure to factors linked to development of NCDs including smoking, alcohol use, physical inactivity, and air pollution.

¹⁶ For further data and details on the Index methodology, please refer to the NCD COVID-19 Vulnerability Dashboard and Theoretical Framework.

An effective and sustainable COVID-19 response requires an intersectional, multi-faceted, ‘whole-of-society’ and ‘whole-of-government’ approach. The main building blocks are:

- ^ **An interdisciplinary task force** should device policies and response strategies. This should consider and meet the needs of all groups of society, with a particular focus on those that are most vulnerable.
- ^ **Coordinate with global and regional efforts** to allow for exchange of ideas and ensure the selection of most suitable approaches on all levels of society.
- ^ **Integrate considerations** for NCDs into COVID-19 response, including identification of essential NCD services, and the need for service delivery adaptations to maintain essential services. Prioritize NCD patients for COVID-19 testing and early care, and protect supply chains for NCD medicines and technologies.
- ^ **Leave no one behind.** Identify vulnerable groups at risk for COVID-19, including marginalized population groups with high rates of NCDs and including migrant workers. Incorporate their needs in to the COVID-19 response plan. [99]
- ^ **Implement mutli-sectoral action.** COVID-19 action is not confined to the health sector alone, but requires cooperation from a multitude of sectors to ensure that the pandemic response and recovery is sensitive to NCDs.

Fig. 6. NCD-driven COVID-19 Vulnerability Index – breakdown of risks



Other innovative COVID-19 policy solutions

In addition, Oman can incorporate more innovative approaches to help reduce risk factors for NCDs and COVID-19 infection and complications. Advanced technological approaches can be used to identify vulnerable groups at risk for severe disease. For example, finding geographical groups at higher risk of severe symptoms of COVID-19 by mapping areas of high prevalence of certain pre-existing conditions or areas of high levels of pollution. [100]

Contact tracing apps are becoming a commonly used tool to help contain the spread of COVID-19 and Oman has joined an ongoing list of countries implementing this technology. [101]–[103] Oman’s contact tracing system titled “Tarassud Plus” involves a mobile app and artificial intelligence to provide COVID-19 information including statistics, guidelines and best practices. The app also offers access to medical hotlines to discuss symptoms and find care.

If individuals are diagnosed they are given a medical tracking bracelet that coordinates with the application to make sure the diagnosed patient remains isolated. [104] Telemedicine clinics have been established and are running in all governorates. Patients are followed up through phone consultations. As Oman’s Ministry of Health continues to use and develop this technology, the tracing functions and alerts of the app should emphasize vulnerable groups ,such as persons with NCDs, by prioritizing these groups and offering useful information on the interaction between NCDs and COVID-19 on the app.

Government efforts to promote physical activity and mental health, to reduce alcohol use, exposure to air pollution and tobacco usage are of critical value. Oman has actively expanded health messaging since the pandemic, including television spots, interviews, and social media messages. Oman may explore how it can further expand such messaging – if necessary – to communicate scientifically backed. For example, Oman can implement resources on healthy diet [105] and exercise [106] on their Ministry of Health website or the COVID app in addition to the provided information on COVID-19 symptoms, prevention, testing, and tracking. These initiatives help address concerns of both NCD and COVID-19 prevention.

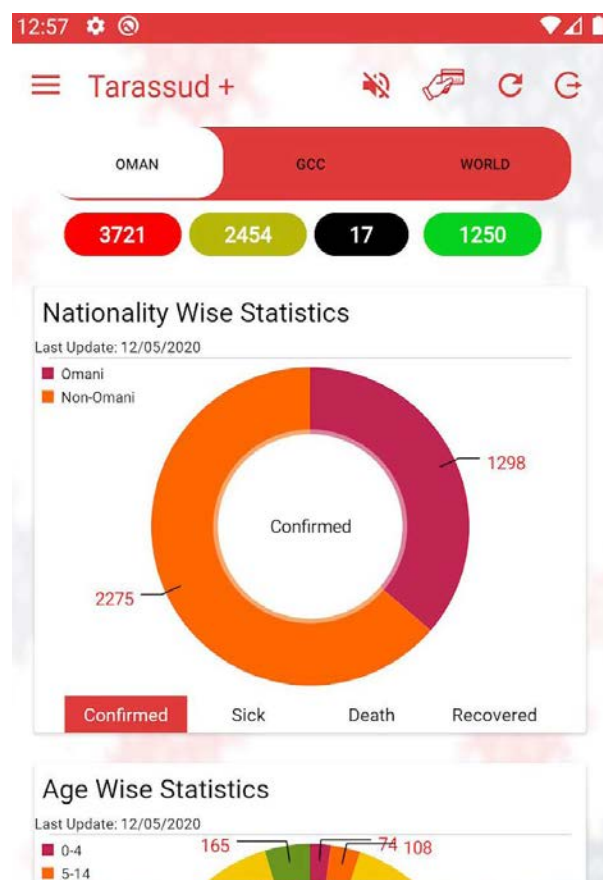


Photo credit: Oman Observer

17 WHO Regional Office for the Eastern Mediterranean, “NCD prevention and control in the Eastern Mediterranean Region Country Case study, Tunisia”, presentation given at the High level EMR Policy Dialogue in preparation of the 3rd High-level Meeting of the United Nations General Assembly on the Prevention & Control of Noncommunicable Diseases, Cairo, Egypt, July 2018.

ANNEX 2: ESTIMATED CURRENT COVERAGE OF NCD INTERVENTIONS TO BE COSTED WITHIN THE ONEHEALTH TOOL

	Current implementation levels	Modeled implementation levels in 2030
Tobacco use		
<i>Monitor tobacco use and prevention policies</i>	Level 3	Level 4
<i>Protect people from tobacco smoke</i>	Level 2	Level 4
<i>Offer to help quit tobacco use: mCessation</i>	Level 1	Level 4
<i>Warn about danger: warning labels</i>	Level 1	Level 4
<i>Warn about danger: mass-media campaign</i>	Level 3	Level 4
<i>Enforce bans on tobacco advertising</i>	Level 2	Level 4
<i>Enforce youth access restriction</i>	Level 3	Level 4
<i>Raise taxes on tobacco</i>	Level 3	Level 4
<i>Plain packaging of tobacco products</i>	Level 3	Level 4
Physical inactivity		
<i>Public awareness campaigning on physical activity</i>	Level 2	Level 4
<i>Brief advice</i>	Level 1	Level 4
High salt consumption		
<i>Surveillance</i>	Level 1	Level 4
<i>Harness industry for reformulation</i>	Level 2	Level 4
<i>Adopt standards: front-of-pack labelling</i>	Level 2	Level 4
<i>Adopt standards: strategies to combat misleading marketing</i>	Level 2	Level 4
<i>Knowledge: education and communication</i>	Level 3	Level 4
<i>Environment: salt-reduction strategies in community-based eating spaces</i>	Level 2	Level 4
Clinical interventions: cardiovascular diseases		
<i>Screening for risk of cardiovascular diseases and diabetes</i>	5%	80%

<i>Treatment for those with high absolute risk of cardiovascular diseases and diabetes (>30%)</i>	5%	80%
<i>Treatment of new cases of acute myocardial infarction with aspirin</i>	5%	80%
<i>Treatment of cases with established ischaemic heart disease and post-myocardial infarction</i>	5%	80%
<i>Treatment for those with established cerebrovascular disease and post-stroke</i>	5%	80%
Clinical interventions: diabetes		
<i>Standard glycaemic control</i>	5%	80%
<i>Retinopathy screening and photocoagulation</i>	5%	80%
<i>Neuropathy screening and preventive foot care</i>	5%	80%

ANNEX 3: HEALTH TAX MODELLING

Increasing taxes on health-harming products is one of the most effective measures a government can take. Doing so reduces the consumption of such products, thereby improving population health and reducing associated costs, while increasing government revenue for national development priorities and improving the health system. The Addis Ababa Action Agenda on Financing for Development [107] recognizes price and tax measures on tobacco as an important revenue stream for financing for development, and the WHO Global Action Plan for SDG 3 – to ensure healthy lives and promote well-being at all ages – emphasizes the role of taxes on cigarettes, tobacco, and sugar in improving population health while reducing healthcare expenditures and increasing government revenue.

There is a consensus among the 194 United Nations Member States to promote fiscal measures to reduce main risk factors for NCDs and promote healthy diets and lifestyles. [108] Health taxes are a fiscal measure that can help finance the health systems across lower middle-income countries whose funding levels for health are currently insufficient to sustain progress towards SDG3. [109] Summan and Laxminarayan estimated that a tax on tobacco, alcohol, and sugar-sweetened beverages (SSBs) that increases retail prices by 50% could “avert over 50 million premature deaths while raising over US\$ 20 trillion of additional revenues worldwide over the next 50 years.” [110] Identifying and increasing sustainable domestic revenue streams is more important now than ever, with COVID-19 causing economic contraction worldwide [111] and placing an additional strain on health-systems.

While health taxes hold great potential, they remain under-implemented, including in Oman. While the country has implemented taxes on tobacco, alcohol and SSBs, these products remain either very affordable or the tax structure could be improved. Increasing the excise tax on these products and altering the alcohol and SSB tax structures to be specific to the alcohol and sugar content is an effective means to reduce consumption and prevent NCDs in Oman. The Gulf Cooperation Council (GCC) makes tax decisions as a regional block. The GCC is inclined towards health taxes and considering how to design and implement a tax on sugar-sweetened beverages. Oman can present the GCC with evidence on the fiscal and health benefits of health-taxes, defending proposals for tax increases that would align those in Oman to more impactful levels. Earmarking revenue from excise taxation for health systems strengthening and/or the SDGs broadly increases public support for such measures and has become standard practice in many countries. In Estonia for example, the Government is earmarking revenue from a payroll tax on national health insurance coverage. In the Philippines, 100% of revenue from alcohol tax and about 85% of tobacco tax revenue is allocated to health coverage and other health programmes. [112]

ANNEX 4: INNOVATIVE POLICY SOLUTIONS TO ENHANCE DIETS IN OMAN

Fruits and vegetables are important components of a healthy diet. Insufficient intake is linked to poor health and increased risk of NCDs. An estimated 3.9 million deaths worldwide were attributable to inadequate fruit and vegetable consumption in 2017. [113] WHO recommends that an adequate intake of fruit and vegetables is about 400g of fruit and vegetables. [114] Four or five servings of fruits and vegetables is typically recommended to reach the 400g recommendation. Data from the 2017 STEPS survey in Oman however, showed that 62.6% of respondents reported having insufficient daily (less than 5 servings) intake of fruits and vegetables per day. [9] The following table reviews a number of innovative interventions, including subtle ‘nudge solutions’, to increase fruit and vegetable consumption to help prevent NCDs.

SCHOOLS

Foster healthy dietary habits in schools



Photo credit: © The California Endowment via Flickr

Children form the core of their dietary preferences in the places where they spend most of their time – at home and school. Some schools have successfully experimented with innovative “nudge” interventions that prompt children to make (and internalize) healthier choices. [115] In one such intervention, researchers from the University of Florida created a software program that children could use to preorder their school meals. While some children simply placed their orders as usual, others were given a “tweaked” version of the software with gentle cues, such as showing a screen with a smiley face when children choose all five foods recommended by the U.S. Department of Agriculture, or designing on-screen buttons that make the healthy choices more natural. Another experiment, carried out by researchers at Cornell University, found that children were more inclined to order foods with appetizing or even quirky descriptors such as “tender grilled chicken” (instead of simply “grilled chicken”) or the more over-the-top “X-ray vision carrots”.

Integrating nutrition policies in school canteens



Photo credit: © Zsuzsanna Schreck

Changing the food offered or the shifting the menus may help promote healthier options. Oman can encourage healthy choices in schools by shifting subsidizing towards fruits and vegetables, similar to Finland where milk subsidies exclude products high in fat or salt. Bans on salty snacks in schools and banning sugary beverages in schools and shops around schools may help deter unhealthy purchases. In California in the United States, state legislation bans the sale of SSBs on school campuses. [116]

SCHOOLS

➤ ***Innovative approaches in primary schools***



Photo credit: © Zsuzsanna Schreck

Parental involvement, taste testing and games are simple ways to encourage healthy eating in children. In England, children who attended schools where parents were involved in efforts to promote fruits and vegetables ate more vegetables compared to schools that did not have a high parental involvement. [117] In the United States, an evaluation of a nutrition education programme that utilizes a taste testing component found that adding taste testing to the programme resulted in higher student consumption rates of fruits and vegetables compared to without taste testing. [118] In Utah in the United States, a school used a game-based approach by promising rewards when the school met a fruit or vegetable consumption goal. Results showed students and teachers enjoyed the game and fruit and vegetable consumption increased when it was played. [119]

➤ ***Reduce salt, sugar, and trans-fats in school meals***



Photo credit: © Zsuzsanna Schreck

Countries have made initiatives to reformulate foods to reduce trans-fat, added sugar and salt in processed foods. Tunisia has demonstrated a successful public-private partnership to achieve food reformulation. Given biscuits are commonly consumed in schools in Tunisia, sweet biscuits filled with jam were reformulated to reduce fat, salt and sugar and eliminate trans-fat.¹⁶

REFORMULATING FOODS AND BEVERAGES



Reduce sugar in soft drinks



In the United Kingdom, the government set a goal for food industry to reduce sugar content in food by 20% by 2020 and implemented a tiered tax on sugar-sweetened beverages in 2018, encouraging reformulation of products. These policies were also accompanied by awareness campaigns. Sugar sold per capita coming from soft drinks decreased by 30% between 2015 and 2018. [120]

Photo credit: © World Bank via Flickr

GROCERY SHOPPING



Front-of-Pack (FOP) labelling



While limited, FOP nutrition labelling schemes, such as traffic light labelling, Nutri-score, and health or endorsement logos, are in use or under development in the WHO Eastern Mediterranean Region. For example, Saudi Arabia and United Arab Emirates have introduced traffic light labelling systems to indicate healthiness of nutrient levels by colour (red, amber or green), Morocco is developing a Nutri-score system which gives an overall rating of a food on a scale from A to E, and Tunisia uses a healthy logo to indicate healthier foods. [121]

Photo credit: © Betarice Murch via Flickr

GROCERY SHOPPING

➤ **Highlight healthy foods through strategic positioning**



Photo credit: © I r via Flickr

A well-established environment nudge for increasing consumer propensity for buying healthy foods involves placing healthy foods next to the cash register (or at the desk) while keeping unhealthy foods elsewhere in the premises. This intervention has been found to increase sales of healthy products (although not necessarily to curb sales of unhealthy products). [115]

➤ **Shopping cart designs and product placement in supermarkets**



Photo credit: © Hyacinth50 via Flickr

In a pilot experiment led by a researcher at the New Mexico (US) State University College of Business, shopping carts were decorated with a yellow tape and a sign, indicating a space reserved for fruit and vegetable. The research found that this simple intervention made shoppers more inclined to buy more fruit and vegetables. Evidence suggests that customers could be further incentivized by making the cart even more appealing (e.g. by including pictures of fresh fruit). [122]

➤ **Increasing local markets**



Photo credit: © WHO

In Montreal, a seasonal outdoor fruit and vegetable market receiving funding from the Public Health Department was placed in a disadvantaged neighbourhood near a subway station. [123] Integrating alternate food sources, such as local markets, in disadvantaged areas offers a useful strategy to promote consumption of fruits and vegetables while addressing health inequalities. Additionally, placing these markets on travel routes may help increase awareness and access.

RESTAURANTS



Making healthy meals the rule with default menus

In some cities, restaurants have tried to nudge consumers towards choosing more nutritious and less caloric meals by presenting healthy foods as the default option in their menus. This could entail, for instance, swapping the French fries for a salad as the default side dish for a protein. Here, the government can play a coordinating role in engaging with restaurants and offering workshops on how to design healthier default menus.



Photo credit: © WHO

MEDIA



Mass media campaigns

Providing nutrition information through various outlets may help promote fruit and vegetable consumption. Adolescents in Austria report television most often as a source a nutrition information. However, those who used newspaper articles, booklets and the internet as a source were more likely to consume fruit and vegetables. [124] This highlights the importance of using a variety of media when developing a public health nutrition campaign.



Photo credit: © Chelsey Badlock via Flickr

ANNEX 5: 2017 JOINT PROGRAMMING MISSION RECOMMENDATIONS AND PROGRESS

Progress review since the Joint Mission of the United Nations Inter-Agency Task Force on the Prevention and Control of Non-communicable Diseases, 10–16 April, 2016

GOVERNANCE

Recommendations

The draft national multisectoral action plan on NCDs needs to be finalized and then costed, prioritized prior to being adopted.

Establish the NCD investment case for the Government of Oman.

The National Committee on NCDs acts as a whole-of-government implementation body supported by a high level Health Council headed by a high ranking official (e.g. the Deputy Prime Minister) with a clear definition of roles and responsibility of each sector.

An active multisectoral cancer control committee is established to ensure that the comprehensive national cancer control plan is delivered.

National capacity for NCD leadership and action at local levels is enhanced.

Progress Update

The national action plan has been finalized and costed. The total cost of its implementation has been taken up to the council of ministers.

Completed as of February 2021.

There are NCD sections in each of the 11 governorates headed by a physician or nurse who supervises all NCD work in the governorate.

TOBACCO

Recommendations

Endorse the comprehensive tobacco control legislation that has been developed.

Convert import taxes for tobacco products are into (domestic) excise taxes and significantly increase them (this will need to be made in conjunction with the Gulf Cooperation Council of which another 5 Gulf countries are members).

Progress Update

Oman imposed a 100% excise tax on tobacco in 2019.

PREVENTION AND REDUCTION OF RISK FACTORS

SALT, SUGAR AND TRANS-FATS

Recommendations

Progress Update

Subsidies for unhealthy foods (salt, sugar, palm oil) are replaced with healthy ones (fruit and vegetable and healthy oils).

This was raised through the NCD committee but not yet implemented.

Tax on sugar-sweetened beverages is introduced with funds re-invested in health sector.

Tax of 50% on carbonated drinks as well as a tax of 50% on soft drinks, plus a tax of 100% on energy drinks is already in place. Tax revenues are not earmarked for the health sector.

Implement labelling for food and beverages rich of salt, sugar or unhealthy fats.

Oman is implementing the GSO standard for Labeling of Prepackaged Food Stuffs (GSO 9/2013 (E)) which mandates labelling for prepacked food with detailed ingredients and nutritive value of the food.

The Gulf Cooperation Council (GCC) policy on food labelling and elimination of trans-fats is adopted and implemented.

Oman will implement the GSO standard of traffic light labelling along with the other Gulf countries.

Legislation is introduced to protect children from the marketing of unhealthy foods and beverages.

OTHER RISKS FACTORS

Recommendations

Progress Update

More intensive discussion takes place to engage the private sector in supporting the Government implement the WHO NCD Global Action Plan “best buys”.

Scale up in developing a set of “healthy cities/villages”.

The city of Sur is currently recognized as a healthy city, and recently Bloomberg Philanthropies and the WHO invited Muscat to join the partnership for healthy cities.

Government ministries and other bodies such as universities demonstrate leadership by becoming “healthy institutions” by NCD-friendly healthy actions such as banning tobacco use and promoting healthy food and physical activity.

PREVENTION AND REDUCTION OF RISK FACTORS

OTHER RISKS FACTORS

Recommendations

Civil society is encouraged to promote consumer demand for government policies and industry action that encourage access to healthy NCD choices for Omanis.

Progress Update

The media highlight NCDs in Oman and the need for pro-NCDs policies in the country. This should include maximising the opportunity of mobile Health for health promotion.

SURVEILLANCE, MONITORING AND EVALUATION

Recommendations

Conduct and finalize STEPS survey by the end of 2016 to ensure that Oman can report on all the NCD targets and indicators.

Conducts a Global Adult Tobacco Survey (GATS) and a national nutritional survey by the end of 2016.

Consider undertaking a nationally representative 24-hour urine study by the end of 2016.

Look to strengthen its civil registration and vital statistics in order to improve the quality of its mortality data.

Enhance the completeness of cancer registration and ensure sustainability of the national cancer registry to be in-line with international standards.

Progress Update

STEPS, GATS and the national nutrition survey completed.

Completed in the stepwise survey of 2017.

A visit was conducted by a team from IARC and the WHO. The cancer registry was evaluated. All technical comments with regards to improving the quality of data has been taken into consideration and incorporated in the 2016 cancer incidence reports and onwards.

HEALTHCARE

Recommendations

Better institutionalize the process of guidelines adaptation/development (structure, processes followed, quality control).

Better integrate existing guidelines moving away from diseases specific guidelines (hypertension, diabetes, CVD) that do not necessarily complement each other to more integrated management. WHO Voluntary Global Target 8 on CVD risk reduction offers an opportunity to better integrate and adapt existing guidelines, adopting WHO recommended total CVD risk stratification approach. As new country specific WHO/ISH CVD risk prediction charts will be made available later this year, countries will have to review their guidelines and training package.

Adopt a monitoring system to assess and enhance quality of care for NCDs (the primary health care indicators that have been developed by EMRO would be a useful model for Oman to build on).

Evaluate the impact and cost-effectiveness of the early detection programme to date in advance of its expansion.

Exploring opportunities for using mHealth, including telemedicine for the management of NCDs. There are opportunities for Oman to learn from the experience of countries in the Region (Tunisia, mCessation, Egypt, mDiabetes) and beyond (Senegal, mDiabetes), in collaboration with the WHO-ITU team.

Progress Update

MOH has recently introduced telemedicine clinics under the Al Shifa system, the central electronic medical records system. Clinics are now run in all governorates through phone consultations. Oman also shares regular messages through all MOH social media platforms on different NCD related topics.

RECOMMENDATIONS FOR ACTION FOR THE UN SYSTEM

Recommendations

Resident UN agencies establish a Thematic group on NCDs (or equivalent) to provide joined up multisectoral technical support in collaboration with UN partners.

WHO (EMRO, HQ and Country Office – through the One-WHO integrated support initiative) should provide technical and convening support for establishing a national coordination mechanism.

WHO and UNDP should provide support for costing, prioritization and finalization of the NCD action plan as well as developing the business case.

Progress Update

BIBLIOGRAPHY

- [1] World Health Organization, 'Oman Noncommunicable Disease Country Profile', 2018.
- [2] Ministry of Health Sultanate of Oman, 'MOH Launches National Policy & Multisectoral Plan on NCDs - Media Center Display Page'. [Online]. Available: <https://www.moh.gov.om/en/-/---669>. [Accessed: 22-Nov-2020].
- [3] World Health Organization, 'Sustainable Development Goals'. [Online]. Available: https://www.who.int/health-topics/sustainable-development-goals#tab=tab_1. [Accessed: 22-Nov-2020].
- [4] United Nations Inter Agency Taskforce for NCD Prevention and Control, 'Oman Joint Mission Report', 2016.
- [5] D. E. Bloom et al., 'The Global Economic Burden of Noncommunicable Diseases. Geneva: World Economic Forum', 2011. [Online]. Available: http://www3.weforum.org/docs/WEF_Harvard_HE_GlobalEconomicBurdenNonCommunicableDiseases_2011.pdf.
- [6] Worldometer, 'Oman Coronavirus Cases', 2020. [Online]. Available: <https://www.worldometers.info/coronavirus/country/oman/>. [Accessed: 24-Jul-2020].
- [7] World Health Organization, 'Preventing chronic diseases: a vital investment', WHO, 2015.
- [8] World Health Organization, 'Tackling NCDs: "best buys" and other recommended interventions for the prevention and control of noncommunicable diseases', 2017.
- [9] World Health Organization, 'Sultanate of Oman STEPS Survey 2017', 2017.
- [10] Ministry of Health Sultanate of Oman, World Health Organization, and Center for Disease Control, 'Global Youth Tobacco Survey. Fact Sheet Oman 2010', 2010.
- [11] Ministry of Health Sultanate of Oman, 'Global Youth Tobacco Survey. Fact Sheet Oman 2016', 2016.
- [12] World Health Organisation, 'Global recommendations on physical activity for health', 2010.
- [13] D. McCall, 'WHO mission report on an assessment of the school and adolescent health programmes as well as the management information system [unpublished]', 2014.
- [14] World Health Organization, 'Reducing free sugars intake in children and adults', WHO, 2017.
- [15] Food and Agriculture Organization, 'New Food Balances - Oman', 2017. [Online]. Available: <http://www.fao.org/faostat/en/#data/FBS>.
- [16] World Health Organization, 'Salt Reduction', 2020. [Online]. Available: <https://www.who.int/news-room/fact-sheets/detail/salt-reduction>.
- [17] World Health Organization, 'WHO plan to eliminate industrially-produced trans-fatty acids from global food supply', 2018. [Online]. Available: <https://www.who.int/news-room/detail/14-05-2018-who-plan-to-eliminate-industrially-produced-trans-fatty-acids-from-global-food-supply>.
- [18] Sultanate of Oman, 'Combating the epidemic of Non-Communicable Diseases in Oman by changing the nutritional quality of the food chain'. .
- [19] World Health Organization, 'Healthy Diet', 2020. [Online]. Available: <https://www.who.int/en/news-room/fact-sheets/detail/healthy-diet>.
- [20] World Health Organization, 'Global Report on Diabetes', 2016.

- [21] World Health Organization, 'Information and public health advice: heat and health', 2011. [Online]. Available: <https://www.who.int/globalchange/publications/heat-and-health/en/>.
- [22] World Health Organization Regional Office for Europe, 'Non-communicable Diseases and Air Pollution', 2019. [Online]. Available: http://www.euro.who.int/__data/assets/pdf_file/0005/397787/Air-Pollution-and-NCDs.pdf?ua=1.
- [23] World Health Organization, 'Global Health Observatory Data Repository', 2017.
- [24] BREATHELIFE, 'The Air Pollution in Muscat, Oman'. [Online]. Available: https://breathelife2030.org/city_data/muscat/. [Accessed: 13-Aug-2020].
- [25] World Health Organization, 'Climate and Health Country Profile Oman', 2015.
- [26] A. Musaiger, 'Food Consumption Patterns in the Eastern Mediterranean Region', 2011. [Online]. Available: <https://www.acnut.com/v/images/stories/pdf/cov2.pdf>.
- [27] K. Backholer, S. Vandevijvere, M. Blake, and M. Tseng, 'Sugar-sweetened beverage taxes in 2018: A year of reflections and consolidation', *Public Health Nutrition*, vol. 21, no. 18. Cambridge University Press, pp. 3291–3295, 01-Dec-2018.
- [28] C. Batis, J. A. Rivera, B. M. Popkin, and L. S. Taillie, 'First-Year Evaluation of Mexico's Tax on Nonessential Energy-Dense Foods: An Observational Study', *PLOS Med.*, vol. 13, no. 7, p. e1002057, Jul. 2016.
- [29] Food Standards Scotland, 'Diet and Nutrition: Recommendations for an out of home strategy for Scotland. Board Meeting 21 August 2019', Board Meeting 21 August 2019, 2019. [Online]. Available: https://www.foodstandards.gov.scot/downloads/Diet_and_Nutrition_-_Recommendations_for_an_out_of_home_strategy_for_Scotland.pdf.
- [30] US News, 'Is Your City Making You Fat?', *US News & World Report*, 2020. [Online]. Available: <https://www.usnews.com/news/cities/articles/2020-02-20/is-your-city-making-you-fat-how-urban-planning-can-address-the-obesity-epidemic>.
- [31] World Health Organization, 'Healthy city is an active city (A): a physical activity planning guide', Mar. 2017.
- [32] R. Mabry, 'Urbanization and Physical Activity in the GCC: A Case Study of Oman', 2018. [Online]. Available: http://eprints.lse.ac.uk/86875/1/_lse.ac.uk_storage_LIBRARY_Secondary_libfile_shared_repository_Content_LSE_Middle_East_Centre_Papers_2018_Mabry_Urbanisation_and_physical_activity.pdf.
- [33] Oxford Business Group, 'Oman's health care system increasingly ready to meet the population's needs', 2016. [Online]. Available: <https://oxfordbusinessgroup.com/overview/rise-growing-population-finds-health-care-system-ready-meet-its-needs>.
- [34] V. Nair, 'Details of Mandatory Health Insurance in Oman Revealed.', *Oman Observer*, 2019. [Online]. Available: <https://www.omanobserver.om/details-of-mandatory-health-insurance-in-oman-revealed/>.
- [35] Ministry of Health Sultanate of Oman, 'Health Vision 2050', 2014.
- [36] Ministry of Health Sultanate of Oman, 'National Policy for the Prevention and Control of Non-communicable diseases', 2016.
- [37] World Health Organization, 'Global Health Expenditure Database', 2020.
- [38] Oxford Business Group, 'Omani health care groups tackle lifestyle-related disease', 2018. [Online]. Available: <https://oxfordbusinessgroup.com/analysis/fit-and-proper-national-groups-expand-efforts-tackle-lifestyle-related-illness>. [Accessed: 22-Nov-2020].

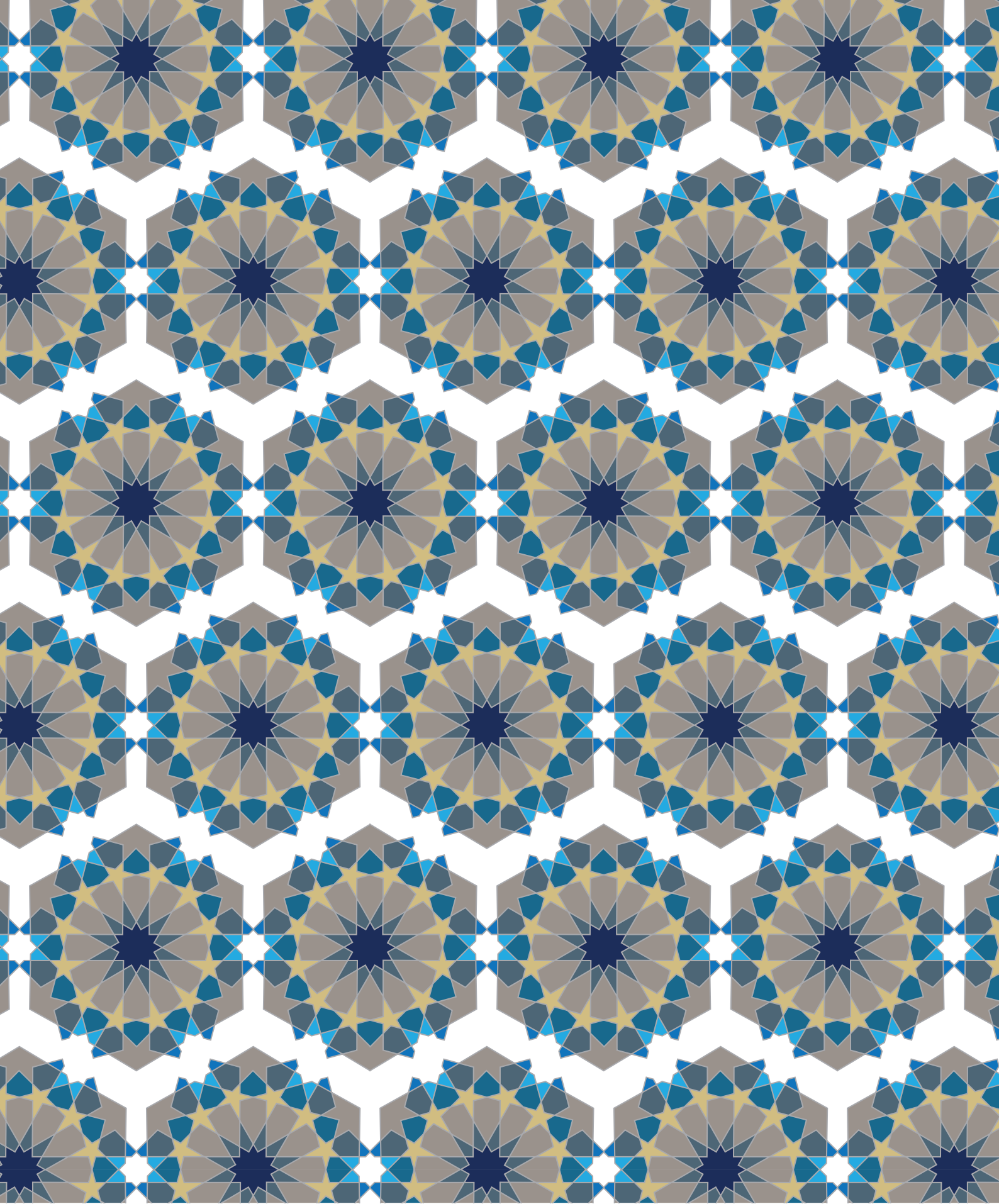
- [39] J. Al-Lawati, R. M. Mabry, and Z. Q. Al-Busaidi, 'Tobacco control in oman: It's time to get serious!', *Oman Medical Journal*, vol. 32, no. 1. Oman Medical Specialty Board, pp. 3–14, 01-Jan-2017.
- [40] World Health Organization, 'WHO report on the global tobacco epidemic, Country profile Colombia', 2019.
- [41] World Health Organization, 'WHO NCD Progress Monitor 2020', 2020.
- [42] Ministry of Regional Municipalities and Water Resources Sultanate of Oman, 'Ministerial Decision - No. 272/2010 Regulating Smoking at Enclosed Public Places', 2010. [Online]. Available: <https://www.tobaccocontrolaws.org/files/live/Oman/Oman> - Decision No. 272.pdf.
- [43] Tobacco Control Laws, 'Legislation by Country - Oman'. [Online]. Available: <https://www.tobaccocontrolaws.org/legislation/country/oman/atp-sales-restrictions>. [Accessed: 13-Aug-2020].
- [44] WHO FCTC Secretariat, '2018 Global Progress Report on the Implementation of the WHO Framework Convention on Tobacco Control', 2018.
- [45] Ministry of Health Sultanate of Oman, 'Excise Tax - Taxpayer Portal'. [Online]. Available: <https://tms.taxoman.gov.om/portal/excise>. [Accessed: 22-Nov-2020].
- [46] World Health Organization, 'Oman launches physical activity campaign', 2016.
- [47] World Health Organization Regional Office for the Eastern Mediterranean, 'Country cooperation strategy for WHO and Oman 2018–2022', 2017.
- [48] Al Jisr Foundation, 'National Nutrition Campaign'. [Online]. Available: <http://www.aljisrfoundation.org/en/national-nutrition-campaign-nnc/>.
- [49] World Action on Salt & Health, 'Country Profile Oman'. [Online]. Available: <http://www.worldactiononsalt.com/worldaction/middle-east/oman/>. [Accessed: 13-Aug-2020].
- [50] World Health Organization, 'Know the NCD targets'.
- [51] S. Al-Bahlani and R. Mabry, 'Preventing non-communicable disease in Oman, a legislative review', *Health Promot. Int.*, vol. 29, pp. i83–i91, Jun. 2014.
- [52] World Health Organization, 'Oman beating NCDs at the souk, the restaurant and the bakery doors', 2017. [Online]. Available: <https://www.who.int/news-room/feature-stories/detail/oman-beating-ncds-at-the-souk-the-restaurant-and-the-bakery-doors>. [Accessed: 22-Nov-2020].
- [53] World Health Organization, 'WHO Global Action Plan for Prevention and Control of Non-communicable Diseases', 2013.
- [54] Gulf Cooperation Council Standardization Organization, 'Trans Fatty Acids', 2015. [Online]. Available: https://extranet.who.int/ncdccc/Data/OMN_B17_Transfatty acids GSO-2483-2015-E.pdf.
- [55] Oman Observer, 'Oman to impose 50% tax on sweetened drinks', 2020. .
- [56] A. A. Ammouri, A. Tailakh, C. Isac, J. K. Kamanyire, J. Muliira, and S. Balachandran, 'Knowledge of coronary heart disease risk factors among a community sample in Oman: Pilot study', *Sultan Qaboos Univ. Med. J.*, vol. 16, no. 2, pp. 189–196, May 2016.
- [57] S. Anwar, G. J. Moslhey, H. H. Rashid, and B. Aleem, 'International Journal of Current Research in Medical Sciences Awareness and Perception of Hypertension in Oman', *Int. J. Curr. Res. Med. Sci*, vol. 4, no. 12, pp. 12–2018, 2018.
- [58] World Health Organization, 'Global NCD Target Improve Access to Technologies and Medicines to Treat NCDs', 2016.

- [59] Gulf Committee for Diabetes Control, 'The Gulf Executive Plan to Combat Diabetes 2016-2025'.
- [60] R. B. Khandekar and J. A. Al-Lawati, 'Epidemiology of diabetic retinopathy in Oman: Two decades of research', *Oman Journal of Ophthalmology*, vol. 8, no. 1. Medknow Publications, pp. 1–2, 01-Sep-2015.
- [61] I. S. Al-Busaidi, 'Diabetic foot disease in oman: A call for more research', *Oman Medical Journal*, vol. 32, no. 4. Oman Medical Specialty Board, pp. 354–355, 01-Jul-2017.
- [62] R. A. Salman, A. S. Alsayyad, and C. Ludwig, 'Type 2 diabetes and healthcare resource utilisation in the Kingdom of Bahrain', *BMC Health Serv. Res.*, 2019.
- [63] Gulf News, 'Oman spent more than Dh57.24m on cancer medicine in 2015', 2016. [Online]. Available: <https://gulfnews.com/world/gulf/oman/oman-spent-more-than-dh5724m-on-cancer-medicine-in-2015-1.1675885>.
- [64] S. Ray, Guarascio, Finch, and T. Self, 'The clinical and economic burden of chronic obstructive pulmonary disease in the USA', *Clin. Outcomes Res.*, vol. 5, no. 1, p. 235, Jun. 2013.
- [65] R. J. Mitchell and P. Bates, 'Measuring health-related productivity loss', *Popul. Health Manag.*, 2011.
- [66] P. S. Wang et al., 'Chronic Medical Conditions and Work Performance in the Health and Work Performance Questionnaire Calibration Surveys', *J. Occup. Environ. Med.*, 2003.
- [67] C. Bommer et al., 'The global economic burden of diabetes in adults aged 20–79 years: a cost-of-illness study', *Lancet Diabetes Endocrinol.*, 2017.
- [68] T. Barnay and T. Debrand, 'Effects of health on the labour force participation of older persons in Europe', 2006.
- [69] P. Darvin, S. M. Toor, V. Sasidharan Nair, and E. Elkord, 'Immune checkpoint inhibitors: recent progress and potential biomarkers', *Exp. Mol. Med.*, vol. 50, no. 12, p. 165, Dec. 2018.
- [70] Avenir Health, 'One Health Tool', 2017. [Online]. Available: <http://www.avenirhealth.org/software-onehealth.php>.
- [71] World Health Organization and United Nations Development Programme, 'Non-Communicable Disease Prevention and Control: A Guidance Note For Investment Cases', 2019. [Online]. Available: <https://apps.who.int/iris/bitstream/handle/10665/311180/WHO-NMH-NMA-19.95-eng.pdf?sequence=1>.
- [72] K. Stenberg et al., 'Advancing social and economic development by investing in women's and children's health: A new Global Investment Framework', *The Lancet*. 2014.
- [73] C. Garg and D. Evans, 'What is the impact of non-communicable diseases on national health expenditures: a synthesis of available data', 2011.
- [74] T. Miles, 'Australia wins landmark WTO ruling on plain tobacco packaging', *Reuters*. [Online]. Available: <https://www.reuters.com/article/us-wto-tobacco-ruling/australia-wins-landmark-wto-ruling-on-plain-tobacco-packaging-idUSKBN1JO2BF>.
- [75] T. E. Emrich, Y. Qi, W. Y. Lou, and M. R. L'Abbe, 'Traffic-light labels could reduce population intakes of calories, total fat, saturated fat, and sodium', *PLoS One*, vol. 12, no. 2, p. e0171188, Feb. 2017.
- [76] J. Webster, K. Trieu, E. Dunford, and C. Hawkes, 'Target salt 2025: A global overview of national programs to encourage the food industry to reduce salt in foods', *Nutrients*, vol. 6, no. 8, pp. 3274–3287, Aug. 2014.

- [77] WHO, 'Global action plan for the prevention and control of noncommunicable diseases 2013-2020.', World Heal. Organ., p. 102, 2013.
- [78] World Health Organization, 'WHO report on the global tobacco epidemic, 2019. Country Profile Oman', 2019. [Online]. Available: https://www.who.int/tobacco/surveillance/policy/country_profile/omn.pdf?ua=1.
- [79] World Health Organization, 'Tobacco taxes and prices. Table 9.1', 2017. [Online]. Available: https://www.who.int/tobacco/global_report/2017/appendix-ix/en/.
- [80] World Health Organization, 'Resource tool on alcohol taxation and pricing policies', 2017. [Online]. Available: <https://apps.who.int/iris/bitstream/handle/10665/255795/9789241512701-eng.pdf?sequence=1>.
- [81] A. M. Thow, S. M. Downs, C. Mayes, H. Trevena, T. Waqanivalu, and J. Cawley, 'Fiscal policy to improve diets and prevent noncommunicable diseases: From recommendations to action', Bull. World Health Organ., 2018.
- [82] E. Blecher, A. C. Liber, J. M. Drope, B. Nguyen, and M. Stoklosa, 'Global Trends in the Affordability of Sugar-Sweetened Beverages, 1990–2016', Prev. Chronic Dis., vol. 14, no. 5, p. 160406, May 2017.
- [83] Arabian Business, 'No plans to delay introduction of VAT in Oman, says finance ministry', 2019. [Online]. Available: <https://www.arabianbusiness.com/politics-economics/425134-no-plans-to-delay-introduction-of-vat-in-oman-says-finance-ministry>. [Accessed: 24-Jul-2020].
- [84] Gulf Cooperation Council, 'The Common VAT Agreement of the States of the Gulf Cooperation Council'. [Online]. Available: [https://www.mof.gov.ae/en/lawsAndPolitics/govLaws/Documents/GCC VAT Agreement.pdf](https://www.mof.gov.ae/en/lawsAndPolitics/govLaws/Documents/GCC%20VAT%20Agreement.pdf).
- [85] International Renewable Energy Agency, 'Sultanate of Oman Renewables Readiness Assessment', 2014.
- [86] Oman Daily Observer, 'Oman targets 3,050 MW of renewables by 2025', 2020. [Online]. Available: <https://www.omanobserver.om/oman-targets-3050-mw-of-renewables-by-2025/>.
- [87] Ministry of Health Sultanate of Oman, 'Muscat Joins Partnership for Healthy Cities Network', 2019. [Online]. Available: <https://www.moh.gov.om/en/--1169>.
- [88] World Health Organization, 'Responding to non-communicable diseases during and beyond the COVID-19 pandemic', Geneva, Switzerland, 2020.
- [89] D. Rajan et al., 'Governance of the Covid-19 response: a call for more inclusive and transparent decision-making', BMJ Glob. Heal., 2020.
- [90] H. P. Henri Kluge et al., 'Prevention and control of non-communicable diseases in the COVID-19 response', Lancet, vol. 395, pp. 1678–1680, 2020.
- [91] World Health Organisation, 'Rapid assessment of service delivery for NCDs during the COVID-19 pandemic', 2020. [Online]. Available: <https://www.who.int/publications/m/item/rapid-assessment-of-service-delivery-for-ncds-during-the-covid-19-pandemic>. [Accessed: 16-Jun-2020].
- [92] Al Arabiya, 'Coronavirus: Oman begins nationwide lockdown, imposes fines for curfew violators', 2020. [Online]. Available: <https://english.alarabiya.net/en/coronavirus/2020/07/26/Coronavirus-Oman-begins-nationwide-lockdown-imposes-fines-for-curfew-violators>. [Accessed: 16-Jun-2020].
- [93] Z. Zheng et al., 'Risk factors of critical & mortal COVID-19 cases: A systematic literature review and meta-analysis', Journal of Infection. W.B. Saunders Ltd, 2020.

- [94] World Health Organisation, 'Information note on COVID-19 and NCDs', 2020. [Online]. Available: <https://www.who.int/who-documents-detail/covid-19-and-ncds>. [Accessed: 12-May-2020].
- [95] A. Algabbani, A. Alqahtani, and N. BinDhim, 'Prevalence and determinants of non-communicable diseases in Saudi Arabia', *Food Drug Regul. Sci. J.*, vol. 2, no. 2, p. 1, Aug. 2019.
- [96] N. M. Ferreira-Borges C, Breda J, 'Alcohol and COVID-19: what you need to know. The World Health Organization Europe', 2020. [Online]. Available: http://www.euro.who.int/__data/assets/pdf_file/0010/437608/Alcohol-and-COVID-19-what-you-need-to-know.pdf. [Accessed: 29-Apr-2020].
- [97] A. Tamara and D. L. Tahapary, 'Obesity as a predictor for a poor prognosis of COVID-19: A systematic review', *Diabetes Metab. Syndr. Clin. Res. Rev.*, vol. 14, no. 4, pp. 655–659, Jul. 2020.
- [98] Y. Zhu, J. Xie, F. Huang, and L. Cao, 'Association between short-term exposure to air pollution and COVID-19 infection: Evidence from China', *Sci. Total Environ.*, vol. 727, p. 138704, Jul. 2020.
- [99] World Health Organisation, 'NCDs, poverty and development', 2014. [Online]. Available: <https://www.who.int/global-coordination-mechanism/ncd-themes/poverty-development/en/>. [Accessed: 25-May-2020].
- [100] B. Leo, 'Technology to fight COVID-19 in the Developing World', *The Africa Report*, 2020. [Online]. Available: <https://www.theafricareport.com/26184/technology-to-fight-covid-19-in-the-developing-world/>. [Accessed: 22-May-2020].
- [101] Malay Mail, 'Covid-19: "MyTrace" app to help in contact tracing, says senior minister', 2020. [Online]. Available: <https://www.malaymail.com/news/malaysia/2020/05/03/covid-19-mytrace-app-to-help-in-contact-tracing-says-senior-minister/1862624>.
- [102] S. Chabba, 'Coronavirus tracking apps: How are countries monitoring infections?', *Deutsche Welle*, 2020. [Online]. Available: <https://www.dw.com/en/coronavirus-tracking-apps-how-are-countries-monitoring-infections/a-53254234>.
- [103] ITU News, 'Ghana launches COVID-19 Tracker App', *ITU News*, 2020. [Online]. Available: <https://news.itu.int/ghana-launches-covid-19-tracker-app/>. [Accessed: 22-May-2020].
- [104] WHO EMRO, 'Using technology to contain COVID-19 in Oman | COVID-19 | Health topics', 2020. [Online]. Available: <http://www.emro.who.int/health-topics/corona-virus/using-technology-to-contain-covid-19-in-oman.html>. [Accessed: 22-Nov-2020].
- [105] World Health Organization Europe, 'Food and nutrition tips during self-quarantine', 2020. [Online]. Available: <http://www.euro.who.int/en/health-topics/health-emergencies/coronavirus-covid-19/technical-guidance/food-and-nutrition-tips-during-self-quarantine>.
- [106] World Health Organization Europe, 'Stay physically active during self-quarantine', 2020. [Online]. Available: <http://www.euro.who.int/en/health-topics/health-emergencies/coronavirus-covid-19/novel-coronavirus-2019-ncov-technical-guidance-OLD/stay-physically-active-during-self-quarantine>.
- [107] UN General Assembly, 'Addis Ababa Action Agenda of the Third International Conference on Financing for Development', 2015.
- [108] UN General Assembly, 'Resolution adopted by the General Assembly on 10 October 2018', 2018. [Online]. Available: <https://undocs.org/A/RES/73/2>.

- [109] World Health Organization, 'Accelerator Discussion Frame 1', 2018. [Online]. Available: <https://www.who.int/docs/default-source/global-action-plan/accelerator1.pdf>.
- [110] The Task Force on Fiscal Policy for Health. Chairs: Michael R. Bloomberg and Lawrence H. Summers, 'Health Taxes to Save Lives, Employing Effective Excise Taxes on Tobacco, Alcohol, and Sugary Beverages', New York: Bloomer Philanthropies, 2019.
- [111] G. Gopinath, 'The Great Lockdown: Worst Economic Downturn since the Great Depression', 2020.
- [112] World Health Organization, 'Earmarking for Health', 2017. [Online]. Available: <https://www.who.int/publications/i/item/earmarking-for-health>.
- [113] World Health Organization, 'Increasing fruit and vegetable consumption to reduce the risk of noncommunicable diseases', 2019.
- [114] World Health Organization, 'Promoting fruit and vegetable consumption around the world'. [Online]. Available: <https://www.who.int/dietphysicalactivity/fruit/en/>.
- [115] L. Samuel, '5 creative ways to trick people into eating healthy', 2016.
- [116] World Health Organization, 'Fiscal policies for diet and prevention of noncommunicable diseases: technical meeting report.', 2020.
- [117] J. K. Ransley, E. F. Taylor, Y. Radwan, M. S. Kitchen, D. C. Greenwood, and J. E. Cade, 'Does nutrition education in primary schools make a difference to childrens fruit and vegetable consumption?', Public Health Nutr., 2010.
- [118] A. Gold, M. Larson, J. Tucker, and M. Strang, 'Classroom Nutrition Education Combined With Fruit and Vegetable Taste Testing Improves Children's Dietary Intake', J. Sch. Health, 2017.
- [119] B. A. Jones, G. J. Madden, and H. J. Wengreen, 'The FIT Game: Preliminary evaluation of a gamification approach to increasing fruit and vegetable consumption in school', Prev. Med. (Baltim)., 2014.
- [120] L. K. Bandy, P. Scarborough, R. A. Harrington, M. Rayner, and S. A. Jebb, 'Reductions in sugar sales from soft drinks in the UK from 2015 to 2018', BMC Med., 2020.
- [121] A. Al-Jawaldeh, M. Rayner, C. Julia, I. Elmadfa, A. Hammerich, and K. McColl, 'Improving nutrition information in the Eastern Mediterranean Region: Implementation of front-of-pack nutrition labelling', Nutrients. 2020.
- [122] F. M. Kroese, D. R. Marchiori, and D. T. D. De Ridder, 'Nudging healthy food choices: A field experimnet at the train station', J. Public Heal. (United Kingdom), 2016.
- [123] S. Chaput, G. Mercille, L. Drouin, and Y. Kestens, 'Promoting access to fresh fruits and vegetables through a local market intervention at a subway station', Public Health Nutr., 2018.
- [124] H. Freisling, K. Haas, and I. Elmadfa, 'Mass media nutrition information sources and associations with fruit and vegetable consumption among adolescents', Public Health Nutr., 2010.
- [125] Ammouri et al. (2016). Knowledge of Coronary Heart Disease Risk Factors among a Community Sample in Oman. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4868518/>
- [126] World Health Organization, "Scaling up action against NCDs: how much will it cost," 2011. Available at https://apps.who.int/iris/bitstream/handle/10665/44706/9789241502313_eng.pdf?sequence=1.



سلطنة عُمان
وزارة الصحة
Sultanate of Oman
Ministry of Health

مجلس الصحة
للدول مجلس التعاون
Gulf Health Council



UN INTERAGENCY
TASK FORCE ON NCDs



@un_ncd



World Health
Organization

