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

QATAR

State of Qatar
Ministry of Public Health

مجلس الصحة
لدول مجلس التعاون
Gulf Health Council

UN INTERAGENCY TASK FORCE ON NCDs
#beatNCDs
@un_ncd

World Health Organization

UNDP

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

QATAR

Prepared by

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

February 2023

Why invest?

IN 2018, AROUND 1,600 QATARIS DIED FROM NON-COMMUNICABLE DISEASES (NCDS), CAUSING

68%

OF ALL DEATHS IN QATAR.

NCDS COST QATAR QR 18.1 BILLION (US$ 5 BILLION) EVERY YEAR, EQUIVALENT TO

2.7% OF GDP IN 2019.

27%

OF THE MAIN NCDS,

CARDIOVASCULAR DISEASE

CAUSES THE MOST DEATHS EVERY YEAR.

IN QATAR, MORE THAN 25% OF PEOPLE LIVE WITH NCDS AND ARE AT INCREASED RISK OF SEVERE COVID-19.

HYPERTENSION AND OBESITY ARE THE MOST PREVALENT METABOLIC RISK FACTORS IN QATAR. PEOPLE LIVING WITH HYPERTENSION AND OBESITY ARE

more than twice as likely

TO SUFFER FROM SEVERE COVID-19.

Investing now

in proven NCD prevention and clinical measures will

PREVENT NEARLY

24,600

DEATHS AND AVERT

OVER

QR 27 billion

OR (US$ 7.5 BILLION) IN ECONOMIC LOSSES BY 2034.

CONTENTS

DISCLAIMER

Suggested citation. Elmusharaf K., Stanton, R., Chestnov, R. et al. (2023) Prevention and Control of Non-Communicable Diseases in Qatar: The Case for Investment. Geneva: UNDP, WHO, UNIATF, GHC.

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

Graphic design by Zsuzsanna Schreck.

ACKNOWLEDGEMENTS

The authors express their sincere gratitude to the Ministry of Public Health of Qatar, the national team that supported the data collection and analysis and the stakeholders who took the time to be interviewed.

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 Qatari officials. The publication also greatly benefited from the intensive advice and contributions of Dr Yahya Al Farsi and the overall guidance of Dr Suleiman Aldakheel, both with the GHC. Dr Khalifa Elmusharaf, University of Limerick, carried out the economic analysis assisted by David Tordrup. Dr Elmusharaf wrote this report together with Rachael Stanton, Johanna Jung, Roman Chestnov, Eileen Liu, Daniel Grafton and Dudley Tarlton of the United Nations Development Programme, Giuseppe Troisi of the UN Interagency Task Force on NCDs and Slim Slama and Nasim Pourghazian of the WHO Eastern Mediterranean Regional Office.

The contributions of the WHO and UNDP Regional Offices and the Qatar Ministry of Public Health in organizing the development of the investment case, and Qatar's ministries and national institutions in providing materials to inform this report are also gratefully acknowledged.

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 Unit 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

BMI	body mass index
CHE	current health expenditure
COPD	chronic obstructive pulmonary disease
COVID-19	coronavirus disease
CRD	chronic respiratory diseases
CVD	cardiovascular disease
DALY	disability-adjusted life-year
GCC	Gulf Cooperation Council
GDP	gross domestic product
GHC	Gulf Health Council
GSO	GCC Standardization Organization
HMC	Hamad Medical Corporation
IMF	International Monetary Fund
QR	Qatari Riyal
MI	myocardial infarction
MOPH	Ministry of Public 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
OOP	out-of-pocket
PHCC	Primary Healthcare Centres Corporation
ROI	return on investment
SSBs	sugar-sweetened beverages
STEPS	WHO STEPwise approach to surveillance
UNDP	United Nations Development Programme
UNIATF	United Nations Interagency Task Force on Non-communicable Diseases on NCDs
WHO	World Health Organization

EXECUTIVE SUMMARY

Overview

The four main NCDs – cancer, cardiovascular diseases, diabetes and chronic respiratory diseases – cause 68 percent of deaths in Qatar. 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.

As in many parts of the world, NCDs in Qatar 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 metabolic[1] – 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 life-saving NCD services.

Qatar's Ministry of Public Health made it a priority to conduct the NCD investment case presented here, which provides evidence that NCDs reduce economic output and that Qatar would benefit from investing in four policy intervention packages that reduce exposure to behavioural risk factors (tobacco use, harmful use of alcohol, 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 four policy packages modelled, the investment case discusses a range of issues that affect health and sustainable development in Qatar. These include air pollution, the food system and urban design (see pages 29-30 and **recommendation 4**), implementation of other interventions such as bans on trans-fats and health taxes on sugar (see **Table 2** on page 43) 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 Qatar. The responsibility for action, as well as the benefits that come from it, fall beyond the health sector alone.

1 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 Qatari economy QR 18,1 billion (US$ 5 billion), equivalent to 2.72% of its 2019 GDP.

These annual costs include a) QR 7.2 billion (US$ 2 billion) in healthcare expenditures, and b) QR 10.9 billion (US$ 3 billion) in lost productive capacities due to premature mortality, disability and workplace losses. The productivity losses from current NCDs account for 60 percent of all NCD-related costs – indicating that NCDs severely impede development in Qatar beyond health. Multisectoral engagement is required for an effective response, and other sectors benefit substantially from supporting NCD investments.

2 Cardiovascular diseases had the greatest impact on the economic burden of NCDs in Qatar, making up 73% of the total burden (QR 13 billion).

Indirect costs, including reduced workforce participation and loss in national productivity, contributed more than direct healthcare spending to the total cardiovascular diseases burden (75 percent and 25 percent respectively).

3 NCDs kill around 1,600 people in Qatar per year, with a risk of nearly one in six of dying before the age of 70.

NCDs contribute to 68 percent of all deaths in Qatar. Cardiovascular disease is the leading cause of NCD deaths Qatar, accounting for 27 percent of all deaths in the country, followed by cancer, other NCDs (16 percent each) and diabetes (9 percent). Chronic respiratory diseases (1 percent) contribute the least to NCD deaths.

By acting now, the Government of Qatar can reduce the burden of NCDs. The investment case findings demonstrate that investing in four proven policy packages would, over the next 15 years:

1 Avert QR 27 billion (US$ 7.5 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 over 24,600 deaths and reduce the incidence of disease.

Enacting the CVD and diabetes clinical intervention package would prevent the most deaths (12,469) followed by the salt reduction package (10,463). About 92 percent of the mortality averted for all interventions (24,679 deaths averted) would be premature deaths averted (22,889 of people <70 years of age).

3 Provide economic benefits (QR 27 billion) that significantly outweigh the costs (QR 4 billion) of implementation.

Each of the WHO-recommended 'best buy' intervention packages is associated with benefits outweighing the costs. The salt reduction package has the highest return on investment over 15 years (25 Qatari Rial for every 1 Qatari Rial invested), followed by CVD and diabetes clinical interventions (5.9), tobacco control (5.6) and diet and physical activity awareness (1.5).

Recommendations

1 > Invest and scale-up

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

2 > 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.

3 > Monitor and account

Strengthen monitoring and evaluation and accountability across sectors.

4 > Innovate

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

5 > Build back better

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

'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

INTRODUCTION

This report provides an overview of the current context of NCDs in Qatar, 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

Qatar has made considerable progress in advancing the prevention and control of non-communicable diseases (NCDs) over the past several years. Still, NCDs remain the leading cause of mortality in Qatar and their prevalence continues to rise. NCDs not only harm health but also sustainable development in Qatar.

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 percent of 2010 global GDP. [1] 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 Qatar as elsewhere, adding to the urgency with which they must be addressed. In response to the pandemic, the Government of Qatar has created an internet resource with COVID-19 information on the virus, restrictions, policy, protective measures and most recently a registration for vaccinations. [2] NCDs and their risk factors – behavioural, environmental and metabolic – increase both susceptibility to infection and the likelihood of severe symptoms and death. People living with NCDs are also at risk of adverse health outcomes 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. **Annex 1** briefly discusses interactions between NCDs and COVID-19 with integrated actions the Qatar government can take.

Box 1. Qatar's multi-sectoral collaboration on NCDs

In Qatar, the Ministry of Public Health (MOPH) has been engaging a wide range of relevant stakeholders for development and implementation of specific NCD-related strategies and guidelines.

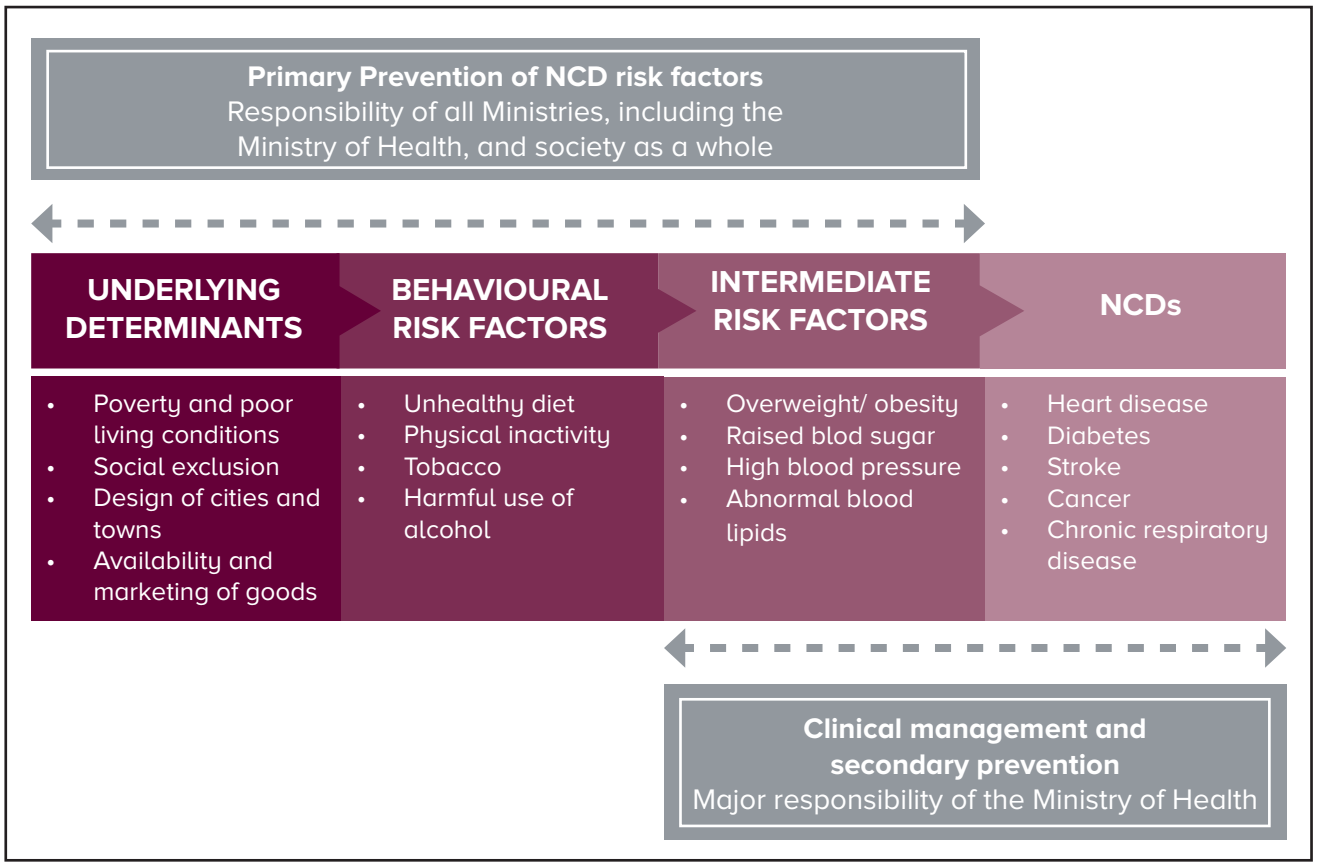
For example, the Qatar National Nutrition and Physical Activity Action Plan [139] was created to align with the results and analysis in the World Health Survey 2006 Qatar. The Action Plan was developed by the National Nutrition and Physical Activity Committee in order to implement the National Health Strategy part 3.2, which is around Nutrition and Physical Activity. The committee was established in April 2011 and is made up of representatives from the following institutions: the Supreme Education Council (SEC), Primary Health Care, Hamad Medical Corporation, Ministry of Municipality and Urban Planning, Ministry of Environment, Qatar Media Corporation, Qatar University, Qatar Olympic Committee, Qatar Women's Sports Committee, Qatar Museum Authority and ASPETAR (Qatar Orthopaedic and Sports Medicine Hospital). [139]

The third sector and civil society have also played a role in the development of NCD control and policy in Qatar. For example, the Qatar Red Crescent Society (a charitable organization) opened the Qatar Workers Health Centre in December 2010, in collaboration with the MOPH, Ministry of Labour and several select private partners. The centre bridges the gap between government, civil society and private companies, and provides community-based NCD prevention. The centre works with private companies to improve workers health-related knowledge and reduce NCDs with interventions including printing leaflets in different languages and conducting information seminars. [140]

High human and economic costs of NCDs highlight the need to reduce their burden in Qatar. The risk of developing NCDs can be reduced by modifying four types of behavioural (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 percent of premature heart disease, stroke and diabetes and 40 percent of cancers can be prevented by eliminating risk factors. [3] 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.

Fig. 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. 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. [4]

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

1 **TOBACCO CONTROL PACKAGE**
REDUCE TOBACCO USE PREVALENCE

2 **SALT REDUCTION INTERVENTION PACKAGE**
REDUCE SALT CONSUMPTION

3 **DIET AND PHYSICAL ACTIVITY AWARENESS PACKAGE**
REDUCE PHYSICAL INACTIVITY AND IMPROVE DIET

4 **CVD AND DIABETES CLINICAL INTERVENTIONS**
SCREEN, TREAT AND MANAGE DIABETES AND CARDIOVASCULAR DISEASE

This report provides an overview of the current context of NCDs in Qatar, 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. The **situation analysis** outlines the health system and institutional arrangements in Qatar 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 Qatar. The report also includes **four annexes** to provide further guidance on effective NCD prevention and control measures to support Qatar sustain improvements in population health.

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:

STATUS QUO

NO NEW POLICIES ARE IMPLEMENTED, AND CURRENT COVERAGE LEVELS REMAIN IN PLACE

INVESTMENT SCENARIO

COST-EFFECTIVE POLICIES AND CLINICAL INTERVENTIONS ARE SCALED UP OVER THE NEXT 15 YEARS

ESTIMATION

THE ECONOMIC AND HEALTH BENEFITS OF IMPLEMENTATION OF FOUR POLICY PACKAGES

ANALYSIS

ROI ANALYSIS OF IMPACT OF INTERVENTIONS AND IDENTIFYING WHICH MEASURES PRODUCE THE LARGEST RETURN

NCDS AND RISK FACTORS IN QATAR

This section provides an overview of the most prevalent behavioural risk factors for NCDs in Qatar: 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 QATAR

Noncommunicable diseases (NCDs) and their risk factors are at present the leading cause of morbidity, mortality and disability in Qatar. According to the Qatar National Health Strategy 2018-2022, over two-thirds of all deaths are attributable to chronic conditions, particularly cardiovascular disease (24 percent), cancer (18 percent) and diabetes (7 percent). [5] This data is comparable to WHO estimates. [6]

People in Qatar are exposed to several behavioural risk factors for NCDs, particularly physical inactivity, unhealthy diet and tobacco use. This results in high rates of diabetes, cardiovascular disease and obesity. Indeed, 70 percent of adults in Qatar are overweight, 46 percent have low levels of physical activity. [7] In 2016, 13 percent of adults were estimated to have diabetes, compared to a worldwide prevalence of 8.5 percent. [6]

Photo credit: © Lars Plougmann via Flickr

Tobacco use

According to the Global Tobacco Survey in 2013, about 12 percent of adults in Qatar used tobacco. [8] Tobacco use prevalence has since slightly increased, based on modelling data from WHO (14 percent age-standardised prevalence in 2018). [9] Second-hand smoking is also an issue in Qatar. Overall, 12.0 percent of adults (8.3 percent among Qatari nationals, and 13.8 percent among expats) who worked indoors were exposed to tobacco smoke at their workplace, and a further 16.8 percent were exposed at their homes. [8] Additionally, the Qatar MOPH stated that despite the presence of a tobacco law that bans smoking in public places in Qatar, up to 29 percent of people in Qatar were exposed to tobacco smoke in restaurants. These results highlight the need for stricter enforcement, which is thought to have contributed to lower tobacco smoke exposure in government buildings. [10] WHO modelling data predicts a decrease of tobacco use prevalence over the next five years. [11]

Water pipe smoking (shisha) is another big challenge for tobacco control in Qatar. A large cross-sectional survey in Qatar concluded that many shisha smokers considered shisha a safer alternative to cigarettes. This highlights the need for educational intervention and awareness campaigns in Qatar. [12] Since Qatar signed and ratified the WHO Framework Convention on Tobacco Control (FCTC) in 2004, [13] there seems to be a growing number of shisha cafes in the country, along with an increasing trend towards shisha smoking among both adults and teenagers, and a reportedly still high prevalence of cigarette use. [12]

Physical inactivity

Physical activity is defined as any bodily movement that requires energy expenditure. Physical inactivity (lack of physical activity) has been identified as the fourth leading risk factor for global mortality (6 percent of deaths globally). Moreover, physical inactivity is estimated to be the main cause for approximately 21–25 percent of breast and colon cancers, 27 percent of diabetes and approximately 30 percent of ischaemic heart disease burden. [14]

The Qatar National Health Strategy 2018-2022 highlights that 44 percent adults in Qatar have low levels of physical activity. Levels of physical inactivity are particularly high among women, and 83 percent of women report not engaging in vigorous activity. [5] There is limited data available on activity levels in children, but studies such as the Qatar Active Healthy Kids Report suggest children do not meet recommended activity standards. [5]

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. WHO recommends to reduce sugar intake to no more than 10 percent of total energy intake for both adults and children and suggests a further reduction to 5 percent.[2] [15]

The World Health Survey conducted in Qatar in 2006 showed that the majority of the population (81.7 percent) did not consume the recommended amounts of fruits and vegetables (of five servings) per day. [17] Similar results were obtained from the STEPs survey (WHO STEPwise approach to surveillance) in 2017, which found that 83 percent of adults in Qatar did not meet the recommendations for fruit and vegetable consumption. Furthermore, the majority of the population frequently consumed sweetened beverages or sweets and fast foods. [18]

Photo credit: © World Bank via Flickr

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 percent

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

by 2025. [19] The Qatari MOPH is working with bakeries to limit the salt use by 30 percent in bread production. [20]

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. [21] As part of the Gulf Cooperation Council (GCC) Standardization Organization, Qatar adheres to a regulation on trans fats where only minimal quantities are permitted in the food supply and they must be declared on the label. [22] Working together with WHO, the Qatar MOPH has launched the Fat, Sugar and Salt reduction Initiative in Qatar to cut such contents in food and beverages – both locally manufactured goods and those imported. [20]

Metabolic risk factors

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

The World Health Organization estimates that in 2016, 34 percent of adults and 18 percent of adolescents in Qatar were obese. [6] Like in other GCC countries, obesity disproportionally affects women (42 percent), and prevalence has increased over the past years. Overweight is a major risk factor for obesity. The 2012 STEPS survey found that a staggering 70 percent of the adult population in Qatar were overweight. [7] A study from the MOPH found that among students aged 5-19 years, the prevalence of overweight or obesity was 45 percent among males and 40 percent among females. [23] This suggests that nearly one in two students in Qatar is overweight.

According to the 2006 World Health Survey in Qatar, 14 percent of the population suffered from hypertension. High cholesterol blood levels were recorded in 27 percent of women and 24 percent of men living in Qatar. [17] The prevalence of both hypertension and hypercholesteremia were found to have increased in the 2012 STEPS survey (33 percent and 22 percent, respectively). [7]

Diabetes has been identified as one the most important health challenges in the State of Qatar. In 2012, the global rate of diabetes was 8 percent, while in Qatar it reached 17 percent. [24] WHO estimated that in 2014, 13 percent of people in Qatar had diabetes, but prevalence is likely to increase again. [6] Indeed, a recent modelling study found that without appropriate interventions, diabetes prevalence will increase to 24 percent by 2050. [25]

Environmental risk factors

Climate conditions: Occupying a small land on the eastern coast of the Arabian Peninsula. Qatar has a dry, subtropical desert climate with low annual rainfall and intensely hot and humid summers. Exposure to such high temperatures, especially for long periods of time, causes physiological stress, may amplify pre-existing conditions and even cause premature death. [26] Qatar is therefore a challenging environment for outdoor physical activity.

Urban environment: Qatar has witnessed its first urbanisation period during the second half of the 20th century, which was linked to rapidly increasing oil production. The Qatari Government has outlined the new strategy "'Qatar National Vision 2030'" for the future prosperity in areas such as diverse economy, clean energy, e-health and urban health. Growth strategies should include plans to create an urban environment conducive to healthy and active living.

Air pollution: Air pollution poses risks to health even at relatively low levels, and causes significant loss of life and ill-health in countries at all levels of development. Exposure to air pollution is related to an increased risk for certain NCDs, such as ischaemic heart disease, stroke, chronic obstructive pulmonary disease and cancers. Levels of ambient air pollution in Qatar are extremely high. In 2014, the median PM2.5 levels in rural and urban areas in Qatar were 103 ug/m^3, which is significantly higher than the global and regional (Eastern Mediterranean) average. [27] The WHO estimated that about 200 deaths were caused by air pollution in Qatar in 2010. [28]

Availability and affordability of nutritious foods: In the region, food consumption patterns have shifted towards more processed foods and animal products, and fewer fruits and vegetables. This coincides with a decrease in fibre intake and an increased intake in sugar, sodium and unhealthy fats (saturated and trans fats). [29]

Food affordability is measured by the ability of consumers to purchase food, their vulnerability to price shocks and the presence of programmes and policies to support consumers when shocks occur. However, affordability and availability of foods does not guarantee ease of access to nutritious and healthy foods.

Food availability is measured through sufficiency of the nation's food supply, risk of supply disruption, capacity to disseminate food and research efforts to expand agricultural output. Qatar and the Middle East region has been working on increasing food supply for its growing and urbanising populations, through exploring urban agriculture and investing in technology to boost productivity. [30]

SITUATION ANALYSIS

This section reviews Qatar'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

In the last decades, Qatar made considerable investments in developing and strengthening its health system by modernising and building new health infrastructure, improving governance and increasing the size of the workforce. [32] Since the early 2000s, the population of the country increased more than fivefold, [33] generating a need for new healthcare providers and facilities to cater for the growing demand. Between 2003 and 2008, the number of physicians in the country more than doubled [32] and continued to increase in the subsequent years. The nurse to population ratio rose from 4.9 per 1,000 people in 2001 to nearly 7.3 in 2018. [34] New hospitals and facilities were recently constructed, expanding the number of hospital beds from around 2,630 in 2016 to over 3,530 in 2018. [35] However, the hospital bed to population and the physicians to population ratios remain below the averages across the GCC and high-income countries. [34] This is partly due to the rapid population growth driven by labour migration. Nonetheless, the development of the healthcare system yielded positive results in healthcare outcomes with a significant reduction in the mortality rate of under 5 year-olds – from 12.5 per 1,000 live births in 2000 to 6.5 in 2019 [36], and a substantial increase in life expectancy – from 77.5 years in 2000 to 80.1 years in 2018. [33]

Qatar has an extensive public healthcare system that is governed by the MOPH. The provision of the services is managed through two not-for-profit entities – the Hamad Medical Corporation (HMC) and the Primary Healthcare Centres Corporation (PHCC). Together, the HMC and PHCC serve over 90 percent of the population. [35] In 2017, the operational capacity of the public system included 13 general and specialized hospitals, 26 primary and health and wellness centres, as well as four Medical Commission units and a specialised centre for treatment of behavioural disorders. [37] In addition to the public healthcare system, Qatar has an extensive network of private healthcare providers, including six private hospitals and more than 200 private polyclinics, as well as a range of clinics, laboratories, pharmacies and medical centres. [35]

Accessing services at public health facilities is mostly free and involves no or very small co-payments as the major share of costs is subsidized by the Government. [35] The increase in the NCD prevalence combined with the an aging population places a growing pressure on the healthcare budget. The Government has thought of introducing a compulsory health insurance similar to the Kingdom of Saudi Arabia, but this has not yet been implemented.

To contain growing healthcare expenses, the Government works to enhance preventive care services and to take stronger action at preserving people's health. This focus is reflected in key strategic and policy documents that set development objectives for the health sector and the country as a whole, including the National Health Strategy 2018-2022, Qatar Public Health Strategy 2017-2022 and Qatar National Vision 2030. The MOPH has taken steps to improve the availability and accessibility of primary healthcare and to promote population screening. Strengthening NCD prevention and control is an integral part of this effort, and the Government has demonstrated strong commitment to improving NCD-related services. For example, in 2019 the Qatar Diabetes Prevention Programme received funding for a nation-wide research on diabetes screening and prevention and has begun recruitment in 2020.

NCD GOVERNANCE

Multisectoral coordination

The MOPH takes a leading role in governing the national health system and developing NCD-related strategies and guidelines. Under the MOPH, the Health Promotion Department is the key player and driving force in NCDs-relevant issues.

The key functions of the Department involve developing guidelines for occupational health-related programmes, implementing laws related to tobacco control, providing expertise and support to promote public health and community partnerships, developing procedures for educational and awareness-raising programmes, working with healthcare providers to support public health strategies, and supervising the implementation of the law regulating mental health among other. [38]

Fulfilling the above functions implies close collaboration with relevant partners and stakeholders and engaging in such collaboration has been an important element of the Department's work. Other ministries and institutions in Qatar have been actively engaging in the collaboration which has a favourable impact on integration of NCD response in the national development agenda. The WHO Review Mission on the National Prevention and Control Response to NCDs conducted in 2018 observed a high political commitment to NCD prevention and control across different sectors and governance structures in Qatar. In particular, the magnitude of the NCD burden, its socio-economic implications and the need for multisector response was recognized by national stakeholders at different levels. [39]

Strategy and planning

Coordination on NCD policies and interventions is further facilitated through national strategies and plans that set common objectives for a diverse range of national stakeholders. In Qatar, both the MOPH and other national governing bodies have given considerable attention to formulating policies in the area of NCDs and health promotion. There is, therefore, a range of strategic documents that address various aspects of NCD policies, from high-level policy frameworks to more NCD-specific plans:

The **Qatar National Vision 2030** provides a long-term vision for the country's development and identifies priorities that inform the formulation of thematic national strategies and implementation plans. [40] The Vision is based on four interconnected pillars, one of which – human development – emphasises the need to foster a healthy population.

The **National Health Strategy 2018-2022**, led by the MOPH, [5] identifies "priority populations", among which are the elderly and people living with NCDs. The Strategy aims to achieve a 20 percent improvement in patient empowerment[3] for people living with chronic conditions by

3 This refers to empowering patients with 'the knowledge and skills to better manage their conditions and prevent unnecessary hospitalization and emergency visits'. It also includes provisions to enable self-care for patients, facilitated

2022 [41] and a one-year increase in Healthy Life Years for the population aged 65 years and above by 2022. [42] Five system-wide priorities are set in the Strategy, one of them is "Enhanced Health Promotion and Disease Prevention". In this priority, the MOPH sets targets clearly [43]:

^ Halt in the rate of overweight and obesity amongst adults (+18 years old) by 2022

^ Five percent reduction in smoking prevalence by end of 2022

^ Achievement of at least 100 percent of the priority surveys included in the data collection framework by 2022

^ Achievement of 100 percent of the health promotion intervention included in the Healthcare Sector Development Action Plan by 2022.

The **Qatar Public Health Strategy 2017-2022**, also led by the MOPH has two major objectives that are relevant to NCDs [44]:

^ Reducing the spread of diseases and premature death from NCDs

^ Enabling individuals to make informed decisions to improve their health through effective awareness campaigns, and implement disease prevention strategies that enhance their lives and health for longer years

Both of these objective are also reflected in the Primary Healthcare Strategic Plan 2019-2023, developed by the PHCC, which includes goals to increase health promotion and well-being, provide early detection and screening, and improve primary care system capability and collaboration. [45]

The **National Diabetes Strategy 2016-2022** was developed by the MOPH with the objective to deliver better and more proactive diabetes services. The strategy's vision statement "Preventing Diabetes Together" was chosen in recognition of the need for continuous collaboration and coordination between health care professionals, patients, patients' families, educators, community leaders, researchers and all programmes that influence the lifestyle and behaviour of population. The strategy sets clear goals that involve launching a national programme to screen all adult populations for diabetes by 2020, providing ongoing education to all healthcare professionals about caring for diabetes patients, providing an annual health plan for all those who have been screened and at risk of becoming ill by 2022. [46]

by integrated and accessible services.

The **Qatar National Dementia Plan 2018-2022** was developed by the Dementia Stakeholder Group in close collaboration with the MOPH. Recognising the gradual ageing of the population, the plan was put in place to promote effective dementia response. The plan is aligned with the Global Plan of Action to Combat Dementia 2017-2025 and articulates the relevant strengths, weaknesses, opportunities and risks along seven working areas for curbing prevalence and severity of dementia in Qatar by 2022. [47]

Health financing

Current health expenditure (CHE) in Qatar is estimated at around 2.6 percent of GDP. [48] In 2003-2008, the country saw a gradual decline in total health spending, however it rebounded in 2012-2015. Overall the level of CHE as a share of GDP in Qatar is lower than in all other GCC countries; however, it is actually the highest in per capita terms amounting to almost US$ 1,650. [48]

The major share of the total health spending is financed by the Government, estimated at 74.7 percent (2018), while the remaining 25.3 percent are financed primarily by out-of-pocket payments as well as voluntary health insurance. [48] The Government allocates around 6.3 percent of its total general expenditure to health – a level that has been maintained since 2013. [48]

Out-of-pocket (OOP) payments have declined between 2000 and 2017 – from around 30 percent to around 9 percent of the CHE. [48] In per capita terms, OOP expenditure on health is lower than in most other GCC countries, and is below the estimated average across high income countries. [48] Nonetheless, some income groups face challenges in accessing healthcare due to high costs and lack of social security coverage. The Qatar World Health Survey in 2008 found that for 5 percent of households, OOP expenditure was above 40 percent, meaning that by definition, these households have faced a catastrophic payment. [49] More recent studies point to the persistence of the problem. A 2020 multivariate analysis of data from the 2014 Household Utilization and Expenditure Survey found that many migrant laborers in Qatar were discouraged from accessing healthcare because of insufficient financial protection. [50]

To maintain affordable healthcare for the population, the Government of Qatar has been subsidizing services provided at healthcare facilities. In principle, both Qatari and non-Qatari residents are obliged to have some form of health insurance coverage, which allows to access healthcare for free or at lower cost. However, health insurance coverage remains an issue among certain population groups, in particular migrant workers, which exposes them to increased financial risk. [50], [51]

IMPLEMENTATION STATUS OF MEASURES MODELLED UNDER THE INVESTMENT CASE

The WHO's Global Action Plan for the Prevention and Control of Non-Communicable Diseases 2013-2020 contains effective clinical and policy interventions recommended for implementation at the national level. **Table 1 and 2** outline the progress Qatar has made towards implementation of key interventions recommended by the WHO. The tables draw attention to areas that need to be strengthened and scaled up to achieve 100 percent coverage.

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

TOBACCO	
Intervention	***Monitor tobacco use/prevention policies***
Current state of implementation	Mpower score= complete policy. The Government has both national and representative data for both adults and youth in Qatar. The Global Adult Tobacco Survey and Global Youth Tobacco Survey were both carried out in 2013. [52] A nationwide STEPS survey was also conducted in 2012.
Intervention	***Protect people from tobacco smoke***
Current state of implementation	While the law prohibits smoking in indoor public places, an implementing decree specifying the places where smoking is prohibited has not been issued. Thus, currently there are no restrictions on smoking in indoor places, workplaces or public transport. [53]
Intervention	***Offer to help quit tobacco use: Brief intervention***
Current state of implementation	Nicotine replacement therapy and Varenicline is available in the country and requires a prescription, with the cost fully covered by national/federal health insurance. Bupropion, another medication commonly used to support smoking cessation, is also available with a prescription, with the cost partially covered by national/federal health insurance or the national health service. [52]

TOBACCO

Intervention ***Offer to help quit tobacco use: mCessation***

Current state of implementation

Smoking cessation support is available in some primary care facilities, health professionals' offices, but not in the community. [52] As of 2019, there is no toll-free telephone quit line/help line available for citizens to discuss cessation. [54]

Intervention ***Warn about danger: warning labels***

Current state of implementation

GSO (GCC Standardization Organization) Technical Regulation 246/2011 on Labelling of Tobacco Product Packages regulates packing and labelling in the Gulf region. Under GSO 246/2011 tobacco products must carry text/picture warning (no less than 50 percent of package) however requirements regarding rotation are uncertain. There are also prohibitions on misleading package/labelling including the use of terms "light" and "low tar". [55] However, the law does not specify that health warnings appear on an equal number of retail packages to ensure concurrent display of messages and does not require that health warnings on smokeless tobacco products are specific to smokeless tobacco products. [56]

Intervention ***Warn about danger: mass media campaign***

Current state of implementation

Qatar has launched comprehensive national anti-tobacco campaigns. MOPH launched a campaign in 2018 as part of the national target within the National Healthy Strategy 2018-2022, to reduce tobacco consumption by 30 percent. In collaboration with HMC and PHCC, the campaign aims to reduce the consumption and effects of smoking and other tobacco products. [57]

Intervention ***Enforce bans on tobacco advertising***

Current state of implementation

Qatar has implemented a number of direct advertising bans and has banned 9 out of 10 types of indirect bans, scoring high on compliance with advertising restrictions according to Tobacco Atlas. [58] However, point of sale product displays are still allowed. To align with FCTC Article 13, tobacco product displays including the visibility of tobacco products at the point of sale should be prohibited. [59]

TOBACCO

Intervention ***Enforce youth access restriction***

Current state of implementation

According to the Global Youth Tobacco Survey survey (2013), 54.6 percent of current young smokers purchased cigarettes at a store, shop, street vendor, kiosk or cafeteria, and among current smokers, 56 percent were not prevented from purchasing due to their age. [60]

Intervention ***Raise taxes on tobacco***

Current state of implementation

On 1st January 2019, the Qatar Excise Tax Law came into effect, adopting the GCC-approved excise taxes. This includes an 100 percent tax rate applied to all tobacco and tobacco derivatives. [61]

Intervention ***Plain packaging of tobacco products***

Current state of implementation

Plain or standardized packaging is not currently required by law. [56]

PHYSICAL INACTIVITY

Intervention ***Awareness campaigns to encourage increased physical activity***

Current state of implementation

Several awareness campaigns have been launched in Qatar to encourage and increase physical activity. MOPH launched the 'Start Now' campaign in collaboration with HMC and PHCC in 2017. Qatar Sports for All Federation, MOPH and Ministry of Culture and sports developed a physical activity programme within the National Nutrition and Physical Activity Action plan, promoting physical activity. The programmeme targets various age groups and is also aimed at changing culture and behaviour towards physical activity. [62] MOPH also launched the Wellness Program in the Workplace in 2014, which focuses on preventing NCDs by promoting physical activity in the work environment and outside, amongst other factors such as promoting healthy nutrition. [63]

PHYSICAL INACTIVITY

Intervention ***Brief advice as part of routine care***

Current state of implementation

National Physical Activity Guidelines were published in 2014, which include the hope that it would be shared with patients 'at every opportunity'. [64] The guidelines were officially launched in 2015, with a workshop conducted to target professionals from healthcare backgrounds to raise awareness of the importance of physical activity in health promotion. A recent study found the workshops increased knowledge of the national physical activity guidelines, and the most common form of physical activity intervention is through verbal advice. The study concluded that while some healthcare professionals offer physical activity advice, improvements could be made. [65] A recent study found that only 13 percent patients received advice from their physician concerning the benefits of regular physical exercise. [64]

SODIUM

Intervention ***Surveillance***

Current state of implementation

There is little information available regarding surveillance on sodium intake levels amongst the population. A urinary sodium excretion measurement with a representative sample, considered the gold standard for dietary sodium assessment, has not been conducted. [66]

SODIUM

Intervention ***Harness industry for reformulation***

Current state of implementation

Qatar has successfully reduced the salt content of bread produced by the main bread supplier (one-third market share) by 20 percent since the start of 2014. This reduction has also been achieved in other main bakeries, with others still in the pilot phase. An additional 10 percent reduction was planned by the end of 2017 to meet targets of reducing salt by 30 percent. A multisectoral national committee has been established to strategize and monitor implementation of salt reduction in bread, with the aim of reducing content by up to 30 percent and reducing levels in samples containing more than 0.8 percent salt. The Ministry of Public Health also monitors implementation to ensure the sustainability of salt reduction strategies in Qatar. [66]

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

Current state of implementation

The MOPH made nutritional labelling mandatory on food products imported into Qatar starting 1 January 2017. Food items not in compliance with the GSO regulation (GSO 9/2013) are not allowed to be imported into Qatar. [67] A traffic light food labelling has been introduced into MOPH premises as part of a pilot scheme, but GCC standards on labelling products in supermarkets has not yet been implemented. Technical assistance has been requested to support the development of salt, fat and sugar policies. [62]

Intervention ***Adopt standards: strategies to combat misleading marketing***

Current state of implementation

According to the WHO NCD progress monitor, Qatar does not meet the WHO recommendations for restrictions on marketing to children, or marketing of breast-milk substitutes. [68]

Intervention ***Knowledge: education and communication***

Current state of implementation

The National Nutrition and Physical Activity Action outlines a comprehensive plan to promote healthy lifestyle nationwide with a focus on nutrition and physical activity. This includes several implementation tools including the Qatar Physical Activity Guidelines, Qatar Dietary Guidelines, in addition to the development of a training of trainers manual for the Qatar Dietary Guidelines. [62] The dietary guidelines include advice on how to reduce the intake of table salt and salty foods, and associated risks. [69] In 2018, MOPH launched an initiative to coincide with Salt Awareness Week to reduce salt consumption in the population. This included several events and activities on best practices to reduce salt consumption, and the dangers of using large amounts of salt. [70]

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 disability-adjusted life-year (DALY) averted in low- and middle-income countries) on trans-fat and sugar, respectively. Though these are not modelled under the investment case, **Table 2** shows the current state of implementation for trans-fats and sugar-related policies.

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

TRANS-FAT	
Intervention	***Eliminate industrial trans-fat by developing legislation to ban their use in the food chain***
Current state of implementation	In 2015 the GCC Standard Organization released a regulation on trans-fats. No more than 2 percent of total fat is permitted in oils and margarine spreads and no more than 5 percent 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. [22]

SUGAR	
Intervention	***Reduce sugar consumption through effective taxation on sugar-sweetened beverages***
Current state of implementation	In 2019, Qatar adopted the GCC-approved tax increases of 50 percent on carbonated high-calorie drinks, which is applicable to sodas and other sugar-sweetened beverages (SSBs), and 100 percent on energy drinks. [61] The GCC is also considering how to modify the design of the tax on SSBs to be more effective (e.g. UK tax on sugar content).

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** below lists a selection of those most relevant to this analysis and are included in the modelling.

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

SCREENING	
Intervention	***Screening for risk of cardiovascular disease and diabetes***
Current state of implementation	As of 2017, less than 25 percent of primary health care facilities report offering cardiovascular disease (CVD) risk stratification and applying government-established CVD guidelines. [6] Qatar's National Diabetes Strategy Preventing Diabetes Together 2016-2022 set a goal to launch a national screening programme by 2018, which would include all target adult populations being screened by 2020. [24]

CARDIOVASCULAR DISEASE	
Intervention	***Treatment for those with high absolute risk of cardiovascular diseases and diabetes (>30 percent)***
Current state of implementation	According to WHO NCD progress monitor (2020), Qatar has not achieved target 10 for drug therapy/counselling to prevent heart attacks and strokes. [68] However, Qatar reports having 10 out of 10 WHO-recommended essential medicines, and 6 out of 6 essential NCD technologies as "generally available". [71]
Intervention	***Treatment of new cases of acute myocardial infarction (MI) with aspirin; Treatment of cases with established ischaemic heart disease and post-myocardial infarction); Treatment for those with established cerebrovascular disease and post-stroke***
Current state of implementation	The Gulf Committee for Cardiovascular Diseases Control released a plan for 2009-2019 which included an objective to improve the quality of health services to patients with cardiovascular diseases, as well as a goal to strengthen the means of monitoring and evaluation of cardiovascular diseases. [72]

DIABETES

Intervention ***Glycaemic control***

Current state of implementation

According to WHO NCD progress monitor (2020), Qatar has not achieved target 10 which includes the provision of drug therapy including glycaemic control. [68]

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

Current state of implementation

As of 2016, retinal photocoagulation, renal replacement procedures, as well as foot vibration perception technology and Doppler exams of foot vascular status were reported as "generally available" in Qatar. [71]

METHODS

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

METHODS

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

CALCULATION OF ECONOMIC BURDEN OF NCDS

1. DIRECT COSTS
(HEALTH CARE COSTS)

2. INDIRECT COSTS
(ABSENTEEISM, PRESENTEEISM AND PREMATURE DEATH)

COMPONENT 2

ROI ANALYSIS

1. COSTING OF INTERVENTIONS
(POLICY AND CLINICAL INTERVENTIONS)

2. IMPACT OF INTERVENTIONS

3. RETURNS ON INVESTMENT USING COSTS AND IMPACT
(COSTS AND BENEFITS)

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 Qatar economic growth, by calculating the cost of illness as a share of gross domestic product (GDP) 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 Qatar 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.

Step 1: Calculating the direct costs

Direct costs represent costs incurred within the health system to treat diseases. 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 (CRD). 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. The average medical cost per patient for each of the four NCD 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 Qatar consumer price index. The number of patients using the health services was estimated based on Institute for Health Metrics and Evaluation (IHME, 2017) (**Table 4**).

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

	Average cost per patient in 2019		Estimated number of patients using the health services in 2019	
NCDs	Cost QR	Data source	Number	Data source
Diabetes	11,969	(Rabha, 2019)	137,478	Assume that 50% of actual estimated number (274,956) of existing cases used the service. Existing cases estimation is based on IHME-GBD_2017 higher estimate.
CVD	24,764	(Bahrain estimation used proxy for Qatar, 2016)	101,684	Assume that 80% of actual estimated number (127,104) of existing cases used the service. Existing cases estimation is based on IHME-GBD_2017 higher estimate.
Cancer	20,000	Qatar Cancer Society, 2019 18,727	30,999	Assume that actual estimated number of existing cases (18,727) used the service. Existing cases estimation is based on IHME-GBD_2017 higher estimate.
CRD	8,249	(Guarascio, 2013)	106,297	Assume that 50% of actual estimated number (212,595) of existing cases used the service. Existing cases estimation is based on IHME-GBD_2017 higher estimate.

Sources: [73]–[75]

Step 2: 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 Qatar 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 Qatar 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 Planning and Statistics Authority Qatar Statistics 2019, STEPS Survey 2012 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 used to approximate each workers' productive output in a given year. GDP per worker was multiplied by the total number of unproductive working days.

Table 5. Rates of absenteeism and presenteeism due to 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 Qatar (209 days)
Sources: [73], [76]–[79]

Premature deaths

The loss of GDP due to premature death of workers was estimated by 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.

Component 2: Return on Investment (ROI) analysis

Step 1: Calculating the costs of policy and clinical interventions

The return on investment is a performance measure used to evaluate the efficiency of healthcare 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 United Nations Development Programme/WHO Joint Programme on Governance of NCDs using the OneHealth Tool and WHO Costing Tool. More detail on the use of these tools is available from the OneHealth Tool Manual [80] and is discussed in detail in a new guidance note for investment cases for preventing and controlling NCDs. [81]

Costs of policy and clinical interventions were calculated using the WHO Costing Tool for NCD prevention and control. [82] 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 conveniently has built-in functionality that works out expected costs of treatment 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 who are expected to be covered each year.

^ Intervention-specific data on current effective coverage are not available. Current and target coverage of clinical interventions was estimated based on the WHO estimated value based on WHO database. In general, current effective coverage was estimated to be 5 percent and expected to reach 80 percent by 15 years. [83]

^ For each clinical intervention the WHO Costing Tool takes as 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, estimates data based on global data was used for the computations.

^ The interventions scale-up scenario for policy interventions is Front Growth scale-up. This pattern assumes that much of the capacity to scale-up policy interventions is already in place, meaning that coverage can escalate rapidly, within 2 years. For clinical interventions we are using linear scale-up. This pattern assumes a gradual but sustained increase in coverage.

Step 2: Estimating the impact of interventions

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

^ The One Health Tool was used to assess the health 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 the 15 years under study. Local data from the STEPS survey were fed into the tool to determine the prevalence of risk factors disaggregated by age group 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, avoided economic losses can be determined, attributed to the value of avoided absenteeism and presenteeism.

^ By considering the labour force participation rate in Qatar 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 [84], 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 percent discounting.

Step 3: Calculating the returns on investment

The return on investment for Qatar was reached by comparing the total economic benefits 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 percent discounting.

Institutional context analysis

The economic analysis was complemented by an institutional context analysis, which was based on a desk review of materials, interviews with policy-makers across sectors and institutions, and discussions with stakeholders.

Members of relevant bodies discussed how NCDs can be prioritized in government policies, the priorities of various sectors and stakeholders and how these could support a strengthened whole-of-government NCD response in Qatar including implementing investment case findings. The valuable insights gained from these discussions are incorporated throughout this report and informed its findings and conclusions.

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.

RESULTS

1. Economic burden assessment

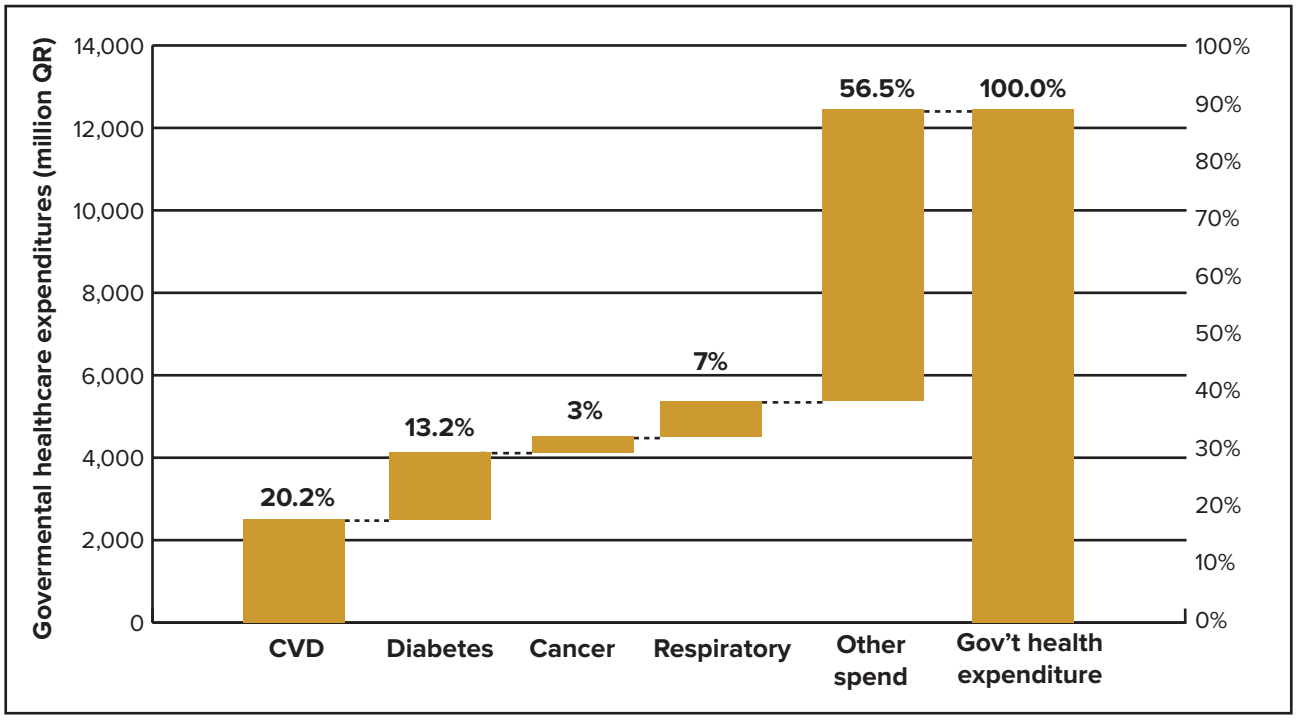
a. Direct costs

The estimate of the direct costs of the economic burden considered the total health expenditure, which included the government healthcare 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 Qatar in 2019 was QR 16,660,698,516 (US$ 4.6 billion). Government health expenditure was QR 12,440,409,810 (US$ 3.4 billion) and accounted for 74.7 percent of the total healthcare expenditures.

National Health Account data in Qatar are not available at the disease subgroup account level by NCD. Our estimates suggest that the Government spent QR 5,414,920,793 (US$ 1.5 billion) on the four major NCD groups under study, so that more than 43.5 percent of all government health expenditure is attributable to the four disease groups. **Figure 2** shows the Government Health Expenditure in 2019 on the four major NCD groups. We estimated that private healthcare costs of the four major NCD is QR 1,836,959,507 (US$ 0.5 billion). The total and government healthcare expenditures on these four major NCD groups is QR 7,251,880,300 (US$ 2 billion). This proportion (43.5 percent) is somewhat higher than other international estimates which, based on average numbers from nine countries, found that the four major NCDs were responsible for 30 percent of health care expenditure. [85]

Fig. 2. Qatar Government Health Expenditure in 2019 on the four major NCD groups



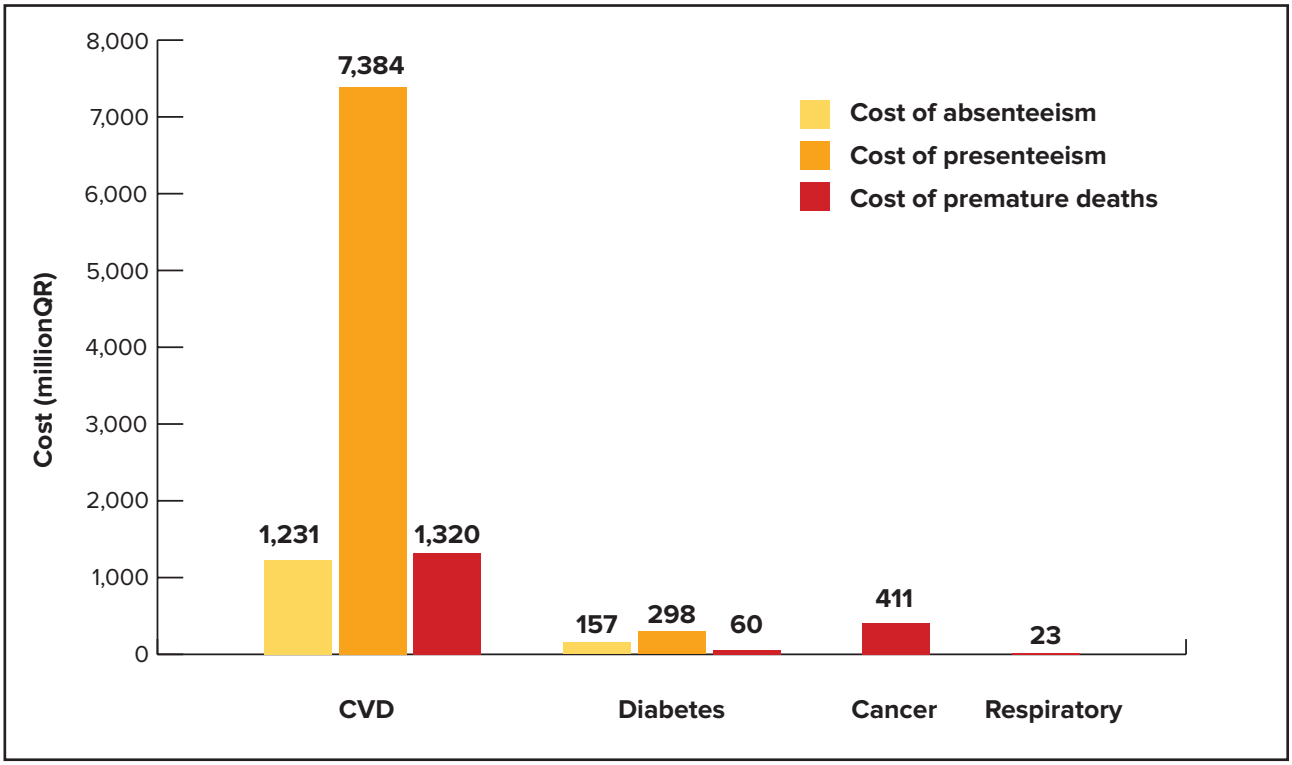
CVD accounted for the major share (20 percent of total health expenditure in Qatar in 2019), at QR 3,372,287,692 (US$ 926 million), followed by diabetes which accounted for 13.2 percent of total health expenditure, at 2,203,699,913 (US$ 605 million). Total spending on chronic respiratory diseases and cancers was estimated at QR 1,174,303,405 (US$ 323 million) (7 percent) and QR 501,589,290 (US$ 138 million) (3 percent), respectively.

b. Indirect costs

For Qatar, 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 QR 1,230,711,967 (US$ 338 million). For presenteeism, the corresponding calculation found that the burden is QR 7,384,497,109 (US$ 2 billion). For diabetes, the cost of absenteeism was an estimated QR 157,009,365 (US$ 43 million). For presenteeism, the corresponding calculation found that the burden is QR 298,317,794 (US$ 82 million).

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



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 QR 1,813,734,072 (US$ 500 million). The loss was the highest for cardiovascular diseases, at QR 1,320,358,050 (US$ 363 million), followed by cancer, at QR 410,686,520 (US$ 113 million).

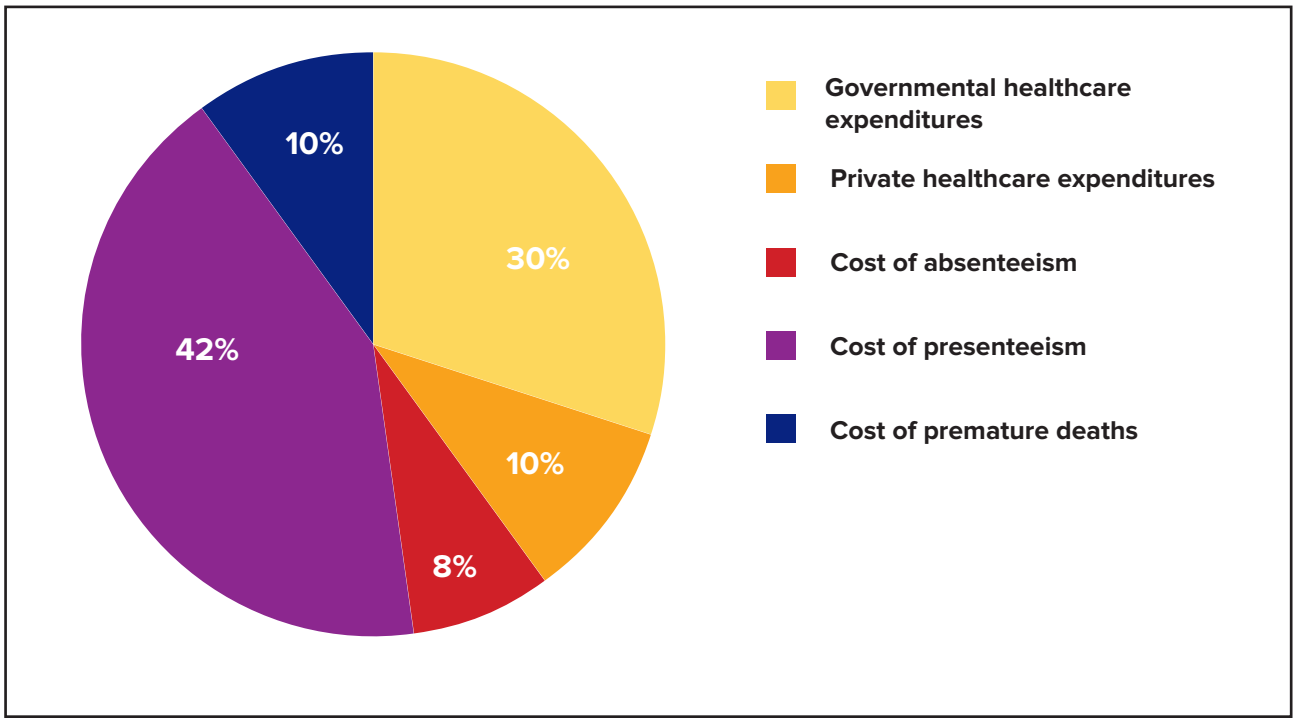
c. Total economic costs

Table 6 summarizes the total direct and indirect costs of NCDs in Qatar. The total health care spending on the four main NCDs in 2019 was already QR 7,251,880,300 (US$ 2 billion) but additional losses to the economy (absenteeism, presenteeism, premature deaths) brought the total economic burden of NCDs to QR 18,136,150,607 (US$ 5 billion), of which 40 percent was direct costs and 60 percent 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 is equivalent to 2.72 percent of GDP in 2019.

Table 6. Economic burden of NCDs in Qatar in 2019 in QR

Cost	Cardiovascular diseases	Diabetes	Cancer	Chronic respiratory diseases	Total	Per GDP
Direct cost						
Government	2,518,060,143	374,532,695	1,645,485,031	876,842,924	5,414,920,793	0.81%
Private	854,227,549	127,056,594	558,214,882	297,460,481	1,836,959,507	0.28%
Total direct cost	3,372,287,692	501,589,290	2,203,699,913	1,174,303,405	7,251,880,300	1.09%
Indirect cost						
Absenteeism	1,230,711,967	No data	157,009,365	No data	1,387,721,332	0.21%
Presenteeism	7,384,497,109	No data	298,317,794	No data	7,682,814,903	1.15%
Premature death	1,320,358,050	410,686,520	60,095,458	22,594,044	1,813,734,072	0.27%
Total indirect cost	9,935,567,126	410,686,520	515,422,617	22,594,044	10,884,270,307	1.63%
Total burden	**13,307,854,818**	**912,275,810**	**2,719,122,530**	**1,196,897,449**	**18,136,150,607**	**2.72%**

Fig. 4. Structure of the economic burden of NCDs in Qatar, 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 QR 16,529,688 (US$ 4.5 million) in the baseline year and increases to QR 100,105,147 (US$ 28 million) in 2024. Implementing the entire cardiovascular disease and diabetes clinical intervention package over the five-year scale-up period would cost QR 287,509,723 (US$ 79 million).

The total costs for the tobacco package based on MPOWER guidelines are QR 108,992,028 (US$ 30 million) for five years and QR 303,378,719 (US$ 83 million) for 15 years. The salt reduction package would cost an estimated QR 212,781,475 (US$ 85 million) over five years and the physical activity awareness interventions, QR 131,113,046 (US$ 36 million).

Table 7. Estimated costs of policy and clinical interventions, 2020–2034 (in QR)

Intervention package	2020	2021	2022	2023	2024	Total for 5 years	Total for 15 years
Policy interventions							
Tobacco control	23,196,589	22,372,465	20,466,368	22,490,238	20,466,368	108,992,028	303,378,719
Diet and physical activity awareness	16,838,350	27,643,168	27,933,313	28,824,094	29,874,120	131,113,046	542,033,242
Salt reduction	44,640,827	44,270,321	42,035,162	40,917,582	40,917,582	212,781,475	613,757,674
Clinical interventions							
CVD and diabetes clinical intervention	16,529,688	35,995,237	56,709,268	78,170,383	100,105,147	287,509,723	2,811,265,143
Total	**101,205,453**	**130,281,191**	**147,144,111**	**170,402,298**	**191,363,217**	**740,396,272**	**4,270,434,778**

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 (12,469 and 10,463 lives saved, respectively), followed by tobacco interventions (1,209 lives saved) and diet and physical activity awareness (538 lives saved). More than 92 percent of these deaths averted are premature (<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 (73,517 healthy life-years gained), the cardiovascular disease and diabetes clinical interventions (47,954 healthy life-years gained), followed by the tobacco interventions (8,347 healthy life-years gained) and diet and physical activity awareness interventions (4,250 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	1,335	706	1,209	1,136	8,347
Salt reduction	12,479	6,127	10,463	9,750	73,517
Diet and physical activity awareness	381	568	538	469	4,250
CVD and diabetes clinical intervention	5,258	3,609	12,469	11,534	47,954
Total	**19,453**	**11,010**	**24,679**	**22,889**	**134,068**

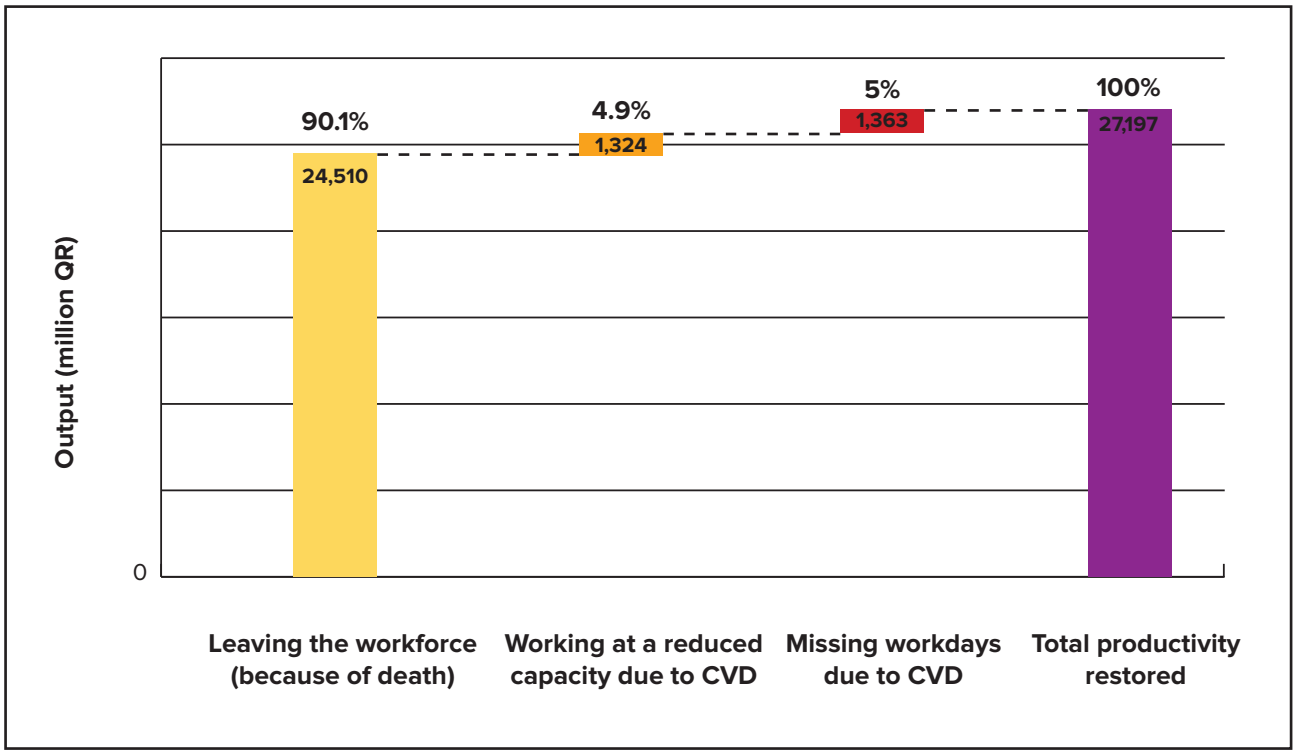
c. Economic benefits

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). **Figure 5** demonstrates the labour productivity gains that would result from the prevented deaths and disease cases over 15 years, described in **Table 8**.

The combined recovered economic output from both the clinical and the policy intervention packages in net present-value terms would be QR 27,196,641,708 (US$ 7.5 billion) in labour productivity gains over the 15-year period or equivalent to 4.1 percent of Qatar's 2019 GDP over 15 years.

The highest labour productivity gains are derived from reduced premature deaths (90.1 percent of recovered economic output), followed by reduced absenteeism and reduced presenteeism (5 percent and 4.9 percent of recovered economic output, respectively).

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



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 common when estimating the benefits of improved health to put a value on being alive. We estimated that the combined social value from both the clinical and the policy intervention packages in net present-value terms would be QR 11,413,259,044 (US$ 3 billion) 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 the salt reduction package and clinical interventions.

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

	5 years		15 years	
Intervention package	**QR**	**US$**	**QR**	**US$**
Tobacco control	39,532,625	10,860,611	712,205,781	195,660,929
Salt reduction	376,468,436	103,425,395	6,293,470,811	1,728,975,497
Diet and physical activity awareness	21,077,419	5,790,500	363,241,527	99,791,628
CVD and diabetes clinical intervention	177,388,392	48,733,075	4,044,340,924	1,111,082,671
Total	**614,466,872**	**168,809,580**	**11,413,259,044**	**3,135,510,726**

e. Return on investment

Comparing the costs and benefits of each package of interventions shows that all the NCD intervention packages included in the analysis have returns on investment greater than 1 Qatari Rial for each 1 Qatari Rial invested over 15 years (**Table 10**).

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

	5 years			15 years		
Intervention package	**Total discounted costs**	**Total productivity benefits**	**ROI**	**Total discounted costs**	**Total productivity benefits**	**ROI**
Tobacco control	102,974,800	43,705,418	0.42	250,396,093	1,394,642,082	5.57
Salt reduction	201,044,019	432,131,202	2.15	504,976,549	12,635,812,792	25.02
Diet and physical activity awareness	122,927,102	20,367,416	0.17	429,440,740	623,908,530	1.45
CVD and diabetes clinical intervention	265,409,545	468,868,389	1.77	2,118,994,649	12,542,278,304	5.92
Total	**692,355,466**	**965,072,425**		**3,303,808,031**	**27,196,641,708**	

The salt reduction package has the highest return on investment of any intervention: for 1 Qatari Rial invested in the salt reduction package, the expected return is 25 Qatari Rial over 15 years. Tobacco control also produces a high return on investment over 15 years (5.57), as does the physical activity package (1.45), and the package of clinical interventions (5.9). The clinical interventions package also results in the most lives saved (11,534 premature deaths averted, see **Table 8**), contributing to SDG Target 3.4.

Adding the values of social benefits 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 (in QR, including social value)

	5 years			15 years		
Intervention package	**Total discounted costs**	**Total productivity + social benefits**	**ROI**	**Total discounted costs**	**Total productivity + social benefits**	**ROI**
Tobacco control	102,974,800	83,238,044	0.81	250,396,093	2,106,847,863	8.41
Salt reduction	201,044,019	808,599,638	4.02	504,976,549	18,929,283,603	37.49
Diet and physical activity awareness	122,927,102	41,444,835	0.34	429,440,740	987,150,057	2.30
CVD and diabetes clinical interventions	265,409,545	646,256,781	2.43	2,118,994,649	16,586,619,228	7.83
Total	**692,355,466**	**1,579,539,297**		**3,303,808,031**	**38,609,900,751**	

'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

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

While Qatar has launched several strategies and initiatives to combat NCDs, they still pose a growing and major threat to the country's development priorities. NCD prevention and control should go hand in hand with Qatar's Vision 2030, as it aligns well with the country's aims for economic growth, social development and environmental management. NCDs are a leading health and development challenge, and this has been exacerbated by the COVID-19 pandemic. Addressing NCDs and COVID-19 together can reduce the health and economic burdens of both.

The findings from the investment case model show that NCDs cost the Qatar economy QR 18.1 billion (US$ 5 billion), equivalent to 2.72 percent of its 2019 GDP. Cardiovascular disease contributes the most to this economic burden (73 percent of the total burden), and most of the CVD burden is mainly attributable to indirect costs including reduced workforce participation and loss in national productivity. Presenteeism constitutes the biggest share of the NCD economic burden (42 percent), followed by government healthcare spending (30 percent), private health expenditure (10 percent), premature death (10 percent), and absenteeism (8 percent).

Investing in four proven intervention packages (best buys) can significantly reduce the burden of cardiovascular diseases, cancer chronic respiratory disease and diabetes. Furthermore, 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 clinical interventions packages would lead to the greatest return. The 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
24,600
DEATHS

ADD ALMOST
134,000
HEALTHY LIFE-YEARS TO PEOPLE IN QATAR

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

	YIELD FOR EVERY QR	TOTAL COST OF POLICY PACKAGE (MILLION QR)	TOTAL BENEFIT (MILLION QR)
SALT REDUCTION INTERVENTION	25	505	12,636
TOBACCO CONTROL	5.57	250	1,395
CVD & DIABETES CLINICAL INTERVENTIONS	5.92	2,119	12,542
DIET & PHYSICAL ACTIVITY AWARENESS	1.45	429	624

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 Qatar reap significant health and economic benefits from scaled-up investments to reduce NCDs:

1 > **A. Invest in new and scale- up current cost-effective clinical and population-based interventions, enhancing efficiency in the health sector and overall public sector fiscal sustainability.** Since the salt reduction and clinical interventions packages largely provide the greatest return on investment, scaling up effective salt reduction initiatives and clinical interventions (particularly prioritizing screening), should be of high priority.

To further reduce salt consumption, Qatar can extend their successful efforts to reduce salt levels in bread by working with other food manufacturers and reducing sodium in other products traditionally high in salt (e.g. chips, canned goods and frozen meals). Qatar should continue engaging and working with both the public and private sector to reduce sodium and fat in other food products. Qatar can also expand its food labelling policy to implement a menu labelling policy for restaurants and cafes. Food and menu labelling policies will allow citizens to make informed decisions regarding nutrition and have an impact on their ability to adhere to national nutritional guidelines.

While chronic conditions such as diabetes and cardiovascular disease cannot be reversed in most cases, early detection and effective management can extend life-expectancy and dramatically increase well-being. The clinical intervention package results in the most lives saved (12,469 deaths averted, 11,534 of which are premature deaths), and constitutes an important intervention in fulfilling the right to health. Qatar should prioritize screening for risk of CVD as less than 25 percent of primary health care facilities report offering CVD risk stratification and applying government-established CVD guidelines. [6] Qatar should also ensure targets set under Qatar's National Diabetes Strategy Preventing Diabetes Together 2016-2022 are achieved, including the goal for all target adult populations to be screened by 2020. [24] Alongside screening, all of those at a high risk for CVD and diabetes should have access to drug therapy, especially since according to the WHO, Qatar has all essential NCD medicines and technologies. [6]

To strengthen tobacco control, Qatar should reinforce existing restrictions to fully align with the WHO FCTC. This includes issuing an implementing decree specifying the indoor public places where smoking is prohibited. This should include indoor workplaces, indoor public places, public transport, hospitals and all other places specified under WHO FCTC Article 8 and Article 8 Guidelines. Qatar could also benefit by strengthening current restrictions on advertising, promotion and sponsorship by addressing international media in existing laws, in addition to implementing bans for internet tobacco product sales and point of sale product displays. Qatar should also implement plain-packaging, following the successful example of

other countries including the Kingdom of Saudi Arabia. As a Party to the WHO Framework Convention for Tobacco Control, Qatar should aim for full implementation of the Convention. In line with this, it is also important that Qatar continues its surveillance activities for both youth and adults on regular basis, to be able to regularly monitor the epidemic and the impact of different tobacco control policies on prevalence.

Interventions to increase physical activity are crucial, considering that 43.9 percent of adults in Qatar have low levels of physical activity. [5] Qatar should continue and scale up its national and local awareness programmes, school programmes and other sports initiatives and engage civil society. Particular attention should be given to women who typically report higher rates of physical inactivity (82.7 percent of women report not engaging in vigorous activity) and higher rates of overweight and obesity (of Qatari women, 68.3 percent are overweight and 43.2 percent are obese). [5] Initiatives to increase physical inactivity should also target youth, as 85 percent of adolescents report being insufficiently active, and nearly one in two students in Qatar is overweight. [86] Physicians must be sufficiently trained to provide brief advice as part of routine physician care which could include offering specific guidance on how to exercise safely in the heat.

B. 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 shifting subsidies from health-harming to health-promoting products, 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. Effective 'health taxes' require ministries of finance and health to work together and benefit from broader whole-of-government support. The Qatar Government 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 UHC, thereby gaining overwhelming public support for the tax increases.

Tobacco: On 1st January 2019, the Qatar Excise Tax Law came into effect, adopting the GCC-approved excise taxes. This includes a 100 percent tax rate applied to all tobacco and tobacco derivatives. [61] Qatar should ensure that taxes meet the WHO-recommended minimum of 75 percent of the retail price, to both reduce consumption and increase government revenue.

Alcohol: Qatar's Excise Tax Law (no. 25 of 2018) came into force on the 1st January 2019, imposing tax on health-harming products including a 100 percent tax on alcohol. [87] However, according to media reports, Qatar's sole importer, distributer and retailer (Qatar distribution company) has reduced prices to offset the price increase caused by the new tax law. [88] Qatar could consider a specific excise tax on the percentage of ethanol, which can help reduce the consumption of alcoholic beverages with high alcohol content, whilst also generating revenue.

Sugar-sweetened beverages (SSBs): In 2019, Qatar adopted the GCC-approved tax increases of 50 percent on carbonated high-calorie drinks, which is applicable to sodas and other SSBs, and 100 percent on energy drinks. [61] This commendable initiative will help reduce consumption of sugar-sweetened beverages and the associated health and economic costs. The Kingdom of Saudi Arabia implemented a similar SSB excise tax in 2017 [89] and a recently published paper examined the impact of the tax, finding a subsequent decrease in sales volume of soft drinks. [90] However, because the tax in Qatar is based on price alone consumers are likely to choose cheaper options instead of healthier ones. To avoid this, WHO recommends an excise tax based on sugar content or volume. [91] 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.[4]

The Gulf Cooperation Council (GCC) makes tax decisions as a regional block. The GCC is inclined towards health taxes and is considering how to design and implement a more effective tax on sugar-sweetened beverages. Qatar 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 Qatar 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. The Philippines, for instance, earmarks excise tax revenues from health-harming products for universal health coverage [92] and Egypt allocates tax revenue from tobacco products to health insurance schemes for students. [93]

Fossil Fuels: Like many countries in the Region, Qatar subsidizes fossil fuels. Qatar also remains the last Gulf state to offer electricity and water free for citizens, though subsidies have been reduced for expatriates in recent years. Qatar has reduced some subsidies including diesel and gasoline which in 2014 increased from US$1.04 to US$1.58 per gallon and US$1.04 to US$1.38 per gallon respectively. Reductions in subsidies have had an impact on demand; 2016 demand decreased by 11.5 percent for gasoline and 2.3 percent for diesel. [94]

While Qatar shifts to alternative, renewable energy sources, reductions in fossil fuel subsidies can help finance the implementation of the recommended policies discussed in this report. Reductions can also be expected to deliver additional health benefits from reduced exposure to air pollution.

2 > Set up a national NCD committee and create a dedicated NCD Strategy. Engage and collaborate by strengthening multisectoral, whole-of-government and whole-of-society action on NCDs. 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. More non-health sectors need to be engaged if not already, such as Finance and Economy, Environment and Energy,

4 The UK has successfully introduced a tiered excise tax structure based on the sugar content of beverages to discourage consumers from purchasing drinks with high quantities of sugar

Food and Agriculture, Labour and Employment, Communication, Education, Youth and Sports, Social and Economic Development, Gender and Family Welfare, Legislative and Executive branches, Investment, Trade and Industry, and Tourism. Additionally, clear mechanisms to ensure accountability for each ministry should be established to ensure NCD commitments are upheld. Multi-sectoral engagement and coordination could be further improved in Qatar through the establishment of a high-level national committee on NCDs. This national committee could also lead on the development of a dedicated multi-sectoral national strategy on NCDs, which Qatar is currently missing.

Qatar can increase the number and intensity of media campaigns to spread awareness of NCD prevalence and how reducing NCD risk factors can help minimize the risk for development of NCDs and their related health complications. Qatar can launch new national mass media campaigns to spread awareness of the health harming effects of tobacco use, physical inactivity and unhealthy diets, while expanding successful campaigns such as the 'Start now' campaign in collaboration with HMC and PHCC. Campaigns may prioritize women and the young in physical activity campaigns and programmes, as they are more likely to report high levels of physical inactivity. Qatar can look at previous successful campaigns targeting these groups, including Sport England's 'This Girl Can' campaign, after which 2.8 million 14-20-year-old women said they did some, or more, activity and cited the campaign as the reason. [95] The Government can engage civil society in monitoring the progress of NCD policies and share success stories with the public to strengthen support. It can also involve organizations and the public in the development and dispersal of media campaigns and other outlets to share NCD-related information. Qatar should also regularly update and engage the public on the status of NCD prevention and control programmes by sharing updates via government websites and social media platforms.

3 > **Strengthen monitoring and evaluation and accountability across sectors.** To strengthen monitoring, Qatar should continue to conduct and update nationwide surveys such as the STEPS survey, and youth and adult tobacco surveys on a routine basis. Qatar should also improve sodium surveillance, including a regular and representative measurement of urinary sodium excretion and dietary assessment study. Qatar should continue plans to monitor the salt content of bread to reach targets of less than 0.8 percent[5] and expand these targets to other food products. Taxation on health-harming goods, such as sugar-sweetened beverages, should also be monitored for changes in consumption patterns and in revenue. In general, Qatar should monitor implemented NCD policies and campaigns on a continual basis to evaluate for effectiveness. To strengthen accountability, Qatar should establish key performance indicators and report these annually to a national committee established for NCDs.

5 The target set under the multisectoral national committee is to reduce overall salt content by up to 30 percent and reduce salt levels in individual samples containing more than 0.8 percent salt.

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, Qatar 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, fresh food markets and mobility systems which encourage walking and/or cycling) and reduce behavioural risk factors. Urban planning is particularly important in Qatar, given that an estimated 99 percent of the population lives in urban areas. [96] Qatar can look to "Khalifa Town" in Bahrain and "Masdar City" or "The Sustainable City" in the United Arab Emirates for innovative uses of urban planning to promote health. Qatar should evaluate similar existing investments for impact and consider implementing new urban design and planning measures to promote health, including increasing physical activity, in both new and older neighbourhoods.

Improving air quality: The energy sector is responsible for 96 percent of GHG emissions in Qatar, followed by the industrial sector (3 percent) and waste (1 percent). Qatar can seek alternative renewable energy sources such as solar power which are more environmentally friendly to fulfil its aim of achieving 20 percent generation of domestic energy demand derived from renewable sources by 2030. [97]

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. Changing food placement and labels in school cafeterias to encourage healthy eating has also been shown to be effective. Schools can also ensure responsible food marketing towards children which encourages healthy food choices. This is particularly important considering the current lack of unhealthy diet marketing restrictions to children in Qatar.

Food environment: Addressing access and availability to healthy food is key to a holistic approach to health. Qatar can continue to prioritize the agricultural sector, to ensure food security and promote local food production of health-promoting foods. Qatar can continue and expand current uses of greenhouses, modern irrigation systems and other measures to overcome the challenges caused by the climate, water shortages and soil fertility issues. [98] Other innovative approaches to improving the food environment can also be considered, including encouraging local food markets and incentivizing consumption of health-promoting foods (see Annex 4 for more details).

5 > **Build back better to ensure that prevention and control of NCDs is a central element of the COVID-19 response and recovery.** 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.[6]

There are initial steps Qatar 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 [100] to support sensitization of actors and integration of NCDs into immediate and longer-term responses.[7] 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-19, leveraging existing key platforms for example the GCC joint operations room for COVID-19.

^ Integrate NCDs into the country's National COVID-19 Strategic Preparedness and Response Plan, especially around pillar 9: maintaining essential services. Refer to WHO's Interim guidance on Maintaining essential services during an outbreak. [101]

^ Different sectors review the WHO and UNDP NCD sectoral briefs to analyse 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).

6 2.7 percent of GDP burden due to NCDs, and 4.5 percent GDP contraction forecasted due to COVID-19 according to the International Monetary Fund, Real GDP growth, IMF Data Mapper.

7 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

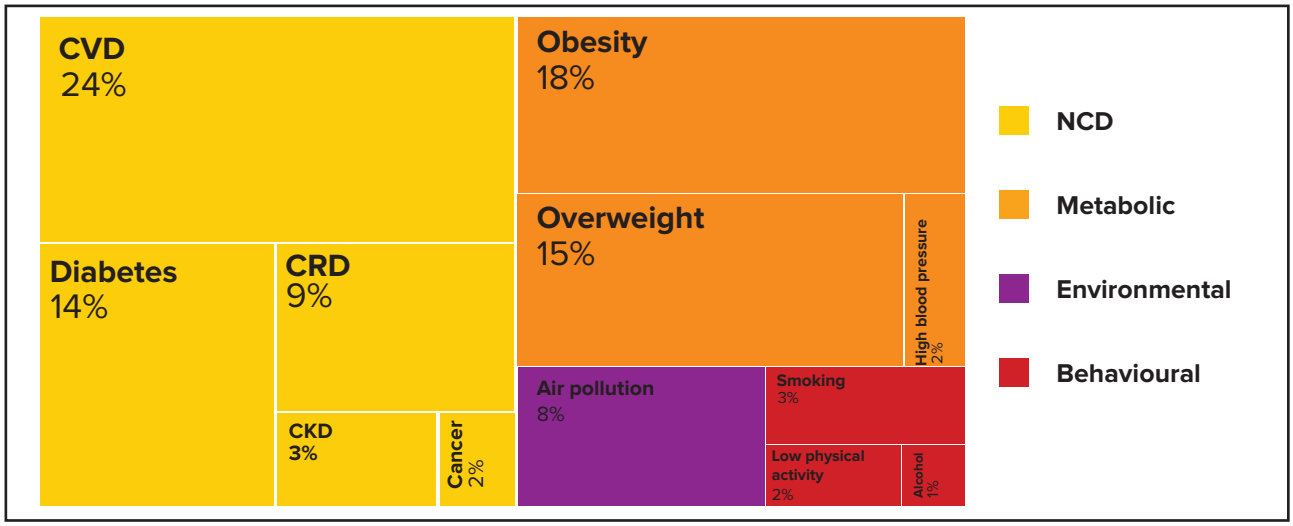
Prevention and control of NCDs is of increased importance during the COVID-19 pandemic. In addition to an increased vulnerability to severe outcomes from COVID-19, patients with NCDs suffer from disruption of or limited access to NCD prevention and treatment services. [102] A recent WHO survey across 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. [103] To combat reduced access to NCD services during the COVID-19 pandemic, the Qatar MOPH fast-tracked the delivery of digital health services, including virtual video consultations, home delivery of medications, and a self-assessment chatbot. [104]

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. [105], [106] In addition, smoking, [107] alcohol consumption, [108]obesity, [109] and exposure to air pollution. [110] This strong interconnection between NCDs and COVID-19 highlights the necessity to integrate considerations for NCDs into the pandemic response on all levels.

Qatar scores 5.97 in the NCD/COVID-19 Vulnerability Index indicating a vulnerability to COVID-19 owing to NCDs and risk factors above the global median, and the third highest in the Gulf region after the United Arab Emirates and Kuwait. 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.[8] The key NCD-related factors driving vulnerability to COVID-19 in Qatar, indicated in the index breakdown (**Fig.6**) are cardiovascular disease, obesity, overweight and diabetes. Furthermore, the high level of air pollution – a risk factor for NCDs and potentially linked to worse outcomes for COVID-19 – above the GCC average contributes to increased vulnerability. The data also suggests that while people in Qatar are less likely to be physically inactive than residents of other GCC countries, the prevalence of overweight and obesity is nonetheless high, contributing to increased vulnerability to severe COVID-19.

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



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

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. Qatar should communicate the elevated vulnerability of affected individuals. The Government of Qatar 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.

An effective and sustainable COVID-19 response requires an intersectional, multi-facetted, 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 into the COVID-19 response plan. [111]

^ **Implement multi-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.

Other innovative COVID-19 policy solutions

In addition, Qatar 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. [112]

Contact tracing apps are becoming a commonly used tool to help contain the spread of COVID-19 and Qatar has joined an ongoing list of countries implementing this technology. [113]–[115] Qatar launched the "Ehteraz" app to track COVID-19 cases and to inform users identified as exposed through contact tracing. Qatar has made the app mandatory for all citizens and expats. [116] The tracing functions and alerts of the app should emphasize vulnerable groups, such as persons with NCDs, by prioritizing these groups when contact tracing and offering useful information on the interaction between NCDs and COVID-19 on the app. The app should also provide advice and support on how to stay healthy during a mandatory 14-day quarantine.

As mentioned, government efforts to promote physical activity and mental health, to reduce alcohol use, exposure to air pollution and tobacco usage are of critical value. The Government of Qatar has taken initiative to provide the public with useful up-to-date accurate information on COVID-19. [117] Notably, the Ministry of Public Health is active on twitter providing public health messaging and COVID updates to the public. [118] These efforts should utilize scientifically backed information and could be further expanded with media campaigns, apps and other forms of technology that can be utilized to communicate about the novel coronavirus as well as suggestions on how to maintain a healthy lifestyle during times of self-isolation and quarantine. For example, Qatar can implement resources on healthy diet and exercise on their Ministry of Public Health website or the "Ehteraz" app in addition to the provided information on COVID-19. These initiatives help address concerns of both NCD and COVID-19 prevention.

Image credit: © Ministry of Interior Qatar via Facebook

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		
Monitor tobacco use and prevention policies	Level 2	Level 4
Protect people from tobacco smoke	Level 1	Level 4
Offer to help quit tobacco use: Brief intervention	Level 3	Level 4
Offer to help quit tobacco use: mCessation	Level 3	Level 4
Warn about danger: warning labels	Level 1	Level 4
Warn about danger: mass-media campaign	Level 3	Level 4
Enforce bans on tobacco advertising	Level 3	Level 4
Enforce youth access restriction	Level 3	Level 4
Raise taxes on tobacco	Level 4	Level 4
Plain packaging of tobacco products	Level 1	Level 4
Physical inactivity		
Public awareness campaigning on physical activity	Level 1	Level 4
Brief advice	Level 1	Level 4
High salt consumption		
Surveillance	Level 1	Level 4
Harness industry for reformulation	Level 1	Level 4
Adopt standards: front-of-pack labelling	Level 1	Level 4
Adopt standards: strategies to combat misleading marketing	Level 1	Level 4
Knowledge: education and communication	Level 2	Level 4
Environment: salt-reduction strategies in community-based eating spaces	Level 1	Level 4

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

ANNEX 3: HEALTH TAX MODELLING

Health taxes are considered the most effective policy measure to reduce consumption of health-harming products. Additionally, they generate revenue and reduce the burden on the health system. The Addis Ababa Action Agenda on Financing for Development [119] 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. [120]Health taxes are a fiscal measure that can help finance health systems whose funding levels for health are currently insufficient to sustain progress towards SDG 3. [121] Summan and Laxminarayan estimated that a tax on tobacco, alcohol and sugar-sweetened beverages (SSBs) that increases retail prices by 50 percent could “avert over 50 million premature deaths while raising over US$20 trillion of additional revenues worldwide over the next 50 years.” [122], [123] Identifying and increasing sustainable domestic revenue streams is more important now than ever, with COVID-19 causing economic contraction worldwide[124] and placing an additional strain on health-systems.

While health taxes hold great potential, they remain under-implemented, including in Qatar. While the country has implemented taxes on tobacco and alcohol, and initiated steps to implement taxes on SSBs, these products remain either very affordable or the tax structure could be improved. Increasing the excise tax on these products and altering the SSB tax structures to be specific to sugar content is an effective means to reduce consumption and prevent NCDs in Qatar.

ANNEX 4: INNOVATIVE POLICY SOLUTIONS TO ENHANCE DIETS IN QATAR

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. [125] WHO recommends that an adequate intake of fruit and vegetables is about 400g of fruit and vegetables. [126] Four or five servings of fruits and vegetables is typically recommended to reach the 400g recommendation. Data from the STEPS survey in Qatar however showed that 91 percent of respondents had insufficient daily (less than 5 servings) intake of fruits and vegetables per day. [7] While this survey was conducted in 2012, data from a recent national study (2020) suggest that the percentage of people with insufficient fruit or vegetable consumption in Qatar is still very high (83 percent). [127] 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. [128] In one such intervention, researchers from the University of Florida created a software programme 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. Qatar 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. [129]

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. [130] 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. [131] 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. [132]

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. [125] 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.

REFORMULATING FOODS AND BEVERAGES

Reduce sugar in soft drinks

Photo credit: © World Bank via Flickr

In the United Kingdom, the Government set a goal for food industry to reduce sugar content in food by 20 percent 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 percent between 2015 and 2018. [133]

GROCERY SHOPPING

Front-of- Pack (FOP) labelling

Photo credit: © Betarice Murch via Flickr

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. [134]

GROCERY SHOPPING

Highlight healthy foods through strategic positioning

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 on the premises. This intervention has been found to increase sales of healthy products (although not necessarily to curb sales of unhealthy products). [128]

Photo credit: © l r via Flickr

Shopping cart designs and product placement in supermarkets

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 vegetables. 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). [135]

Photo credit: © Hyacinth50 via Flickr

Supporting local markets

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. [136] 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.

Photo credit: © WHO

RESTAURANTS

Making healthy meals the rule with default menus

Photo credit: © WHO

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.

MEDIA

Mass media campaigns

Photo credit: © Chelsey Badlock via Flickr

Providing nutrition information through various outlets may help promote fruit and vegetable consumption. Adolescents in Austria report television most often as a source of nutrition information. However, those who used newspaper articles, booklets and the internet as a source were more likely to consume fruit and vegetables. [137] This highlights the importance of using a variety of media when developing a public health nutrition campaign.

BIBLIOGRAPHY

1. D. E. Bloom et al., "The Global Economic Burden of Noncommunicable Diseases. Geneva: World Economic Forum," 2011. Available at http://www3.weforum.org/docs/WEF_Harvard_HE_GlobalEconomicBurdenNonCommunicableDiseases_2011.pdf.
2. Ministry of Public Health Qatar: COVID-19. Available at: https://covid19.moph.gov.qa/EN/Pages/default.aspx. (accessed Feb. 10, 2021).
3. World Health Organization, "Overview - Preventing chronic diseases: a vital investment" Available at: https://www.who.int/chp/chronic_disease_report/part1/en/ (accessed Dec. 07, 2020).
4. World Health Organization, "Tackling NCDs: 'best buys' and other recommended interventions for the prevention and control of noncommunicable diseases," 2017. https://apps.who.int/iris/bitstream/handle/10665/259232/WHO-NMH-NVI-17.9-eng.pdf?sequence=1&isAllowed=y
5. Ministry of Public Health State of Qatar, "National Health Strategy 2018–2022." https://www.moph.gov.qa/english/strategies/National-Health-Strategy-2018-2022/Pages/default.aspx (accessed Apr. 24, 2020).
6. World Health Organization, Noncommunicable Diseases Country Profiles 2018. 2018.
7. World Health Organization, "NCDs | STEPwise approach to chronic disease risk factor surveillance in Qatar," WHO, 2012. https://www.who.int/ncds/surveillance/steps/qatar/en/ (accessed Nov. 07, 2020).
8. World Health Organization, "Global Adult Tobacco Survey 2013 Qatar." https://www.who.int/tobacco/surveillance/survey/gats/qatcountryreport.pdf?ua=1 (accessed Apr. 22, 2020).
9. World Health Organization, "WHO global report on trends in prevalence of tobacco use 2000-2025, third edition," WHO Geneva, 2019. https://www.who.int/publications/i/item/who-global-report-on-trends-in-prevalence-of-tobacco-use-2000-2025-third-edition (accessed Dec. 13, 2020).
10. M. of P. H. in Qatar, "Core questionnaire of the reporting instrument of WHO FCTC," p. 101, 2018.
11. World Health Organization, WHO global report on trends in prevalence of tobacco use third edition. 2019.
12. M. Jaam, W. Al-Marridi, H. Fares, M. Izham, N. Kheir, and A. Awaisu, "Perception and intentions to quit among waterpipe smokers in Qatar: a cross-sectional survey," Public Heal. Action, vol. 6, no. 1, pp. 38–43, Jan. 2016, doi: 10.5588/pha.15.0054.
13. WHO FCTC Secretariat, "Qatar – WHO FCTC Implementation Database." https://untobaccocontrol.org/impldb/qatar/ (accessed Apr. 23, 2020).
14. World Health Organization, "Global recommendations on physical activity for health," 2010. https://www.who.int/dietphysicalactivity/global-PA-recs-2010.pdf (accessed Nov. 04, 2020).
15. World Health Organization, "Reducing free sugars intake in children and adults," 2010.

16. World Health Organization, "Qatar Global Alcohol Report." https://www.who.int/substance_abuse/publications/global_alcohol_report/profiles/qat.pdf?ua=1 (accessed Nov. 08, 2020).

17. World Health Organization, "World Health Survey: Qatar," 2009. http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.569.5321&rep=rep1&type=pdf (accessed Apr. 25, 2020).

18. M. Al Thani et al., "Adherence to the Qatar dietary guidelines: a cross-sectional study of the gaps, determinants and association with cardiometabolic risk amongst adults," doi: 10.1186/s12889-018-5400-2.

19. World Health Organization, "Salt reduction Fact Sheet," WHO, 2020. https://www.who.int/news-room/fact-sheets/detail/salt-reduction (accessed Nov. 08, 2020).

20. T. Koe, "Qatar government demands lower fat, sugar, and salt content in food and beverages," Foodnavigator Asia, 2019. https://www.foodnavigator-asia.com/Article/2019/02/13/Qatar-government-demands-lower-fat-sugar-and-salt-content-in-food-and-beverages# (accessed Nov. 08, 2020).

21. World Health Organization, "WHO plan to eliminate industrially-produced trans-fatty acids from global food supply," 2018. https://www.who.int/news/item/14-05-2018-who-plan-to-eliminate-industrially-produced-trans-fatty-acids-from-global-food-supply (accessed Nov. 08, 2020).

22. GCC Standardization Organization (GCC), "Trans Fatty Acids GSO 2483/2015 (E)."

23. M. Al-Thani et al., "The prevalence and characteristics of overweight and obesity among students in Qatar," Public Health, vol. 160, pp. 143–149, Jul. 2018, doi: 10.1016/j.puhe.2018.03.020.

24. Ministry of Public Health, "Qatar National Diabetes Strategy 2016-2022," 2018.

25. S. F. Awad, M. O'Flaherty, J. Critchley, and L. J. Abu-Raddad, "Forecasting the burden of type 2 diabetes mellitus in Qatar to 2050: A novel modeling approach," Diabetes Res. Clin. Pract., vol. 137, pp. 100–108, Mar. 2018, doi: 10.1016/j.diabres.2017.11.015.

26. World Health Organization, "Information and public health advice: heat and health," WHO, 2018. http://www.who.int/globalchange/publications/heat-and-health/en/ (accessed Nov. 10, 2020).

27. World Health Organization, "Ambient Air Pollution: A global assessment of exposure and burden of disease," WHO Geneva, 2016. https://www.who.int/phe/publications/air-pollution-global-assessment/en/ (accessed Dec. 07, 2020).

28. WHO EMRO, "Addressing the impact of air pollution on health in the Eastern Mediterranean Region | RC61 | About WHO." http://www.emro.who.int/about-who/rc61/impact-air-pollution.html (accessed Nov. 10, 2020).

29. A. Obaid Musaiger and M. -Bahrain, Food Consumption Patterns in Eastern Mediterranean Countries. 2011.

30. G. Y. Lim, "Qatar takes top spot for food security in Middle East and North Africa: Annual GFSI report," Foodnavigator Asia, 2020. https://www.foodnavigator-asia.com/Article/2020/04/08/Qatar-takes-top-spot-for-food-security-in-Middle-East-and-North-Africa-Annual-GFSI-report# (accessed Nov. 10, 2020).

31. "Qatar Food Security." https://foodsecurityindex.eiu.com/Country/Details#Qatar (accessed Nov. 10, 2020).
32. A. Bener and A. Al Mazroei, "Health Services Management in Qatar," Croat. Med. J., vol. 51, no. 1, pp. 85–88, 2010, doi: 10.3325/cmj.2010.51.85.
33. United Nations, "Population Division: World Population Prospects 2019," World Population Prospects, 2019.
34. World Health Organization, "Global Health Observatory," WHO Global Health Observatory Database, 2020. https://www.who.int/data/gho (accessed Jun. 11, 2020).
35. Oxford Business Group, "Demand for health services rises in Qatar," The Report: Qatar 2020, 2020. https://oxfordbusinessgroup.com/overview/keeping-pace-private-sector-set-play-more-important-role-demand-medical-services-continues-rise (accessed Nov. 28, 2020).
36. Inter-agency Group for Child Mortality Estimation, "UN Inter-Agency Group for Child Mortality Estimation: Data," 2020. https://childmortality.org/ (accessed Dec. 07, 2020).
37. Ministry of Public Health State of Qatar, "Annual Report 2017," Doha, 2017.
38. Ministry of Public Health Qatar, "Health Promotion Department," 2020.
39. World Health Organization, "WHO Review Mission on the National Prevention and Control Response to Noncommunicable Diseases in Qatar," Unpublished, 2018.
40. Government Communications Office Qatar, "Qatar National Vision 2030." https://www.gco.gov.qa/en/about-qatar/national-vision2030/ (accessed Dec. 07, 2020).
41. Ministry of Public Health State of Qatar, "Improved Health for People with Multiple Chronic Diseases." https://www.moph.gov.qa/english/strategies/National-Health-Strategy-2018-2022/Priority-Populations/Pages/Improved-Health-for-People-with-Multiple-Chronic-Diseases.aspx (accessed Dec. 07, 2020).
42. Ministry of Public Health Qatar, "Healthy Aging." https://www.moph.gov.qa/english/strategies/National-Health-Strategy-2018-2022/Priority-Populations/Pages/Healthy-Aging.aspx (accessed Dec. 07, 2020).
43. Ministry of Public Health State of Qatar, "Enhanced Health Promotion and Disease Prevention." https://www.moph.gov.qa/english/strategies/National-Health-Strategy-2018-2022/System-wide-Areas/Pages/Enhanced-Health-Promotion-and-Disease-Prevention.aspx (accessed Dec. 07, 2020).
44. Ministry of Public Health Qatar, "Qatar Public Health Strategy 2022-2017." https://www.moph.gov.qa/english/strategies/Supporting-Strategies-and-Frameworks/QatarPublicHealthStrategy/Pages/default.aspx (accessed Dec. 07, 2020).
45. PHCC, "Primary Health Care Corporation Corporate Strategic Plan 2019-2023." Primary Health Care Corporation, Doha, 2019.
46. Ministry of Public Health State of Qatar, "National Strategy to Prevent Diabetes." https://www.moph.gov.qa/english/strategies/Supporting-Strategies-and-Frameworks/nationaldiabetesstrategy/Pages/default.aspx (accessed Dec. 07, 2020).
47. Ministry of Public Health State of Qatar, "Qatar National Dementia Plan 2018-2022." https://www.moph.gov.qa/english/strategies/Supporting-Strategies-and-Frameworks/QatarNationalDementiaPlan/Pages/default.aspx (accessed Dec. 07, 2020).

48. World Health Organization, “Global Health Expenditure database,” WHO, 2020. https://apps.who.int/nha/database/Select/Indicators/en (accessed Dec. 07, 2020)

49. World Health Organization, “World Health Survey: Qatar,” 2008.

50. L. Liu, O. Gjebrea, F. M. Ali, and R. Atun, “Determinants of Healthcare Utilisation by Migrant Workers in the State of Qatar,” Health Policy (New. York)., vol. 124, no. 8, pp. 873–880, 2020.

51. P. Adhikary, Z. Sheppard, S. Keen, and E. van Teijlingen, “Risky work: Accidents among Nepalese migrant workers in Malaysia, Qatar, and Saudi Arabia,” Heal. Prospect J. Public Heal., vol. 16, no. 2, 2017.

52. World Health Organization, “Country profile Qatar Summary of MPOWER measures in Qatar.”

53. Tobacco Control Laws, “Smoke Free Status of Indoor Public Places, Workplaces and Public Transport.”

54. A. AlMulla et al., “Smoking cessation services in the Eastern Mediterranean Region: highlights and findings from the WHO Report on the Global Tobacco Epidemic 2019 ,” East. Mediterr. Heal. J., vol. 26, no. 1, 2020.

55. Tobacco Control Laws, “Qatar Details.”

56. Tobacco Control Laws, “Other Packaging and Labelling Requirements.”

57. “MoPH launches national anti-tobacco campaign,” The Peninsula Qatar, 2018. https://www.thepeninsulaqatar.com/article/16/05/2018/MoPH-launches-national-anti-tobacco-campaign (accessed Dec. 07, 2020).

58. Tobacco Atlas, “Qatar – Tobacco Atlas.”

59. Tobacco Control Laws, “Regulated Forms of Advertising, Promotion and Sponsorship.”

60. Global Youth Tobacco Survey, “Factsheet Qatar 2013,” 2013.

61. PwC Middle East, “Excise Tax Law comes into effect in Qatar starting 1 January 2019 ,” 2019, Jan. 2019.

62. World Health Organization, “WHO Review Mission on the National Prevention and Control Response to Noncommunicable Diseases in Qatar 29th January - 1st February 2018.” 2018.

63. Ministry of Public Health Qatar, “MOPH signs a Memorandum of Understanding with Qatar International Court and Dispute Resolution Center to implement the Workplace Wellness Program,” MOPH.

64. The State of Qatar, National Physical Activity Guidelines First Edition. 2014.

65. M. G. Al-kuwari, A. Alhamdani, and W. Albaker, “Physical activity guidelines awareness and counselling practice in relation to health care providers’ knowledge and behaviour in Qatar,” no. July, 2020.

66. A. Al Jawaldeh, B. Rafii, and L. Nasreddine, “Salt intake reduction strategies in the Eastern Mediterranean Region,” East. Mediterr. Heal. J., vol. 24, no. 12, pp. 1172–1180, Dec. 2018, doi: 10.26719/emhj.18.006.

67. Huda NV, “Nutrition labels made mandatory - The Peninsula Qatar,” Jan. 2017. .

68. World Health Organization, “Noncommunicable Diseases Progress Monitor 2020,” 2020.

69. Ministry of Public Health State of Qatar, “Qatar Dietary Guidelines,” MOPH Qatar, 2015. https://www.moph.gov.qa/Admin/Lists/PublicationsAttachments/Attachments/68/MOPH_DIETARY_BOOKLET_ENG.PDF (accessed Dec. 07, 2020).

70. The Peninsula Qatar, “HMC urges public to reduce salt intake,” The Peninsula, Mar. 2018.

71. World Health Organization, “Diabetes Country Profiles 2016 - Qatar.” .

72. Gulf Committee for Cardiovascular Diseases Control, “The integrated executive Gulf plan to prevent cardiovascular diseases 2009-2018.”

73. 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, doi: 10.1186/s12913-019-4795-5.

74. Gulf News, “Oman spent more than Dh57.24m on cancer medicine in 2015,” 2016.

75. A. J. Guarascio, S. M. Ray, C. K. Finch, and T. H. Self, “The clinical and economic burden of chronic obstructive pulmonary disease in the USA,” ClinicoEconomics and Outcomes Research. 2013, doi: 10.2147/CEOR.S34321.

76. R. J. Mitchell and P. Bates, “Measuring health-related productivity loss,” Popul. Health Manag., 2011, doi: 10.1089/pop.2010.0014.

77. 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, doi: 10.1097/01.jom.0000100200.90573.df.

78. 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, doi: 10.1016/S2213-8587(17)30097-9.

79. T. Barnay and T. Debrand, “Effects of health on the labour force participation of older persons in Europe,” 2006.

80. Avenir Health, “One Health Tool,” 2017.

81. World Health Organization and United Nations Development Programme, “Non-Communicable Disease Prevention and Control: A Guidance Note For Investment Cases,” 2019.

82. D. Chisholm D, Mendis S, Abegunde, “Costing Tool – User Guide,” 2012.

83. World Health Organization, “Scaling up action against NCDs: how much will it cost,” 2011.

84. 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, doi: 10.1016/S0140-6736(13)62231-X.

85. C. Garg and D. Evans, “What is the impact of non-communicable diseases on national health expenditures: a synthesis of available data,” 2011, [Online]. Available: http://www.who.int/healthsystems/NCDdiscussionpaper3.pdf.

86. World Health Organization, “Country Factsheet Insufficient Physical Activity Qatar,” Jun. 17, 2015. https://apps.who.int/iris/bitstream/handle/10665/204253/Fact_Sheet_HED_2015_EN_16392.pdf?sequence=1&isAllowed=y (accessed Nov. 05, 2020).

87. "The General Tax Authority urges businesses to comply with Excise Tax," Gulf Times, 2019. https://www.gulf-times.com/story/618649/General-Tax-Authority-urges-businesses-to-comply-w (accessed Dec. 07, 2020).

88. "Health tax in Qatar: Price hikes as 100% levy on alcohol, energy drinks, and pork introduced," Jan. 2019.

89. Arabian Business, "Saudi Arabia introduces 'sin tax' from today," 2017.

90. R. Megally and A. Al-Jawaldeh, "Impact of sin taxes on consumption volumes of sweetened beverages and soft drinks in Saudi Arabia," F1000Research, vol. 9, p. 1117, Sep. 2020, doi: 10.12688/f1000research.25853.1.

91. A. M. Thow, S. M. Downs, C. Mayes, H. Trevena, T. Waqanivalu, and J. Cawleye, "Fiscal policy to improve diets and prevent noncommunicable diseases: From recommendations to action," Bull. World Health Organ., 2018, doi: 10.2471/BLT.17.195982.

92. R. Marten et al., "Sugar, tobacco, and alcohol taxes to achieve the SDGs," The Lancet. 2018, doi: 10.1016/S0140-6736(18)31219-4.

93. Tobacco Free Kids, "Strategic Investment of Tobacco Tax Revenue," 2020. https://www.tobaccofreekids.org/assets/global/pdfs/en/strategic_investment_tobacco_tax_revenue.pdf.

94. J. Krane and F. J. Monaldi, "OIL PRICES, POLITICAL INSTABILITY, AND ENERGY SUBSIDY REFORM IN MENA OIL EXPORTERS," May 2017. Accessed: Nov. 04, 2020. [Online]. Available: https://www.bakerinstitute.org/media/files/files/0660db8a/CES-pub-QLC_Subsidies-042517.pdf.

95. [95] World Cancer Research Fund International, "Driving action to prevent cancer and other non-communicable diseases : a new policy framework for promoting health diets, physical activity, breastfeeding and reducing alcohol consumption.," 2018.

96. The World Bank, "Urban population (% of total population) - Qatar ." https://data.worldbank.org/indicator/SP.URB.TOTL.IN.ZS?locations=QA (accessed Nov. 03, 2020).

97. C. Lanouar, A. Y. Al-Malk, and K. Al Karbi, "Air Pollution in Qatar: Causes and Challenges." Accessed: Nov. 03, 2020. [Online]. Available: https://www.qu.edu.qa/static_file/qu/colleges/cbe/documents/research/Charfeddine_2016.pdf.

98. Government of Qatar, "Environment and Agriculture." https://portal.www.gov.qa/wps/portal/topics/Environment+and+Agriculture (accessed Nov. 05, 2020).

99. World Health Organization, "Responding to non-communicable diseases during and beyond the COVID-19 pandemic," Geneva, Switzerland, 2020. [Online]. Available: https://www.who.int/publications/i/item/WHO-2019-nCoV-Non-communicable_diseases-Evidence-2020.1.

100. D. Rajan et al., "Governance of the Covid-19 response: a call for more inclusive and transparent decision-making," BMJ Glob. Heal., 2020, doi: 10.1136/bmjgh-2020-002655.

101. World Health Organization, "Maintaining essential health services: operational guidance for the COVID-19 context, Interim guidance," 2020.

102. WHO EMRO, "Digital innovation stories during COVID-19". http://www.emro.who.int/noncommunicable-diseases/publications/success-stories.html?format=html (accessed 01 February 2021).

103. World Health Organization, “Rapid assessment of service delivery for NCDs during the COVID-19 pandemic.” Geneva, 2020.

104. A. Hagagy, “Kuwait imposes 20-day ‘total curfew’ from May 10 to curb coronavirus,” Reuter, 2020.

105. Z. Zheng et al., “Risk factors of critical & mortal COVID-19 cases: A systematic literature review and meta-analysis,” Journal of Infection. 2020, doi: 10.1016/j.jinf.2020.04.021.

106. World Health Organization, “Information note on COVID-19 and NCDs,” 2020.

107. J. S. Alqahtani et al., “Prevalence, severity and mortality associated with COPD and smoking in patients with COVID-19: A rapid systematic review and meta-analysis,” PLoS ONE. 2020, doi: 10.1371/journal.pone.0233147.

108. World Health Organization Europe, “Alcohol and COVID-19: what you need to know. The World Health Organization Europe,” 2020.

109. 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., 2020, doi: 10.1016/j.dsx.2020.05.020.

110. 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., 2020, doi: 10.1016/j.scitotenv.2020.138704.

111. World Health Organization, “NCDs, poverty and development,” 2014.

112. B. Leo, “Technology to fight COVID-19 in the Developing World, The Africa Report,” 2020.

113. Malay Mail, “Covid-19: ‘MyTrace’ app to help in contact tracing, says senior minister,” 2020.

114. S. Chabba, “Coronavirus tracking apps: How are countries monitoring infections?,” Deutsche Welle, 2020.

115. ITU News, “Ghana launches COVID-19 Tracker App,” 2020.

116. “Green status on Ehteraz, the new normal,” Gulf Times, 2020, Accessed: Nov. 07, 2020. [Online]. Available: https://www.gulf-times.com/story/665052/Green-status-on-Ehteraz-the-new-normal/.

117. Government Communications Office, “Coronavirus (COVID-19),” Government of Qatar, 2020. https://www.gco.gov.qa/en/focus/covid-19/ (accessed Nov. 07, 2020).

118. Minister of Public Health Qatar, “@MOPHQatar - Twitter Feed,” Twitter. https://twitter.com/MOPHQatar (accessed Nov. 07, 2020).

119. UN General Assembly, “Addis Ababa Action Agenda of the Third International Conference on Financing for Development,” 2015.

120. UN General Assembly, “Resolution adopted by the General Assembly on 10 October 2018,” 2018. .

121. World Health Organization, “Accelerator Discussion Frame 1,” 2018. .

122. A. Summan, N. Stacey, J. Birckmayer, E. Blecher, F. J. Chaloupa, and R. Laxminarayan, “The potential global gains in health and revenue from increased taxation of tobacco, alcohol and sugar-sweetened beverages: A modelling analysis,” BMJ Glob. Heal., 2020, doi: 10.1136/bmjgh-2019-002143.

123. G. Gopinath, “The Great Lockdown: Worst Economic Downturn since the Great Depression,” 2020.

124. Kuwait Visa, “Understanding Alcohol Laws in Kuwait: A Guide for Foreigners.”

125. World Health Organization, “Increasing fruit and vegetable consumption to reduce the risk of noncommunicable diseases,” 2019.

126. World Health Organization, “Promoting fruit and vegetable consumption around the world.”

127. M. Al Thani et al., “Adherence to the Qatar dietary guidelines: A cross-sectional study of the gaps, determinants and association with cardiometabolic risk amongst adults,” BMC Public Health, vol. 18, no. 1, p. 503, Apr. 2018, doi: 10.1186/s12889-018-5400-2.

128. L. Samuel, “5 creative ways to trick people into eating healthy,” 2016.

129. World Health Organization, “Fiscal policies for diet and prevention of noncommunicable diseases: technical meeting report.,” 2020.

130. 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, doi: 10.1017/S1368980010000595.

131. 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, doi: 10.1111/josh.12478.

132. 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, doi: 10.1016/j.ypmed.2014.04.015.

133. 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, doi: 10.1186/s12916-019-1477-4.

134. 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, doi: 10.3390/nu12020330.

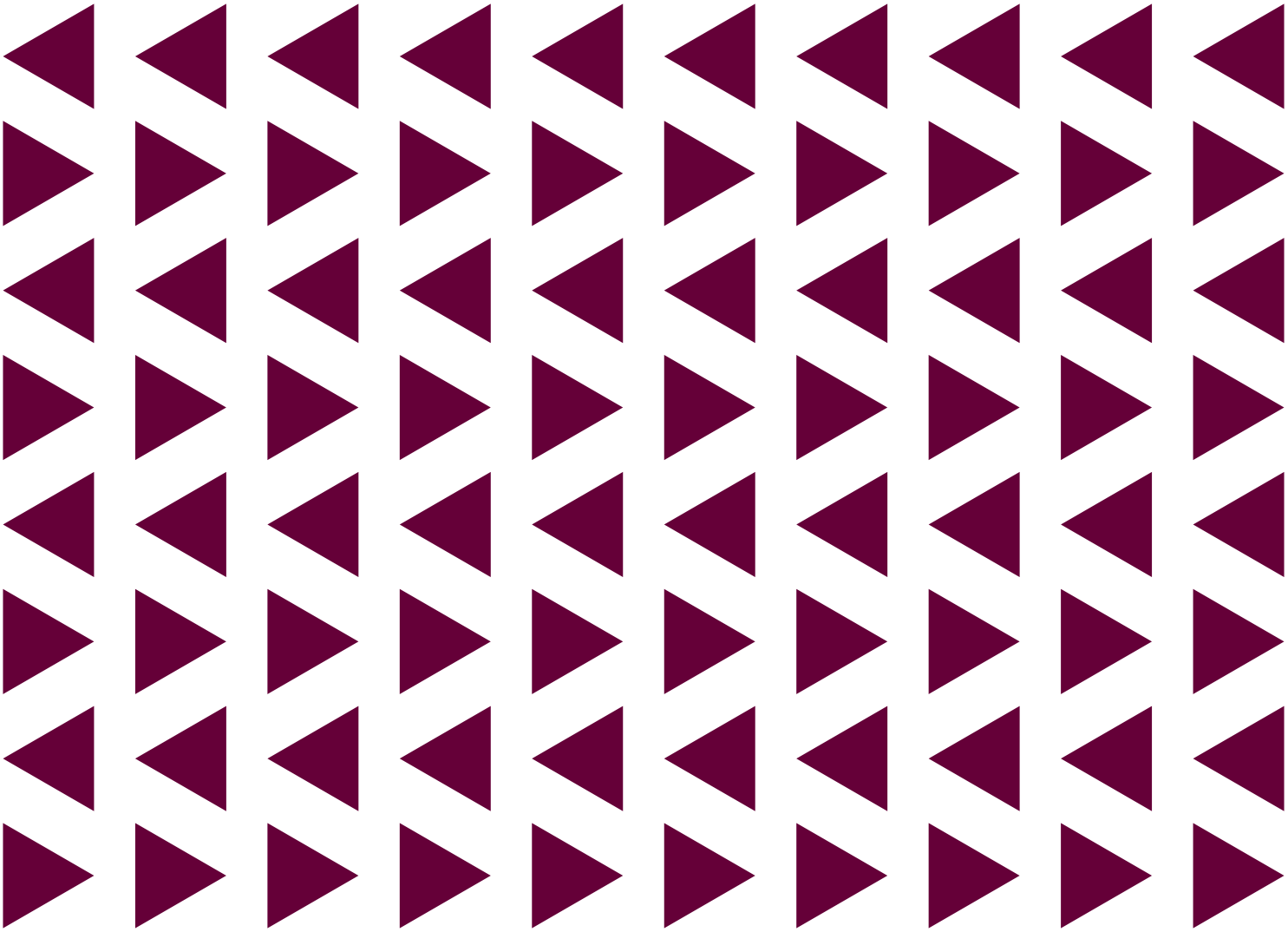
135. F. M. Kroese, D. R. Marchiori, and D. T. D. De Ridder, “Nudging healthy food choices: A field experiment at the train station,” J. Public Heal. (United Kingdom), 2016, doi: 10.1093/pubmed/fdv096.

136. 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, doi: 10.1017/S1368980018001921.

137. 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, doi: 10.1017/S1368980009991297.

138. A.-A. Mohammed Al-Thani, “Qatar National Nutrition and Physical Activity Action Plan The National Nutrition and Physical Activity Action Plan 2011-2016.” 2011.

139. International Federation of Red Cross and Red Crescent Societies, “The Road to Resilience - Bridging Relief and Development for a More Sustainable Future,” 2012. https://www.ifrc.org/PageFiles/96178/1224500-Road to resilience-EN-LowRes %282%29.pdf (accessed Dec. 07, 2020).



State of Qatar
MINISTRY OF PUBLIC HEALTH

مجلس الصحة
لدول مجلس التعاون
Gulf Health Council

UN INTERAGENCY TASK FORCE ON NCDs
#beatNCDs
@un_ncd

World Health Organization

UNDP