



**THE CASE FOR INVESTMENT
IN PREVENTION AND CONTROL OF
NON-COMMUNICABLE DISEASES IN THE
UNITED ARAB EMIRATES**





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Prepared by

Ministry of Health and Prevention, UAE
United Nations Development Programme
World Health Organization
Secretariat of the UN Inter-Agency Task Force on NCDs

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UNITED ARAB EMIRATES
MINISTRY OF HEALTH & PREVENTION

مجلس الصحة
لدول مجلس التعاون
Gulf Health Council



UN INTERAGENCY
TASK FORCE ON NCDs



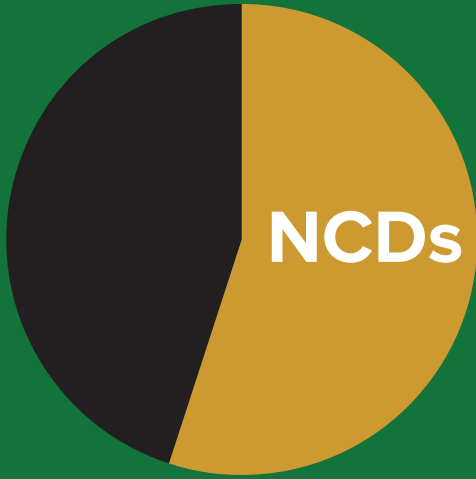
@un_ncd



World Health
Organization



Why invest?



AROUND 4,800 PEOPLE IN THE UAE DIE EVERY YEAR FROM THE FOUR MAIN NON-COMMUNICABLE DISEASES (NCDs), WHICH CAUSE

55%

OF ALL DEATHS IN THE UNITED ARAB EMIRATES.



NCDS COST THE UAE AED 39.9 BILLION (US\$ 10.9 BILLION) EVERY YEAR, EQUIVALENT TO

2.7%

 OF GDP IN 2019.

AS A COMPARISON, THIS IS EQUAL TO NEARLY HALF OF THE ECONOMIC CONTRACTION IN THE UAE DUE TO COVID-19 (5.9 PERCENT IN 2020).¹



34%

OF ALL DEATHS IN THE UAE ARE DUE TO **CARDIOVASCULAR DISEASE,** WHICH CAUSES THE MOST DEATHS EVERY YEAR.

¹ IMF Data mapper: Real GDP Growth 2020. Available at: https://www.imf.org/external/datamapper/NGDP_RPC@WEO/OEMDC/ADVEC/WEOWORLD. Last accessed 9 June 2021.



MANY PEOPLE IN THE UAE LIVE WITH NCDS, PUTTING THEM AT INCREASED RISK OF SEVERE COVID-19.

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

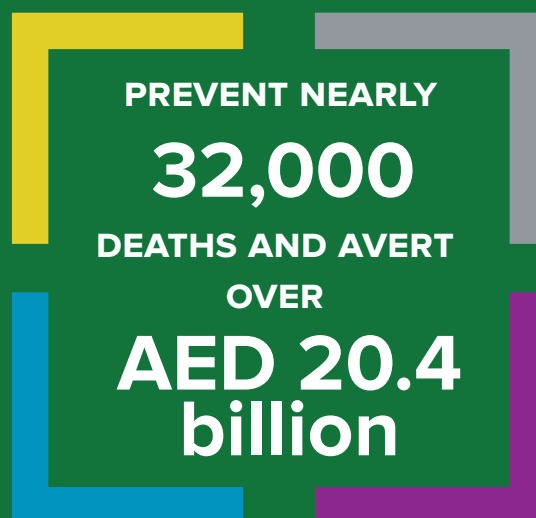
**more than
twice as likely**

TO SUFFER FROM SEVERE COVID-19.²

Investing now

IN FOUR PROVEN AND HIGHLY COST-EFFECTIVE
policy and clinical interventions

WOULD



OR (US\$ 5.6 BILLION) IN ECONOMIC LOSSES BY 2034.

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ABBREVIATIONS

AED	United Arab Emirates Dirham
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
FAO	Food and Agriculture Organisation
GYTS	Global Youth Tobacco Survey
GCC	Gulf Cooperation Council
GDP	gross domestic product
GHC	Gulf Health Council
GYTS	Global Youth Tobacco Survey
ICA	Institutional Context Analysis
IMF	International Monetary Fund
MENA	Middle East and North Africa
MI	myocardial infarction
MOHAP	Ministry of Health and Prevention
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
NRT	nicotine replacement therapy
PHC	primary healthcare
ROI	return on investment
SSBs	sugar-sweetened beverages
STEPS	WHO STEPwise approach to surveillance
UAE	United Arab Emirates
UNDP	United Nations Development Programme
UNIATF	United Nations Interagency Task Force on the Prevention and Control of 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 55 percent of deaths in the UAE.³ 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 the UAE 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, miss days of work or work at lower capacity due to illness. NCDs are exacerbated by COVID-19 and vice versa. NCDs and their risk factors – behavioural, environmental and metabolic⁴ – increase, to varying degrees, susceptibility to COVID-19 infection and the likelihood of severe and fatal outcomes.

This report results from the UAE’s engagement in 2017 with the United Nations Interagency Task Force on the Prevention and Control of Non-communicable Diseases which provided recommended actions to strengthen national response to NCDs. The UAE’s Ministry of Health and Prevention made it a priority to conduct the NCD investment case presented here, which provides evidence that NCDs reduce economic output and that the UAE would benefit from investing in four policy intervention packages that reduce exposure to behavioural risk factors (tobacco use, salt reduction, 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 the UAE. These include air pollution, the food system and urban design (see **Recommendations #2 and #4**), implementation of other cost-effective interventions, such as bans on trans-fats and health taxes on sugar (see **Table 2**) and other health-harming products, and integrated responses to NCDs and COVID-19 (see recommendations and **Annex 1**). The policy and clinical interventions analysed in this investment case represent critical first actions needed to fundamentally reverse NCD trends in the United Arab Emirates. The responsibility for action, as well as the benefits that come from it, fall beyond the health sector alone.

3 Data obtained from MOHAP UAE.

4 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 UAE economy AED 39.9 billion (US\$ 10.9 billion), equivalent to 2.7 percent of its 2019 GDP.

These annual costs include a) AED 19 billion (US\$ 5 billion) in healthcare expenditures, and b) AED 21 billion (US\$ 6 billion) in lost productive capacities due to premature mortality, disability, and reduced productivity and absence from the workplace due to illness. The productivity losses from current NCDs account for 53 percent of all NCD-related costs – indicating that NCDs burden the economy in the UAE beyond health. Multisectoral engagement is required for an effective response, and other sectors benefit substantially from supporting NCD investments.

2 Cardiovascular disease had the greatest impact on the economic burden of NCDs in the UAE, causing AED 26 billion in economic losses, or 66 percent of the total burden.

Indirect costs, including reduced workforce participation and loss in national productivity, contributed more than direct healthcare spending to the total CVD burden (72 percent and 28 percent respectively).

3 The four main NCDs kill around 4,800 people in the UAE per year, and the chance of dying before the age of 70 from NCDs is nearly one in five.

Cardiovascular disease is the leading cause of NCD deaths in the UAE, accounting for 34 percent of all deaths in the country, followed by cancer (12 percent).

By acting now, the Government of the United Arab Emirates can reduce the burden of NCDs. The investment case findings demonstrate that investing in four cost-effective and proven policy packages would, over the next 15 years:

1 Avert AED 20.4 billion (US\$ 5.6 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 32,000 lives and reduce the incidence of disease.

Enacting the CVD and diabetes clinical intervention package would prevent the most deaths (16,000) followed by the salt reduction package (13,000). About 93 percent of the mortality averted for all interventions (32,000 deaths averted overall) would be premature deaths averted (30,000 of people <70 years of age).

3 Provide economic benefits (AED 20 billion) that significantly outweigh the costs (AED 9 billion) of implementation.

Each of the best-buy intervention packages is associated with benefits that outweigh the costs. The salt reduction package has the highest return-on-investment (AED 12 for every AED 1 invested), followed by the tobacco package (AED 1.9), CVD and diabetes clinical interventions (AED 1.8) and diet and physical activity awareness (AED 1.4).

Recommendations

1 > Invest and scale-up

Invest in new and scale-up current clinical and population-based interventions which are associated with benefits that significantly outweigh the costs, 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 the UAE 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

The United Arab Emirates has made considerable progress in advancing the prevention and control of non-communicable diseases (NCDs) over the past several years, for example through strategies and initiatives targeting air pollution, physical inactivity, and unhealthy diet. Still, NCDs remain the leading cause of mortality in the United Arab Emirates and their prevalence continues to rise. NCDs harm not only health but also the country's sustainable development.

The Joint Mission of the United Nations Interagency Task Force on the Prevention and Control of Non-communicable Diseases (UNIATF on NCDs) to the United Arab Emirates in 2017 recognized the considerable burden that NCDs have on health and the economy. NCDs account for over 55 percent of all deaths, with CVD accounting for 34 percent of all deaths and 70 percent of NCD-related deaths. The World Health Organization estimates that the probability of dying between age 30–70 from the four NCDs in the UAE is 17 percent. [1] United Nations Sustainable Development Goals target 3.4 aims to reduce premature mortality from NCDs by one third by 2030.

The impact of NCDs on human health is clear, but this is only one part of the story. NCDs also result in high healthcare 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). Globally, NCDs are estimated to cost over US\$ 30 trillion from 2011 to 2030, representing 48 percent of 2010 Global GDP. [2] 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 the UAE as elsewhere, adding to the urgency with which they must be addressed. In response to the pandemic, the Government of the United Arab Emirates has introduced night curfews, closed shopping malls, and established one of the highest per-capita testing rates in the world. NCDs and their risk factors – behavioural, environmental and metabolic⁵ – increase both susceptibility to infection and the likelihood of severe symptoms and death. People living with NCDs are also at risk of adverse health outcomes due to disruption of prevention and treatment services for NCDs. [3] The prevention and control of NCDs must therefore be a central element of the COVID-19 response and recovery. In recognition of this, the UAE has increased action on tobacco control since the pandemic began, enforcing a ban on waterpipe use in public places, rolling out a national awareness campaign and increasing smoking cessation services. [4] The UAE has also developed a plan to sustain essential NCD services including through digital health, home delivery of medications and virtual public awareness programmes to prevent NCD

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

associated risk factors. The UAE is also conducting 100,000–250,000 daily COVID-19 tests - such screens can help curb the spread of the virus and thus protect vulnerable population groups. **Annex 1** briefly discusses interactions between NCDs and COVID-19 with integrated actions the UAE government can take.

Box 1. The UAE Assistant Undersecretary for health centres and clinics receives UNIATF award

In recognition of his outstanding efforts towards NCD prevention and control, the UAE's Dr Hussain Abdul Rahman Al Rand was awarded a UNIATF Award in 2018. In his role as Assistant Undersecretary for health centres and clinics, he was instrumental in guiding the UAE's transition from policy making to the implementation of NCD priority actions. He guided the Ministry of Health and Prevention (MOHAP) to develop a National NCD action plan (2017-2021) and create a national multisectoral committee for NCDs to oversee the plan's implementation. A particular focus lay on full involvement of all non-health sectors. This is clearly evidenced by the multi-sectoral representation in the national NCD committee, which involved governmental and non-governmental entities, the UAE media, private sector, academic institutions, and municipalities.

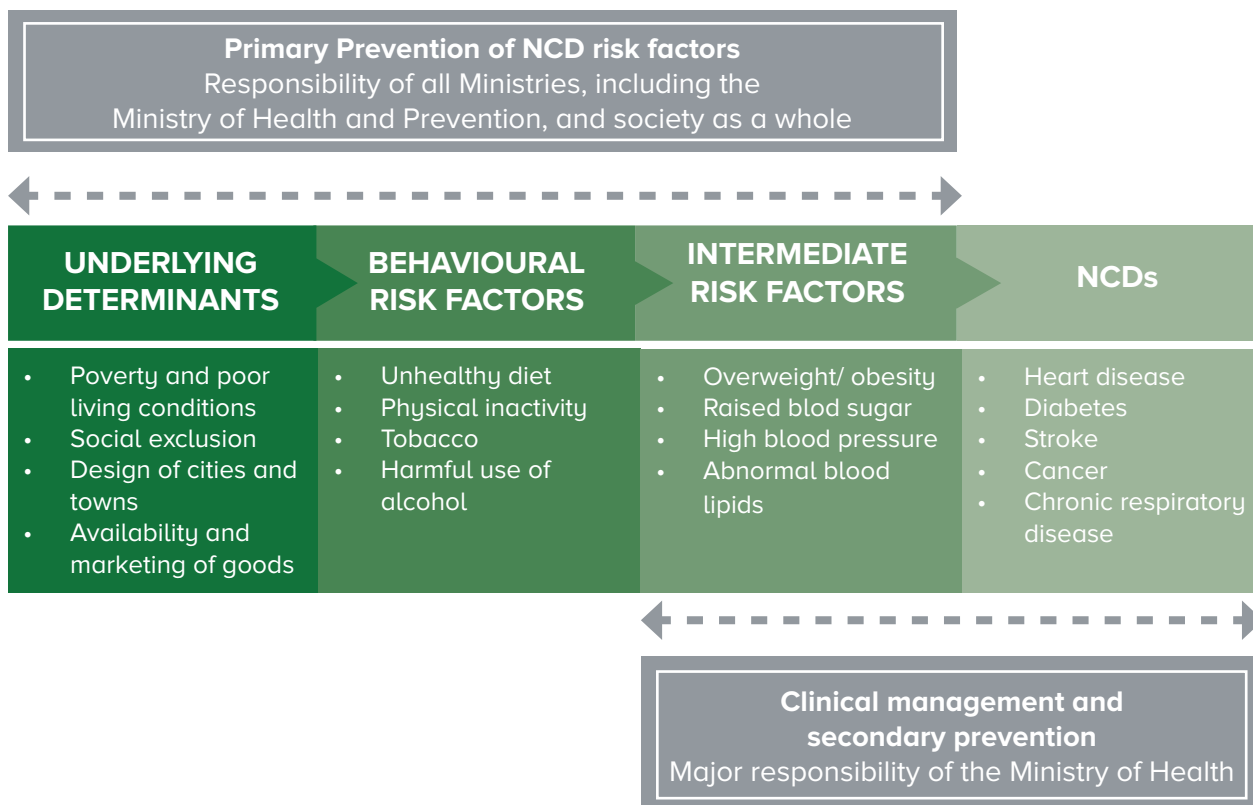
The national multisectoral committee on NCDs has so far conceptualised and delivered a plethora of innovative activities and public health campaigns. These include move for health (involving community members to promoting a healthy lifestyle), Maternal bliss (promoting healthy eating during pregnancy and breastfeeding), Junior Chef Program (combating childhood obesity), steps (promoting physical activity) Fit find (fitness calculators and step trackers), and many more. The UAE has not only made significant progress in NCD interventions and programmes, but also in the promotion of fiscal policies. Together this demonstrates the political and societal momentum to fight the NCD epidemic in the UAE.

The 2017 UNIATF visit to the United Arab Emirates resulted in recommended actions in line with the Framework for Action to implement the United Nations Political Declaration on NCDs of the WHO Regional Committee for the Eastern-Mediterranean (see **Annex 5**). As part of the 2017 mission, WHO and the Ministry of Health discussed the value of investigating the economic case for NCD action in the United Arab Emirates. Recommendations from the Joint Mission to the UAE included conducting an NCD investment case.

High human and economic costs of NCDs highlight the need to reduce their burden in the UAE. The risk of developing NCDs can be reduced by modifying four types of behaviour (tobacco use, harmful use of alcohol, unhealthy diet and physical inactivity) and metabolic risk factors such as high blood pressure, high blood sugar 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. [5] Reducing risk for NCDs is possible through a healthy diet, regular physical activity and avoidance of tobacco products and harmful use of alcohol. Reducing people's exposure to environmental risks, such as outdoor air pollution, can also reduce deaths and disability from NCDs.

Figure 1 illustrates the determinants and risk factors that drive the development of NCDs, many of which are beyond the control of the health sector alone.

Fig. 1: Determinants of NCDs and responsibilities for response



WHO developed a menu of highly cost-effective policy options, referred to as ‘best-buys’, and an additional set of cost-effective interventions to assist Member States to reduce the NCD burden. 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. [6]

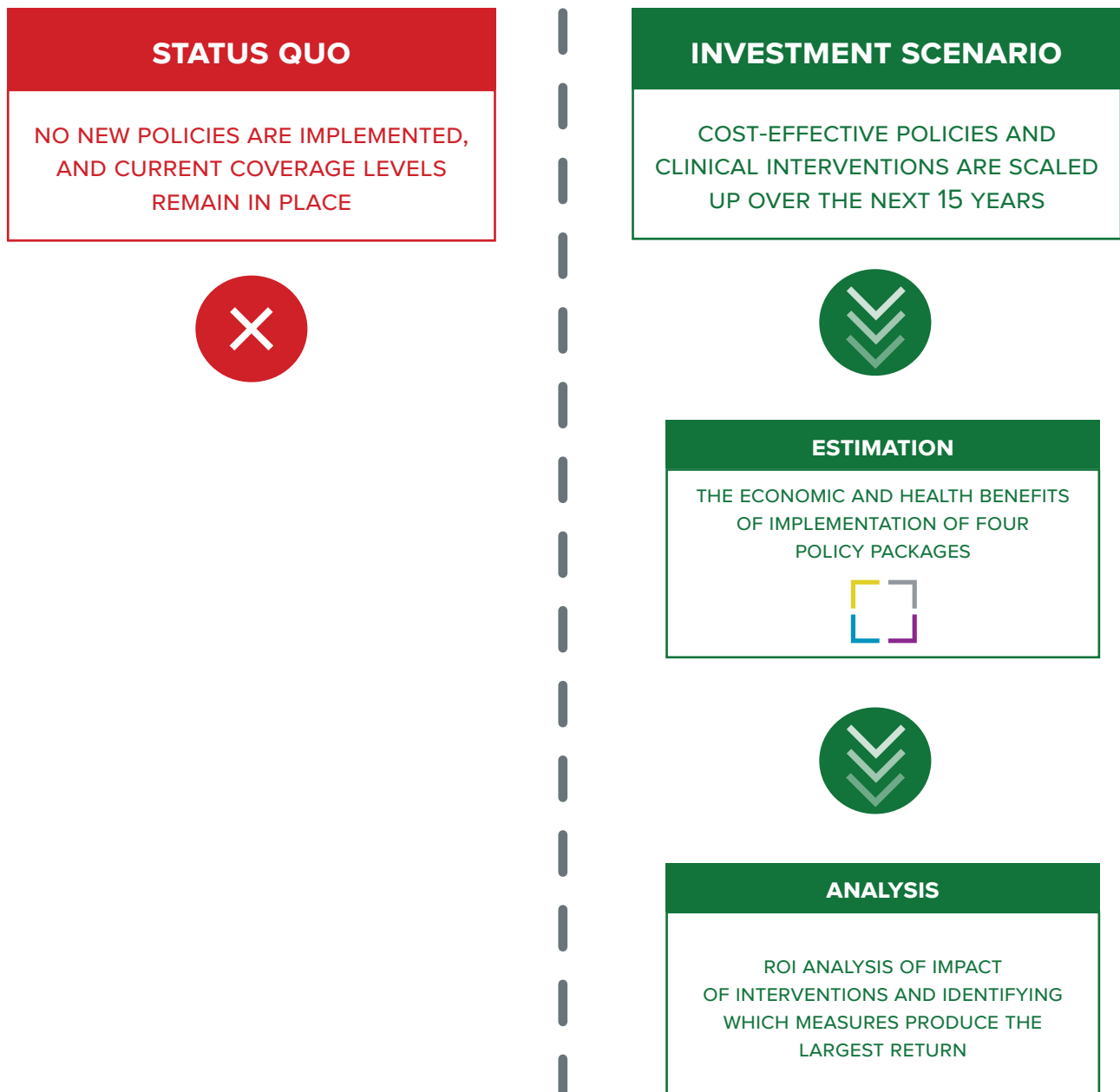
Despite the strong evidence of their cost-effectiveness, WHO best buys remain under-implemented globally. This is partly due to the hidden costs of NCDs (i.e. the economic impact) often being overlooked. Therefore, quantifying the costs of interventions to prevent and control NCDs, as well as their returns 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 model

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



The investment case 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 the UAE. It analyses the following four packages of interventions and policies:



This report provides an overview of the current context of NCDs in the UAE, 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 the UAE 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 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 the United Arab Emirates. The report also includes **five annexes** to provide further guidance on effective NCD prevention and control measures to support the UAE sustain improvements in population health.



‘The real wealth of the country is made up of men, of children, and of future generations. It is this which constitutes the real treasure.’

Sheikh Zayed bin Sultan Al Nahyan, Founder of the UAE

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NCDS AND RISK FACTORS IN THE UAE

This section provides an overview of the most prevalent behavioural risk factors for NCDs in the UAE: 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; and reviews environmental risk factors as well.

NCDS AND RISK FACTORS IN THE UAE

As a result of sustained economic growth and successful government efforts to treat and prevent communicable diseases, the UAE has transitioned to an epidemiological profile typical of high-income countries, marked by an intense NCD disease burden. Today, approximately 55 percent of deaths in the UAE are due to the four main NCDs – principally cardiovascular disease (34 percent). [1] Cardiovascular diseases (e.g. ischemic heart disease and stroke), in particular, have risen dramatically over the last ten years and are the leading cause of NCD deaths in the UAE. Other major contributors to NCD-related deaths are cancer⁶ (12 percent of all deaths), chronic respiratory diseases (5 percent) and diabetes (5 percent). [1]

Nationals and expatriates in the UAE are exposed to multiple risk factors for NCDs, particularly tobacco consumption, low physical activity, high rates of overweight and obesity [7]. A national STEPS survey was conducted in 2017-2018. A total of 8,214 adults (18+) from all seven Emirates participated in the survey and a response rate of 87 percent was registered. [8]

This section provides an overview of behavioural risk factors for NCDs in the UAE, as described amongst others in the STEPS survey 2017-2018: 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,⁷ and touches upon some environmental risk factors, such as air pollution.

Tobacco use

According to the results of the 2017–2018 STEPS survey, 9.1 percent of adults (18+) in the UAE smoke, second lowest among the Gulf states after Oman (8%). [8] Smoking is particularly prevalent among the male population, as the share of men who smoke is seven times greater than the share of women – 15.7 percent vs. 2.4 percent, respectively. Furthermore, Emirati nationals are more likely to smoke than expatriates: the share of Emirati men (18+) who smoke is estimated at 20.5 percent, while the share of expatriate men who smoke is 14.9 percent.



Photo credit: © Freepik.com

As in most other countries, the majority of smokers (89 percent) use tobacco products daily,

6 Strictly, the statistic for cancer present here refers to the broader category of neoplasms. Since benign neoplasms represent a virtually null share of deaths by neoplasms, the figure is considered a robust proxy for cancer burden.

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

with considerable repercussions for their health. A particular cause for concern is that the peak age-specific smoking rate is found among 28- to 36-year-olds (37.2 percent), at an age in which people are often at the height of their productivity. [8] The most common form of tobacco product are manufactured cigarettes, followed by shisha, medwakh (a small smoking pipe) and e-cigarettes. Notably, the prevalence of e-cigarettes use is the highest among the younger population (18-27), which suggests that young people might be misled by the tobacco industry about the impact of e-cigarettes on health. Children below 18 also frequently use medwakh, which is generally cheaper than cigarettes. [9]

Overall, men in the UAE get exposed to nicotine at an early age. Interviews with smokers have shown that the majority of tobacco users (95 percent) start smoking at or before the age of 28. [10] A UAE University study, presented at the International Society of Addiction Medicine conference in Abu Dhabi in October 2017, reported that some children in the UAE start to smoke as early as 9 years old. The study surveyed nearly 1,200 12- to 14-year-old pupils and found that 8.5 percent of them are current smokers. Notably, an even higher smoking prevalence was reported in the results of the 2013 Global Youth Tobacco Survey (GYTS) in the UAE, which concluded that around 12.2 percent of children aged 13-15 in the UAE smoke. [11]

Furthermore, many children and adults in the UAE get exposed to second-hand smoke at home and/or in public places. The STEPS survey found that 6.2 percent of adults are subjected to second-hand smoking at home and 5.4 percent at work. The numbers for children are much higher, based on the results of GYTS in 2013 – 25.2 percent at home and 45.7 percent in public spaces – which can be detrimental to their health. It may be of interest to collect more recent data on second hand tobacco exposure for youth to ascertain whether regulations adopted since 2013 have had a positive impact.

Physical inactivity

Physical activity is defined as any bodily movement that requires energy expenditure. Physical inactivity (lack of physical activity) has been found as the fourth leading risk factor for global mortality (6 percent of global death). [12] 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 ischemic heart disease worldwide. [13]

The 2017-2018 STEPS survey found that 70.8 percent of people living in the UAE were insufficiently physically active (i.e. not meeting the WHO recommendation of no less than 150 minutes of exercise per week). [8] Less than 9 percent of the adult (18+) population in the UAE engage in vigorous- or moderate-intensity sports, fitness, or recreational activities, and just around 6 percent of the population do moderate-intensity activities at work. [8] As in most other countries, lack of physical activity is more prevalent among women than men, although in the UAE the reverse pattern is observed among the older age groups (45+). Particular worrying is the low uptake of sports and exercising among the young population. A meta-study published in 2016 and covering 12,782 adolescents found that almost a quarter of the young population in the UAE have a sedentary lifestyle. [14]

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.

In 2010 (latest year for which the data is available), the average salt intake among adults aged 20 and older was estimated at 9 g per day, which is nearly twice the amount recommended by the WHO. [1] The 2017-2018 STEPS survey found that 41 percent of adults aged 18 years and older always or often add salt to their food right before or while eating. Furthermore, 48.3 percent of adults reported to at least sometimes consume processed food that is high in salt (packaged salty snacks, canned salty food, salty food prepared at a fast food restaurant, etc.). [8]

Consumption of sugar in the UAE is also above the norm, in particular among the youth. One study that assessed patterns in water consumption among 527 children and adolescents aged 6-18, found that sugar-sweetened beverages accounted for 13.9 percent of their daily fluid intake. [15] Another study conducted among 400 undergraduate university students in the UAE, concluded that 56 percent of the respondents were heavy consumers of sugar and that their nutritional knowledge level was generally low or modest. [16]

WHO recommends five servings of fruits and vegetables per day (at least 400 grams). [17] Fruits and vegetables are part of a healthy diet for many reasons, one being they are a source of fibre, an important nutrient that can help improve cholesterol levels to reduce the risk of NCDs. Data from the STEPS survey showed that nearly 83 percent of respondents consumed insufficient levels of fruit and vegetables (according to WHO recommendations), and that the consumption of fruit and vegetables was particularly low in the 33-44 age category. Overall, the mean number of servings of fruit and vegetables consumed on average per day by adults was estimated at less than two which is insufficient.



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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.

Overweight and obesity: Results from the 2017-2018 STEPS Survey suggest that 67.9 percent of the UAE adult population are overweight and 27.8 percent are obese. Prevalence of obesity was particularly high among female Emirati respondents (41.8 percent were obese) and in the age group of 30- to 44-year-olds. [8] These numbers are the lowest among GCC countries, but significantly higher than the averages in the WHO Eastern Mediterranean Region – estimated at 46.5 percent for overweight and 19.5 percent for obesity in 2016. [18] A greater proportion of males (70.8 percent) than females (64.9 percent) is overweight, but obesity is more common among females (30.6 percent) than males (25.1 percent). Notably, prevalence of both overweight and obesity is highest in the 33-44 age group. [8] Despite the UAEs current efforts and preventive measures to control obesity and overweight, their prevalence is expected to continue to increase over the next years. [1] Of high concern is the growing prevalence of obesity among adolescents in the UAE. In 2016, over 17 percent of adolescents (5-19 years) were obese, which has steadily increased from 12.2 percent in 2006. [19]

Raised blood pressure: Raised blood pressure is among the top five major risk factors driving disability and disease in the UAE. [20] WHO estimates suggest prevalence has slightly increased in past years, from 12.5 percent in 2011 to 13 percent in 2015 [21], and tends to rise with age. The 2017-2018 STEPS Survey found that 28.8 percent of respondents had high blood pressure, and that this was more prevalent among males and in the non-Emirati group. Furthermore, 72.5 percent of respondents who reported raised BP (SBP \geq 140 and/or DBP \geq 90 mmHg) were not currently on medication for this. The majority of people with raised blood pressure were non-Emiratis and particularly male respondents in the age group of 30- to 44-year-olds. [8] Notably, only 28.8 percent of the adults who had raised blood pressure reported to be on medication, which suggests that awareness of and/or access to medication need to be improved. [8]

High cholesterol: According to the 2017-2018 STEPS survey, 43.7 percent of adults in the UAE have high cholesterol (\geq 5.0 mmol/L or \geq 190 mg/dl) or are currently on medication for high cholesterol. The prevalence of this risk factor is slightly higher among men (44.4 percent) than women (42.9 percent), and is reported to be highest in the 47-59 age group. [8]

Diabetes: Diabetes has become a more prominent cause of disease and disability in the UAE. The burden in Disability Adjusted Life Years (DALYs) is estimated to have increased by 100 percent between 2007 and 2017. [20] The 2017-2018 STEPS survey found that the percentage of adults (18+) who have been diagnosed with diabetes was 11.8 percent, and that the prevalence was higher among men than women. [8] While this prevalence is above the global average (at around 9 percent), UAE has the second lowest diabetes prevalence among the GHC countries. Notably, Non-Emirati males (14.2 percent) had higher prevalence of raised fasting glycaemia than Emirati males (10.3 percent). [8] It was also observed that the self-reported raised blood glucose or diabetes was highest among adult respondents in the age group 47-59 (34.7 percent) and that herbal or traditional medicine for diabetes was commonly used as a remedy.

Environmental risk factors

Climate conditions: The UAE’s climate conditions represent a challenging setting for outdoor physical activity and outdoor workplaces due to high summer temperatures that may peak above 40°C. Exposure to high temperature, especially for long periods of time, causes physiological stress and may amplify pre-existing conditions and even premature death or disability. [22]

Ramadan during the summer months poses the need for further health considerations, considering individuals are fasting throughout the day, especially for those working or exercising in the hot weather. Working in high temperature environments, such as industrial environments, increases risk for heat stress and illness. [23] The UAE’s Ministry of Human Resources and Emiratization has taken measures to reduce exposure to high temperatures by banning all work performed under the sun and outdoors in the summer months between the hours of 12.30 pm and 3 pm.



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Urban Environment: The level of physical activity among UAE adults is low. Current urban infrastructure and planning exert strong influence on people’s readiness to engage in exercising. According to the results of the 2017-2018 STEPS survey, 60.7 percent of respondents reported that improved availability of park areas near their places of residence would encourage them to be more physically active. [24], [8] Nonetheless, the UAE has been a leading example in promoting healthy lifestyles as a community. This is demonstrated by the various initiatives undertaken by the Government to raise awareness on healthy behaviours, such as the “Dubai Fitness Challenge 30X30”. Launched in 2017 by Sheikh Hamdan bin Mohammed, it has seen success in bringing together the people of Dubai as one community to champion and advocate a healthy lifestyle.

Air pollution: Air pollution includes a mixture of pollutants, including gases and particles that can adversely impact lung capacity and people’s health. Increased exposure to air pollution is related to an increased risk for certain NCDs, such as ischaemic heart disease, stroke, chronic obstructive pulmonary disease and cancer. [25] While no systematized WHO data is available for air pollution in the UAE, the Real-time Air Quality Index rates air quality around Abu Dhabi and Dubai City as “Moderate”, nearing the above category of “Unhealthy for Sensitive Groups.” [26] A recent review highlighted that indoor air pollution can also be a health challenge in the UAE, and that pollutants often derive from the burning of incense, smoking of Hookah

or cigarettes and kitchen appliances. [27] A survey among 6,363 adolescents from 9 regions in the UAE found that poor air quality was among the major predictors of respiratory health problems among UAE children. [28]

Air quality in the UAE is supervised by the Ministry of Climate Change and Environment, which monitors 4 main air pollutants: nitrogen dioxide, carbon monoxide, sulphur dioxide and ozone. The National Agenda 2021 sets the target of raising air quality in the UAE by 2021. To further address the health challenges of climate change and assess risks and options for action, a National Climate Adaptation Program, “Health Adaptation to Climate Change in the UAE“, was launched in 2018 in collaboration with MOHAP and other sectors.

Availability and affordability of nutritious foods: Citizens’ diets have changed rapidly over the past several years. In the Eastern Mediterranean Region, food consumption patterns have shifted towards more processed foods and animal products and less fruits and vegetables. [29] This represents a decrease in fibre intake and an increased intake in sugar, sodium and unhealthy fats (saturated fats and trans-fats). Furthermore, sustained population growth over the years has made the UAE increasingly dependent on food imports. Between 2006 and 2016, the population of the UAE increased by over 75 percent; however, there has been a very limited growth in domestic food production, as indicated by the FAO food production index, which increased by just over 2 percent compared to the baseline 2004-2006 period. [30] Agricultural land declined between 2006 and 2016, from around 7.7 percent of land area to just under 5.5 percent. [8] On the other hand, the value of food imports increased from US\$ 2.2 billion to US\$ 5.1 billion over the same period. [8] The reliance on imports can leave the UAE vulnerable to price spikes for fruit and vegetable whenever there are major disruptions to trade.

Another prominent feature of the UAE’s food landscape is the ubiquity of fast-food chains and the popularity of fast food among its citizens. A 2020 study involving school-aged children in Sharjah, UAE, found that over 53 percent always or often eat fast food. [31] Such dietary habits also have an impact on market dynamics, whereby the demand for healthy food is reduced resulting in lower availability of healthy products.

To address the above challenges, the National Food Security Strategy was launched in 2018, aiming to achieve zero hunger by ensuring access to safe, nutritious and sufficient food all year round. The strategy also aims to implement resilient agricultural practices that increase productivity and production, but help maintain ecosystems. Following this strategy, the UAE has improved considerably on its ranking in the Global Food Security Index, moving from 31st rank in 2018 to 21st rank in 2019. This reflects the efforts of the UAE government to establish the country as a world-leading hub in innovation-driven food security. The Global Food Security Index 2019 covered three main criteria – food availability, affordability, and quality and safety – and assessed 113 countries. Raising the UAE’s rank amongst the top 10 countries on the Global Food Security Index by 2021 is the main objective of the National Food Security Strategy. [32]



3

SITUATION ANALYSIS

This section reviews the UAE'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.

SITUATION ANALYSIS – HEALTH SYSTEMS AND REFORMS

The health system of the UAE underwent significant development in the past decades. Rapid economic growth has enabled substantial investments in healthcare, significant increase in the number of healthcare facilities and workforce, and improvements in service quality. [33] For example, the number of physicians per 1,000 population increased from 1.8 in 2000 to 2.5 in 2018, while the number of nurses and midwives per 1,000 rose from 3.4 to 5.7 over the same period. [34] Number of hospitals increased from just over 90 in 2009 to more than 140 in 2017. [33], [35]

The health sector is regulated by the Ministry of Health and Prevention (MOHAP) as well as healthcare authorities at emirate level – most notably the Department of Health Abu Dhabi and the Dubai Health Authority.

Improvement of healthcare has long been among the priorities of the national development and the UAE aims at having an exemplary health system ranked among the best globally. [33] These ambitions have been partly motivated by the emergence of the health tourism sector as a new contributor to the national economy.

In the early 2000, the UAE authorities initiated system-wide reforms that aimed at improving efficiency and addressing cost and quality challenges. [33] As part of the reform, social health insurance schemes were introduced and the growth of the private health sector was encouraged. [36] As of 2017, around 67 percent of all hospitals and nearly 64 percent of all physicians were in the private sector. [35] Furthermore, partial separation of functions occurred, whereby regulatory authorities ceased to be responsible for service provision in some of the emirates. For example, in the emirate of Abu Dhabi, a new entity was formed to manage service provision – the Abu Dhabi Health Services Company, SEHA. The implementation of the reforms occurred gradually across the country and was most accelerated in Abu Dhabi.

The reforms have led to some impressive achievements in increasing the range of available services, improving service accessibility and attracting additional investments. Nevertheless, their impact on curbing the burden of NCDs has been unclear, with some observers pointing to a range of challenges, including rising costs of services with no obvious improvement in outcomes, service over-use, regulatory fragmentation and deficiencies in preventive measures. [33], [36]

To address the above challenges, the MOHAP and other national stakeholders are engaged in strengthening the primary healthcare (PHC) infrastructure and integration of NCD services (including screening) in the package of services provided at community level. Between 2017 and 2018, 42 NCD clinics were launched. [37] Furthermore, capacity building for PHC staff to improve their skills in early detection and management of NCDs was carried out. [37] The goal to strengthen NCD prevention through improving PHC service availability, quality and utilization is reflected in national policy documents, including the UAE NCD Action Plan.

NCD GOVERNANCE

Multisectoral coordination

The UAE has a national multisectoral action plan and a national multisectoral committee to facilitate cooperation and joint response to NCDs in the country.

The UAE NCD Action Plan was formulated through an inclusive consensus-building process, which was started by the MOHAP in 2013. [38] A situational analysis and a series of consultative meetings with stakeholders were conducted to collect the required inputs, and the draft of the Plan was subsequently assessed using a WHO checklist to determine its completeness. [39] In 2017, the Plan was officially launched. Its four main areas are: NCD early detection; NCD monitoring, evaluation, research, surveillance and management; health promotion and risk reduction; and NCD governance. [38] The Plan provides a strong framework for multisectoral collaboration and responsibility-sharing. The engagement of a diverse range of stakeholders in the preparation of the Plan has helped to sensitize different sectors to NCD response and to spread awareness of their respective roles in preventive action. [38]

To further facilitate multisectoral coordination, the National Multisectoral NCD Committee (NMNDC) was established in 2017 through a Ministerial Decree. The Committee provides a mechanism for policy coherence and information sharing as well as a platform to discuss and oversee the implementation of the NCD Action Plan. [38] The Committee is composed of representatives from across government, along with representatives from the private sector, civil society, academia and municipalities. Its main functions include [38]: monitor, implement and plan activities for NCDs; expedite general policy coordination and harmonization among different domestic stakeholders; supervise national NCD Action Plan implementation; develop agenda for engagement and accountability of different sectors; decided on progress reporting, responsibilities and roles. The MOHAP is the main facilitator of the Committee's work and leads on the organization of the regular meetings, which are usually held on a monthly basis. The Committee, in collaboration with other stakeholders, has been actively promoting population-based interventions and supporting monitoring and accountability of different sectors involved in NCD prevention. [38]

Five executive teams established by MOHAP work to foster collaboration and compliance to corresponding work plans across different sectors (including private sector partners) [38]:

- ^ Executive team for healthy lifestyles' indicators
- ^ Executive team for healthcare quality indicators
- ^ Executive team for cardiovascular and cancer deaths' indicators
- ^ Executive team for health resources and infrastructure indicators
- ^ Executive team for health regulatory indicators

The MOHAP also collaborates with a number of local and regional organizations to enhance the implementation of the relevant NCD measures. These include: Department of Health Abu Dhabi, the Dubai Health Authority, the GCC Health Ministers' Council, the Federal Tax Authority and the GCC Standardization Organization (GSO).

Strategy and planning

The national strategy and plans for NCD prevention and control are laid out in the multisectoral NCD Action Plan and the National Agenda Vision 2021.

The two documents are inter-linked and provide a coherent approach to addressing the NCD burden in the country. The National Agenda sets concrete targets and indicators to guide national efforts in reducing the prevalence of NCDs and their risk factors, while the Plan provides a roadmap for multi-stakeholder action.

The targets set by the National Agenda are reflective of most of the SDG 3 targets, namely targets 3.4, 3.5, 3.8, 3a, 3b, 3c and 3d. [38] Strengthening the prevention and treatment of harmful use of alcohol has not been included in the national NCD targets, yet.

A set of corresponding key performance indicators (KPIs) was also adopted and is closely monitored by specialized executive committees under the overall guidance of the MOHAP. The KPIs include:

- ^ Number of deaths from cardiovascular disease per 100,000 inhabitants
- ^ Number of deaths from cancer per 100,000 population
- ^ Prevalence of smoking any tobacco product among adults (18+)
- ^ Prevalence of diabetes among population 20-70 years of age
- ^ Prevalence of obesity among children (5-17) years

The Prime Minister Office periodically monitors the all national KPIs and reviews relevant reports submitted by ministries and federal authorities. [38]

Notably, the approach adopted by the UAE for NCDs in the National Agenda 2021 is fully aligned with the six strategic fields of action set out by the WHO, including governance, multisectoral response, strengthening intercultural cooperation, restructuring health services, building national capacity for R&D and accountability.

Box 2. Update from UNIATF mission

During 26-29 November 2017 the UN Interagency Task Force on NCDs completed a Joint Programming Mission in UAE. Representatives from FAO, UNDP, UNICEF and WHO participated in the mission. After assessment of NCD prevalence, risk factors, prevention and control measures and goals, UNIATF gave recommendations of actions to the government of UAE.

The Mission observed a very high political commitment to NCDs at different governance levels and across different sectors, which was recognized as an important enabling factor for scaling up the NCD response. It was noted that the need to address the challenges posed by high prevalence of NCD factors was widely recognized and reflected in national strategic and policy documents, including the UAE Vision 2021 under the Goal 4.1 “long and healthy lives”. The Mission further noted the alignment of the NCD goals, targets and indicators with health-related SDG targets and with the WHO EMRO regional action plan.

Furthermore, the Mission found that important progress was being made in implementation of crucial preventive measures, including an increase in tobacco taxes, implementation of excise taxes on soft and power drinks and public campaigns to promote physical activity. Acknowledging the significant momentum gained in the national NCD response, the Mission concluded that further strengthening of NCD prevention and control was very timely and poised to bring major benefits to UAE society and economy. While significant progress was achieved, some of the measures still fell short of fully meeting the WHO recommendations and needed further scaling, including the measures stipulated by the Framework Convention on Tobacco Control.

Following the Mission, a range of actions were taken by the Ministry of Health and Prevention, which began active implementation of the national NCD Action Plan, accelerated collaboration with local health authorities, established technical committees to monitor progress, and scaled up NCD integration in primary healthcare through NCD clinics and the national wellness programme. All these actions create strong basis for further strengthening of NCD response to minimize the burden of NCDs on the UAE population.

Local government

The UAE is composed of seven emirates: Abu Dhabi, Dubai, Ajman, Fujairah, Ras al Khaimah, Sharjah and Umm al Quwain. In the emirates of Abu Dhabi and Dubai, healthcare is administered by local regulatory authorities – the Department of Health Abu Dhabi and the Dubai Health Authority. In the other five emirates, the key regulatory functions are performed by the MOHAP which also acts as the major purchaser and provider of health services. [33]

Collaboration through local stakeholders and institutions is strengthened through the work of the executive teams established by the MOHAP to promote and monitor progress on health-related KPIs. These teams also foster coherence and collaboration for policy implementation across relevant local government and private entities. [38]

Health financing

Current health expenditure (CHE) in the UAE amounts to around 4 percent of the GDP. The main share, at 55.6 percent of CHE, is financed by the government, followed by social insurance which finances 27 percent of the CHE, private insurance (5.2 percent) and out-of-pocket expenditures (12.2 percent).

Current health expenditure amounts to around 14 percent of the total general government expenditure and have remained at that level throughout most of the period since 2000. In absolute terms, however, due to continuous GDP growth and expansion of government revenues, the per capita expenditure on healthcare has risen by over 130 percent between 2000 and 2017 – from Int\$ PPP 1,323 to Int\$ PPP 3,036. [40]

Overall, there has been a consistent growth in health expenditures. Based on some projections, the expenditure on health could rise to US\$ 25.7 billion by 2024, thus nearly doubling since 2014. While overall expenditure may increase, the proportion faced privately by individuals has been gradually declining, from around 22 percent in 2000 to 12 percent in 2017 - although there were some considerable fluctuations. [40]

Recognizing the growing healthcare costs to the population, largely caused by the rising burden of NCDs and the ageing of the population, the Government introduced and has been promoting compulsory financing arrangements for the entire population. These arrangements differ across the emirates, but all cover a comprehensive scope of services. For example, in Abu Dhabi the Government runs the “Thiqa” programme which provides full medical coverage to UAE nationals at a wide network of both public and private facilities. [41] In Dubai, aside from publicly funded health protection schemes, the “Saada” programme was introduced to offer insurance for citizens who were not covered by any other scheme. [42] National regulations also mandate health insurance coverage for all expatriates who work in the UAE as well as their dependents. In both the emirate of Abu Dhabi and the emirate of Dubai, employers are required to provide coverage to their employees. [43]

IMPLEMENTATION STATUS OF MEASURES MODELLED UNDER THE INVESTMENT CASE

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

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

TOBACCO	
Intervention	<i>Monitor tobacco use/prevention policies</i>
Current state of implementation	
MPOWER monitoring score = moderate policy. [44] The Government has national and representative data on tobacco use for both adults and youth in the UAE. A nation-wide STEPS survey was conducted in 2017-2018, and a Global Youth Tobacco Survey was conducted in 2013, providing updated and representative national data on tobacco use in the UAE. [45], [46]	
Intervention	<i>Protect people from tobacco smoke</i>
Current state of implementation	
Smoking is restricted in indoor workplaces and indoor public places - smoking is prohibited in certain enclosed public spaces (Law No. 15 and Decision No. 24) however definition of “enclosed public space” does not align with the definition in the FCTC Art. 8 and the WHO FCTC Art. 8 Guidelines.	
Smoking is prohibited in any form in hospitals, healthcare facilities, childcare facilities, schools and university/vocational facilities. The law aligns with WHO FCTC Article 8 in these locations. [47]	
Intervention	<i>Offer to help quit tobacco use: Brief intervention</i>
Current state of implementation	
Tobacco cessation is included in healthcare degree curricula/primary care providers are regularly trained in brief tobacco interventions. Patients tobacco use status is also routinely recorded on medical records. [48] Nicotine replacement therapy and Varenicline is available in the country and can be purchased at a pharmacy without a prescription, with the cost partially covered by national/federal health insurance. Bupropion, which is another medication commonly used to support smoking cessation, is available in UAE in both government and private sector. [44]	

TOBACCO

Intervention *Offer to help quit tobacco use: mCessation*

Current state of implementation

MPOWER Cessation programmes score = complete policy. As of 31 December 2018, there is a toll-free telephone quit line/help line to discuss cessation. Smoking cessation support is available in some primary care facilities, health professionals' offices and in the community. [44]

Intervention *Warn about danger: Warning labels*

Current state of implementation

Health warnings are required by law under Federal Law No. 15 and Standard Specifications of the United Arab Emirates, Adopting GSO 246/2011 on Labelling of Tobacco Product Packages (UAE.S/GSO 246:2011). Health picture/text warnings are required on no less than 50 percent of front and back of the package. Provisions align with WHO FCTC Article 11 guidelines regarding size, composition and front and back location requirements.

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 warnings specific to smokeless tobacco products. [49]

Intervention *Warn about danger: Mass Media about danger: Mass Media Campaign*

Current state of implementation

MPOWER score = weak policy. No national campaign conducted between 1 July 2016 and 30 June 2018 for a minimum duration of three weeks. [44] However, tobacco has been included within other campaigns. In 2016, MoHAP launched "Your Health comes first" which promoted the adoption of healthy lifestyles, including the avoidance of tobacco. The campaign included initiatives to prevent people from starting smoking, and encouraging them to quit. [50] As a response to the COVID-19 pandemic, the UAE's MoHAP started a tobacco awareness campaign in March 2020. [4]

TOBACCO

Intervention *Enforce bans on tobacco advertising*

Current state of implementation

Advertising is prohibited in all print/electronic media and at the point-of-sale, though the law does not explicitly ban advertising and promotion via international TV, radio, newspapers or magazines. There are some restrictions prohibiting the display of tobacco products (including in places of worship, educational institutions sports/health facilities, or in areas in proximity to the sale of food, health or children's products), however the law does not ban product display in all places. [51]

Intervention *Enforce youth access restriction*

Current state of implementation

Federal Law No.15 of 2009 regarding Tobacco Control prevents the sale of tobacco products to individuals under 18, and automatic vending equipment and devices for tobacco distribution inside United Arab Emirates. It also bans shisha cafes from operating within 150 metres of residential areas and schools (excluding those with a special licence). [52] However according to the GYTS 2013 Survey, 12.2 percent of students used tobacco products and 47.3 percent of current cigarette smokers purchased them at a store, shop, gas station, cafeteria or supermarket. 50.7 percent of current smokers were not prevented from purchasing them because of their age. [46]

Intervention *Raise taxes on tobacco*

Current state of implementation

According to Cabinet Decision No. 52 of 2019 on Excise Goods, Excise Tax Rates and the Methods of Calculating the Excise Price; tobacco products, electronic smoking devices and the liquids used in such devices are subject to 100 per cent excise tax. [53]

Intervention *Plain packaging of tobacco products*

Current state of implementation

Plain or standardized packaging is not required by law. [54]

PHYSICAL INACTIVITY

Intervention *Awareness campaigns to encourage increased physical activity*

Current state of implementation

Fully achieved. ‘Dream Small... It adds up’ launched in February 2019 as part of the MA’KOM initiative to encourage physical activity and adopt a healthier lifestyle. [55] The Ministry of Health and Prevention launched “Keep On Beating” campaign in collaboration with Pfizer, to encourage citizens to make a number of positive lifestyle changes including physical activity to reduce the risk of CVD. [56] As part of the “30x30 Challenge” residents of Dubai were encouraged to engage in 30 minutes of activity a day for 30 days. [57] Also notable is the 2021 Healthy Children initiative, a campaign under the National Program for Government Communication with the aim to raise awareness among children about healthy lifestyles, including physical activity.

SODIUM

Intervention *Surveillance*

Current state of implementation

Measurement of urinary sodium excretion and dietary assessment studies, considered the gold standard of sodium measures, have been conducted in 2014, however they are not conducted at regular intervals and are not based on a representative sample of the population (females only). [58] According to the UAE National Action Plan in Nutrition, a National Nutrition Survey (NNS) was planned to be initiated and implemented in 2018/19 with data analysis and report expected to be completed in 2020/2021. [59]

According to the STEPS survey 2018, 51.7 percent of adult respondents always/often add salt or salty sauce to their food, and 19.9 percent of adult respondents report always or often eating processed foods high in salt. [45]

SODIUM

Intervention *Harness industry for reformulation*

Current state of implementation

The UAE National Action Plan in Nutrition 2017-2021 includes the objectives of 30 percent relative reduction in mean population intake of salt and reducing salt content in bread to less than 0.5 percent. The UAE have adopted several WHO policy statements on action plans on salt, sugar and fat reduction. [59] There have also been initiatives at the municipal level. In 2017, chefs in Dubai were encouraged to reduce the salt and oil content of their dishes as part of the 'Eat Healthy, Live Healthy' campaign. In 2016, the Food Safety Department of Dubai in collaboration with the MOHAP have encouraged hypermarkets in Dubai to reduce salt content in their own-brand products. [60]

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

Current state of implementation

Nutrition Labelling Policy is currently voluntary during its initial phase and will become compulsory in January 2022. The policy adopts the traffic light system for nutritional information on fat, sugar and salt. [61]

Intervention *Adopt standards: strategies to combat misleading marketing*

Current state of implementation

According to the WHO NCD Progress Monitor 2020, UAE does not meet the WHO recommendations with regards to restricting marketing to children and only partially meets the WHO recommendations with regards to restricting marketing of breast-milk substitutes. [62]

SODIUM

Intervention **Knowledge: education and communication**

Current state of implementation

MOHAP in collaboration with the Food Security Office, launched the National Nutrition Guideline in 2019. It includes the 6 guides with the respective aims: 1) support and promote health living through food and physical activity, 2) maintain healthy food intake, 3) reduce calories from high sugar, saturated/trans fats and reduce salt intake, 4) eat nutrient rich foods 5) adopt healthy food patterns and 6) achieve food safety. [63] The Government also launched a Student Growth Record Initiative in 2019 to support the national programme to combat obesity in young people. The initiative will highlight cases of obesity annually and provide information on dietary habits, physical activity and other health related behaviors of every child. [64] The Government has also tried a novel approach with “Health Heroes” which uses an electronic app to disseminate health information amongst the youth, including healthy eating, physical activity, dangers of smoking and the importance of following a healthy lifestyle. [38]

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

Current state of implementation

MOHAP launched Healthy Restaurant Initiative, aimed at encouraging restaurants to include two healthy options for adults and a complete list of options for children. Options needed to be high in nutritional value, low in sodium and fat, and nutritional analysis is to be shown next to the dish on the menu. [65]

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

TRANS-FAT	
Intervention	<i>Eliminate industrial trans-fat by developing legislation to ban their use in the food chain</i>
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. [66] The UAE is thought to be considering bringing forward new regulations to ban the use of artificial trans-fats before 2023. [67]
SUGAR	
Intervention	<i>Reduce sugar consumption through effective taxation on sugar-sweetened beverages</i>
Current state of implementation	United Arab Emirates has adopted the GCC-approved tax increases of 50 percent on carbonated high-calorie drinks (applicable to sodas and other sugar-sweetened beverages (SSBs) and 100 percent on energy drinks. [53] The GCC is also considering 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	<i>Screening for risk of cardiovascular disease and diabetes</i>
Current state of implementation	More than 90 percent of primary health care facilities report offering CVD risk stratification and applying government-established CVD guidelines. [68]
CARDIOVASCULAR DISEASE	
Intervention	<i>Treatment for those with high absolute risk of cardiovascular diseases and diabetes (>30 percent)</i>
Current state of implementation	According to the WHO NCD progress monitor, the UAE has fully achieved target 10 for drug therapy/counselling to prevent heart attacks and strokes. [62] United Arab Emirates also reports having 10 out of 10 WHO-recommended essential medicines, and 6 out of 6 essential NCD technologies as “generally available”. [68]
Intervention	<i>Treatment of new cases of acute myocardial infarction with aspirin; Treatment of cases with established ischaemic heart disease and post-myocardial infarction; Treatment for those with established cerebrovascular disease and post-stroke</i>
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. [69] Furthermore, MOHAP launched a national strategy to prevent cardiovascular disease for 2017-2021.

DIABETES

Intervention *Glycaemic control*

Current state of implementation

According to WHO NCD progress monitor (2020) , UAE has fully achieved target 10 which includes the provision of drug therapy including glycaemic control. [62] However, despite a trend of improvement, a recent study indicated that less than 40 percent of patients in UAE achieved the optimum glycaemic target, highlighting the need for further collaborative action. [70]

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 were reported as “generally available” in the UAE; Doppler exams of foot vascular status, on the other hand, were not generally available. [71]



METHODS

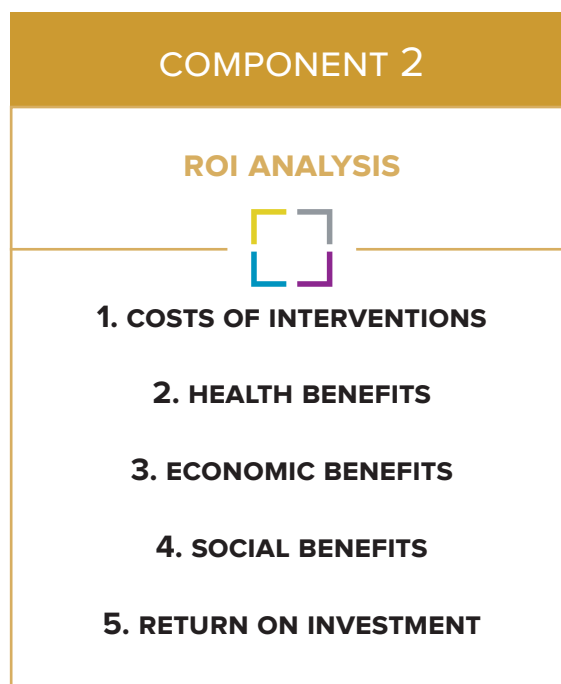
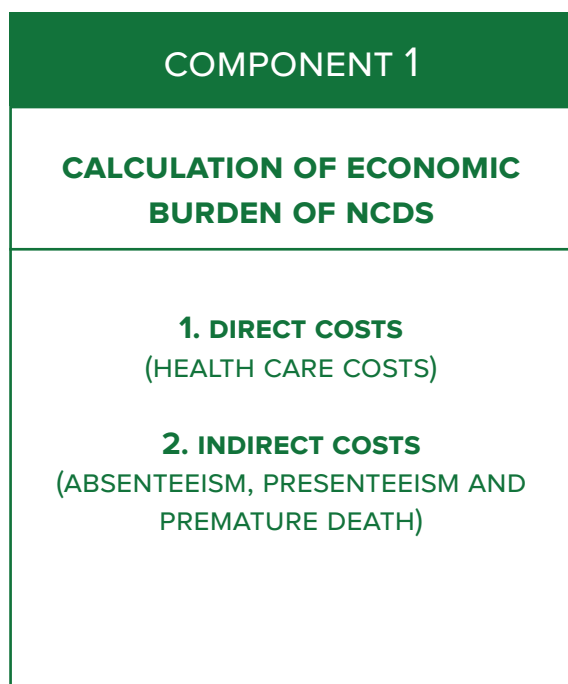
This section outlines the different methods and economic models applied at different stages of the economic analysis.

METHODS

A multiagency, multidisciplinary team comprising staff from MOHAP UAE, WHO (headquarters, WHO Regional Office for the Eastern Mediterranean and WHO country office) the United Nations Inter-Agency Task Force on the Prevention and Control of Non-communicable Diseases, the United Nations Development Programme (UNDP) and Gulf Health Council of the Cooperation Council for the Arab States of the Gulf undertook initial data collection and analysis in the UAE in 2020 to complete a three-tier economic NCD investment case, complemented by an institutional and context analysis. The team consisted of health economists, epidemiologists and social development and public health experts. Intensive follow-up work (described below) was undertaken as part of the methods for collecting and analysing 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.

Economic analysis



1. 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 the UAE 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 the UAE economy. WHO and the United Nations Development Programme developed the NCD economic burden model, which provides estimates of the current direct and indirect costs of NCDs.

a. 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. The total health expenditure on each of these four NCDs was calculated by multiplying the estimated average cost per patient by the estimated number of patients using the health services. The average cost per patient and the number of patients using the health services in 2019 was estimated based on three tightly identified financing schemes, namely the basic financing scheme, enhanced financing scheme and governmental financing schemes.

The three schemes were characterised in terms of the number of beneficiaries, the number of users per disease, the total expenditure per disease, and the total health expenditure of each scheme. Accordingly, the average cost per patient per disease and the number of service users were calculated for these schemes, then the average was adjusted for the whole country based on two factors: first, the percentage of the health expenditure of the three schemes to domestic current health expenditure of the country, which was 50 percent according to the national health account; second, the percentage of the population in the geographical area, which was estimated at 30 percent. The current health expenditure was known from the national health account, the overall expenditure per disease was counted for the three schemes, and the percentage service users was calculated for the three schemes and verified with another large district in the country. Accordingly, an assumption was made that the average percentage of service users in the selected schemes represents the average percentage of service users in the UAE. A smaller number of system users in other districts increases the cost of illness per patient; thus the above assumption renders this study more conservative (**Table 4**).

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

NCDs	Average cost in AED per patient in 2019		Estimated number of patients using the health services in 2019	
	Cost AED	Data source	Number	Data source
Diabetes	7,143	Estimated By MOHAP	1,145,941	Estimated By MOHAP
CVD	4,970	Estimated By MOHAP	1,498,560	Estimated By MOHAP
Cancer	19,553	Estimated By MOHAP	74,185	Estimated By MOHAP
CRD	1,224	Estimated By MOHAP	1,244,767	Estimated By MOHAP

Source: United Arab Emirates Ministry of Health and Prevention MOHAP, 2021

b. 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 the UAE 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 UAE 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 UAE National Health Survey 2018 (NHS),⁸ Bayanat (the official data portal of the UAE government),⁹ estimates from the UAE Ministry of Health and Prevention,¹⁰ World Bank Open Data and estimates from the Institute for Health Metrics and Evaluation.¹¹

[^] 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

8 Available at https://www.mohap.gov.ae/Files/MOH_OpenData/1556/UAE_NHS_2018.pdf

9 Available at <https://bayanat.ae/en>

10 Available at <https://data.worldbank.org/country/ united-arab-emirates>

11 Available at <http://www.healthdata.org/>

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 common health complications associated with the four main NCDs

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

*Based on the number of days worked per year in the UAE (217 days)

Sources: [72]–[76]

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.

2. 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 intervention 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 at 3 percent 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 identified during the visit.

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 [77] and is discussed in detail in a new guidance note for investment cases for preventing and controlling NCDs. [78]

Costs of policy and clinical interventions were calculated using the WHO Costing Tool for NCD prevention and control. The tool 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 in line with previous WHO analyses in the area of NCDs [79], aiming to reach 80 percent coverage by 15 years.
- ^ 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 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 economic losses avoided 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 UAE National Health Survey (NHS) 2018 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 the UAE 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.
- ^ The impact of an intervention, measured as the total Economic burden avoided increase in GDP, was calculated by combining the three types of gains in addition to the value of not replacing staff.
- ^ Following Stenberg et al [80], 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 the UAE was reached by comparing the impact (avoided economic losses) 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.



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

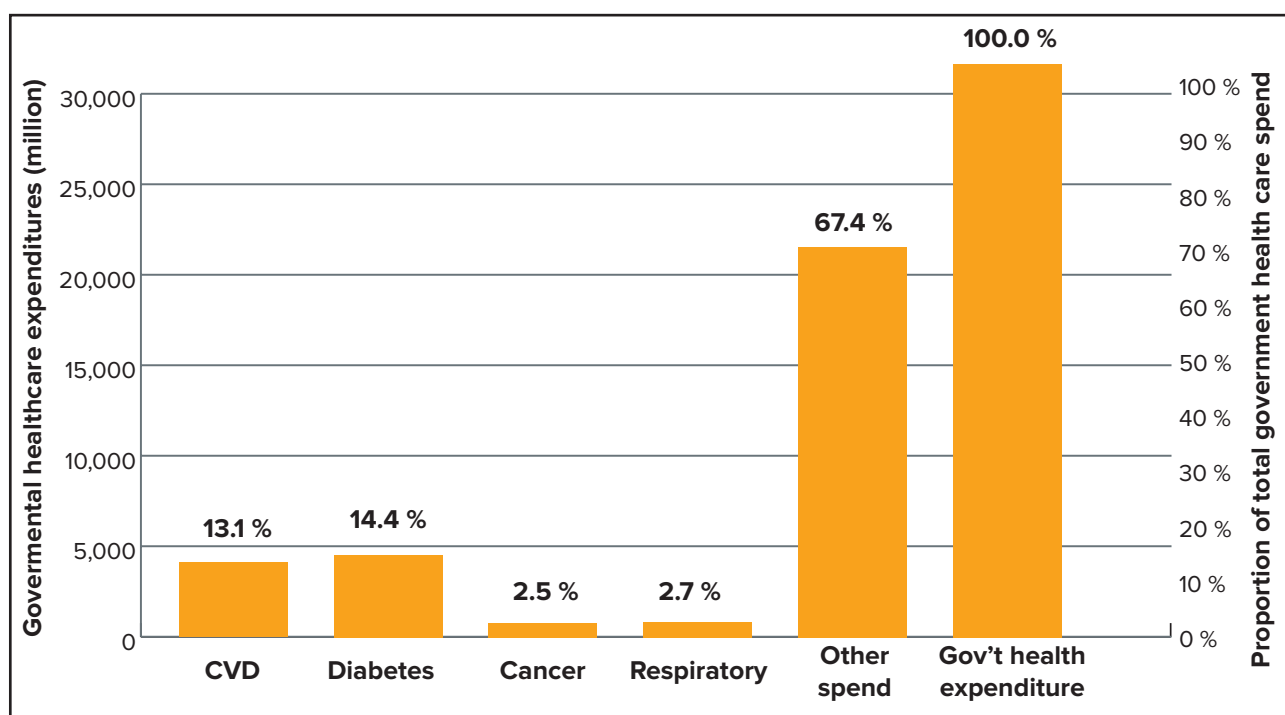
a. Direct costs

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

Total healthcare expenditures for UAE in 2017 was AED 57,019,608,494 (US\$ 15.5 billion). Government health expenditure was AED 31,702,251,118 (US\$ 8.6 billion) and accounted for 55.6 percent of the total healthcare expenditures.

According to the MOHAP calculation, the government spent AED 10,345,906,655 (US\$ 2.8 billion) on the four major NCD groups under study, so that more than 32.6 percent of all government health expenditure is attributable to the four disease groups. This proportion is consistent with 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. [40] **Figure 2** shows the estimated Government Health Expenditure in 2019 on the four major NCD groups.

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



It is calculated that private healthcare costs of the four major NCD is AED 8,262,221,354 (US\$ 2.3 billion). The total healthcare expenditures on these four major NCD groups is AED 18,608,128,009 (US\$ 5 billion).

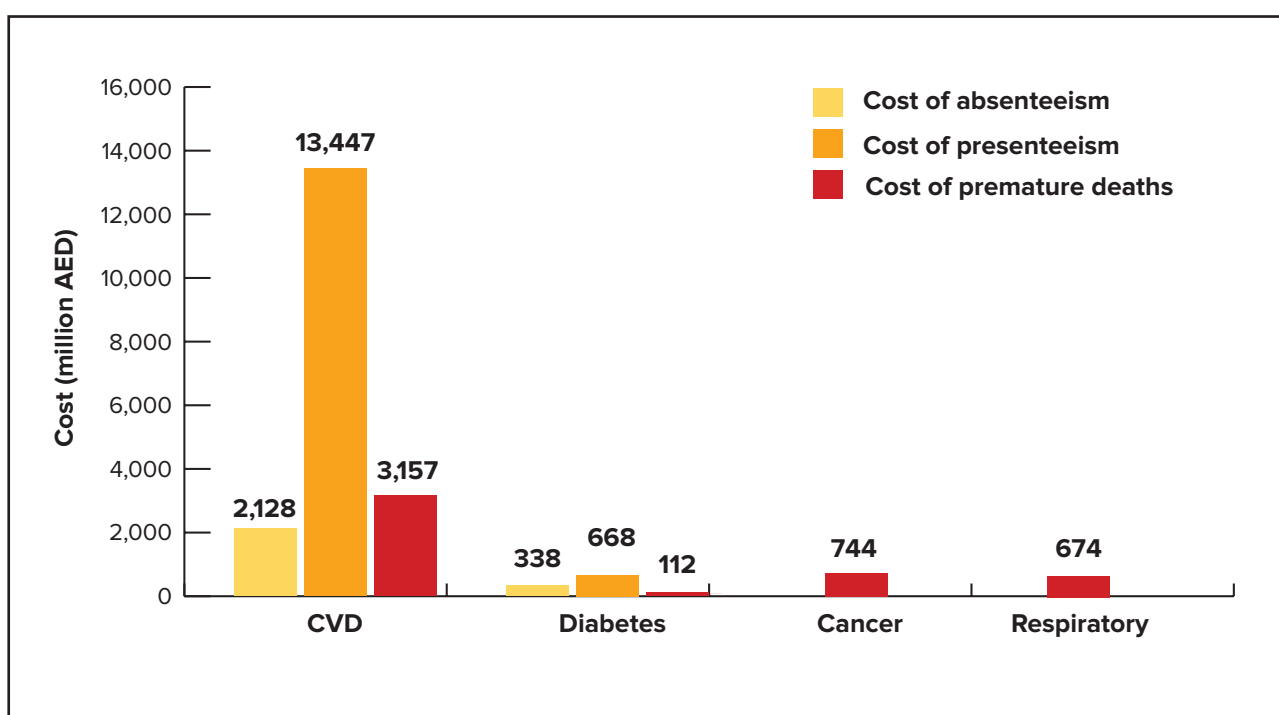
Diabetes accounted for the major share (14.4 percent of total health spending), at AED 8,185,339,012 (US\$ 2.2 billion), followed by CVD which accounted for 13.1 percent of total health spending, at AED 7,448,064,844 (US\$ 2 billion). Total expenditure on chronic respiratory diseases and cancers was AED 1,524,205,580 (US\$ 415 million) (2.7 percent) and AED 1,450,518,573 (US\$ 395 million) (2.5 percent), respectively.

b. Indirect costs

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

The estimation of absenteeism and presenteeism is based on the surviving workforce. **Figure 3** shows the results for 2019. They could only be estimated 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 AED 2,127,748,615 (US\$ 580 million). For presenteeism, the corresponding calculation found that the burden is AED 13,446,555,632 (US\$ 3.7 billion). For diabetes, the cost of absenteeism was an estimated AED 338,485,277 (US\$ 92 million). For presenteeism, the corresponding calculation found that the burden is AED 667,739,137 (US\$ 182 million).

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



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 AED 4,687,776,494 (US\$ 1.3 billion). The loss was the highest for cardiovascular diseases, at AED 3,157,036,072 (US\$ 860 million), followed by cancer, at AED 744,461,094 (US\$ 203 million).

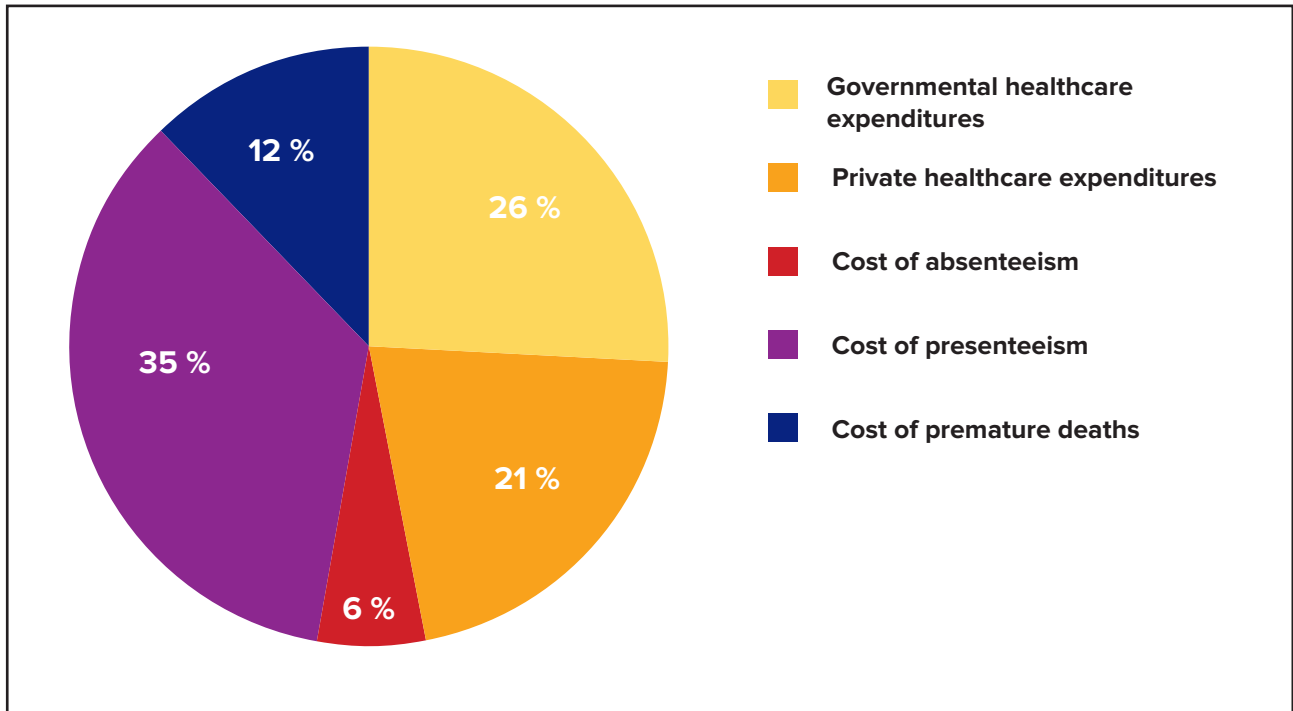
c. Total economic costs

Table 6 summarizes the total direct and indirect costs of NCDs in the UAE. The total health care spending on the four main NCDs in 2019 was already AED 18,608,128,009 (US\$ 5 billion) but additional losses to the economy (absenteeism, presenteeism, premature deaths) brought the total economic burden of NCDs to AED 39,876,433,163 (US\$ 10.9 billion), of which 46.7 percent was direct costs and 53.3 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 2.7 percent of GDP in 2019. **Figure 4** illustrates the structure of the economic burden of NCDs in the UAE in 2019.

Table 6. Economic burden of NCDs in the UAE in 2019 in AED

Cost	Cardiovascular diseases	Diabetes	Cancer	Chronic respiratory diseases	Total	Per GDP
Direct cost						
Government	4,141,038,991	4,550,955,008	806,471,760	847,440,895	10,345,906,655	0.70%
Private	3,307,025,853	3,634,384,004	644,046,812	676,764,685	8,262,221,354	0.56%
Total direct cost	7,448,064,844	8,185,339,012	1,450,518,573	1,524,205,580	18,608,128,009	1.25%
Indirect cost						
Absenteeism	2,127,748,615	338,485,277	No data	No data	2,466,233,891	0.17%
Presenteeism	13,446,555,632	667,739,137	No data	No data	14,114,294,768	0.95%
Premature death	3,157,036,072	112,043,817	744,461,094	674,235,511	4,687,776,494	0.32%
Total indirect cost	18,731,340,318	1,118,268,230	744,461,094	674,235,511	21,268,305,154	1.43%
Total burden	26,179,405,162	9,303,607,242	2,194,979,667	2,198,441,091	39,876,433,163	2.7%

Fig. 4: Structure of the economic burden of NCDs in the UAE, 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 AED 48,080,056 (US\$ 13 million) in the baseline year and increases to AED 258,540,169 (US\$ 70 million) in 2024. Implementing the entire cardiovascular disease and diabetes clinical intervention package over the five-year scale-up period would cost AED 6,885,069,437 (US\$ 1.9 billion).

The total costs for the tobacco package based on MPOWER guidelines are AED 173,615,795 (US\$ 47 million) for five years and AED 480,217,676 (US\$ 131 million) for 15 years. The salt reduction package would cost an estimated AED 330,795,719 (US\$ 90 million) in five years and the diet and physical activity awareness interventions, AED 199,797,617 (US\$ 54 million).

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

Intervention package	2020	2021	2022	2023	2024	Total for 5 years	Total for 15 years
Policy interventions							
Tobacco control	35,413,342	35,286,254	33,573,666	35,768,867	33,573,666	173,615,795	480,217,676
Salt reduction	25,841,284	42,191,242	42,420,045	43,837,247	45,507,799	199,797,617	837,046,267
Diet and Physical activity awareness	71,170,322	68,506,349	64,906,349	63,106,349	63,106,349	330,795,719	952,787,158
Clinical interventions							
CVD and diabetes clinical intervention	48,080,056	101,905,143	155,722,963	207,965,171	258,540,169	1,234,802,467	6,885,069,437
Total	180,505,003	247,888,989	296,623,023	350,677,634	400,727,984	1,939,011,598	9,155,120,538

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 (16,382 and 13,331 lives saved, respectively), followed by diet and physical activity awareness (1,352 lives saved) and tobacco interventions (1,125 lives saved). More than 93 percent of these averted deaths are averted premature mortality (<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 cardiovascular disease and diabetes clinical interventions (100,602 healthy life-years gained), salt reduction intervention (100,140 healthy life-years gained) and then diet and physical activity awareness interventions (11,620 healthy life-years gained) and the tobacco interventions (8,311 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	898	1,088	1,125	1,069	8,311
Salt reduction	12,154	14,602	13,331	12,409	100,140
Diet and physical activity awareness	590	1,807	1,352	1,196	11,620
CVD and diabetes clinical intervention	14,747	10,326	16,382	15,315	100,602
Total	28,389	27,823	32,190	29,989	220,673

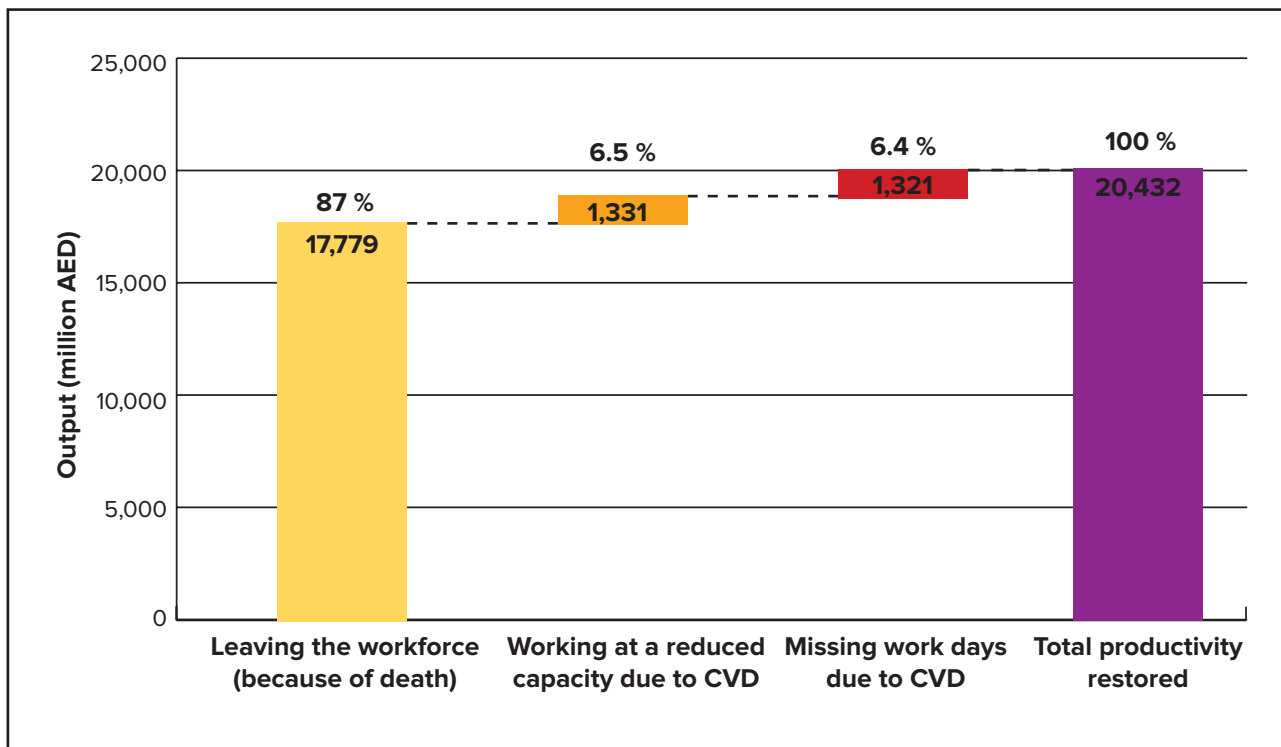
c. Economic benefits

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 AED 20,431,502,614 (US\$ 5.6 billion) in labour productivity gains over the 15-year period or equivalent to 1.4 percent of the UAE's 2019 GDP over 15 years.

The highest labour productivity gains are derived from reduced premature deaths (87 percent of recovered economic output), followed by reduced presenteeism and reduced absenteeism (6.52 percent and 6.46 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 AED 11,898,955,875 (US\$ 3.2 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 salt reduction package and CVD and diabetes clinical interventions.

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

Intervention package	5 years		15 years	
	AED	US\$	AED	US\$
Tobacco control	25,011,713	6,810,541	452,103,637	123,105,143
Salt reduction	318,490,811	86,723,162	5,459,900,090	1,486,698,459
Diet and physical activity awareness	36,451,733	9,925,591	632,994,998	172,360,789
CVD and diabetes clinical interventions	123,029,856	33,500,301	5,353,957,151	1,457,850,824
Total	502,984,113	136,959,595	11,898,955,875	3,240,015,215

e. Return on investment

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

Table 10. Costs, benefits and return on investment at 5 and 15 years, by intervention package (in AED, not including social value)

Intervention package	5 years			15 years		
	Total discounted costs	Total productivity benefits	ROI	Total discounted costs	Total productivity benefits	ROI
Tobacco control	163,881,589	23,648,172	0.14	396,386,608	761,973,010	1.92
Salt reduction	312,682,223	315,914,613	1.01	784,330,139	9,447,152,570	12.04
Diet and physical activity awareness	187,338,996	28,013,853	0.15	662,490,377	907,912,959	1.37
CVD and diabetes clinical interventions	713,828,099	183,986,915	0.26	5,208,182,928	9,314,464,075	1.79
Total	1,377,730,908	551,563,553		7,051,390,053	20,431,502,614	

The salt reduction package has the highest return on investment of any intervention: for AED 1 invested in the salt reduction package, the expected return is AED 12.04 for 15 years. Tobacco control also produce a positive return on investment over 15 years (1.9), as does the physical activity package (1.37).

The package of clinical interventions is estimated to provide a return on investment of AED 1.79 per AED 1 invested. This is frequently the case in health economics because of the high costs of medical treatment necessary under clinical interventions. Further, these treatment options (treatment, secondary prevention after acute events and other) have low potential to increase labour force participation after stroke, myocardial infarction and diabetes. Nevertheless, the clinical interventions package still provides an ROI > 1 under this analysis, while also resulting in most lives saved (15,315 premature deaths averted, see **Table 8**).

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 5 and 15 years, by intervention package (in AED, including social value)

Intervention package	5 years			15 years		
	Total discounted costs	Total productivity + social benefits	ROI	Total discounted costs	Total productivity + social benefits	ROI
Tobacco control	163,881,589	48,659,885	0.30	396,386,608	1,214,076,646	3.06
Salt reduction	312,682,223	634,405,424	2.03	784,330,139	14,907,052,660	19.01
Diet and physical activity awareness	187,338,996	64,465,585	0.34	662,490,377	1,540,907,957	2.33
CVD and diabetes clinical interventions	713,828,099	307,016,772	0.43	5,208,182,928	14,668,421,226	2.82
Total	1,377,730,908	1,054,547,667		7,051,390,053	32,330,458,489	



'I want my people to live better now, to go to high school school now, to go to good health care now, not after 20 years.'

His Highness Sheikh Mohammed bin Rashid Al Maktoum

Photo credit: © Freepik.com





CONCLUSION & RECOMMENDATIONS

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

CONCLUSION

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

The findings from the investment case model show that

- ^ It is estimated that NCD cost the UAE economy AED 39.9 billion (US\$ 10.9 billion) annually, equivalent to 2.7 percent of its 2019 GDP.
- ^ Cardiovascular disease contributes the most to the economic burden of NCDs in the UAE at 66 percent of the total burden or AED 26 billion, of the overall NCD burden, 47 percent attributable to direct healthcare spending and 53 percent due to indirect costs including reduced workforce participation and loss in national productivity.
- ^ Investing AED 9 billion over the next 15 years can save over 32,000 lives and provide economic benefits of AED 20 billion in restored productivity.

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

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

Summary of main findings

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

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



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

	YIELD FOR EVERY AED	TOTAL COST OF POLICY PACKAGE (MILLION AED)	TOTAL BENEFIT (MILLION AED)
SALT REDUCTION INTERVENTION	12.04	784	9,447
CVD & DIABETES CLINICAL INTERVENTIONS	1.79	5,208	9,314
DIET & PHYSICAL ACTIVITY AWARENESS	1.37	662	908
TOBACCO CONTROL	1.92	396	762

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



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 packages to reduce salt and tobacco consumption largely provide the greatest return on investment, scaling up effective salt reduction initiatives and tobacco control should be of high priority.

To strengthen tobacco control, the UAE should strengthen restrictions and regulations on tobacco promotion and sponsorship to meet WHO FCTC guidelines including point of sale display, CSR and misleading advertising. The UAE should also prohibit the display of tobacco products at points of sale. It is important that the UAE continues its surveillance activities for both youth and adults on a regular basis, to ensure regular monitoring of tobacco use and the impact of various tobacco control policies on prevalence.

The UAE has taken commendable steps to improve diet and reduce salt consumption, including the UAE National Action Plan in Nutrition 2017-2021 objective of reducing salt content in bread to less than 0.5 percent, and the Nutrition Labelling Policy, which will become compulsory in January 2022. [59] To further reduce salt consumption, the UAE can extend its objectives of reducing salt content in bread to other products and continue to set ambitious targets regarding relative reductions in mean population intake of salt, like those set in the National Action Plan in Nutrition 2017-2021. The UAE could also consider initiatives to combat misleading marketing to meet WHO recommendations. This includes implementing restrictions on marketing to children and strengthening existing restrictions on the marketing of breast-milk substitutes to fully meet WHO recommendations.

Interventions to increase physical activity are crucial, considering that 70.8 percent of Emiratis (both nationals and expatriates) were insufficiently physically active (i.e. not meeting the WHO recommendation of no less than 150 minutes of exercise per week). [45] The UAE should continue and scale up its national and local awareness programmes, school programmes and other sports initiatives, engaging civil society and particularly targeting women and the young who typically report higher rates of physical inactivity.

Cardiovascular disease remains the leading cause of NCD deaths in the UAE. While these chronic conditions cannot be reversed in most cases, early detection and effective management can extend life-expectancy and dramatically increase well-being. The UAE can improve the monitoring and surveillance of CVD to ensure up-to-date data regarding the population at risk of CVD and patients with existing CVD.

The UAE has also implemented several CVD initiatives which should be evaluated for impact and extend and expand successful ones. This includes the Salamat Initiative which could be scaled up and expanded to employees in other government ministries, and the private sector. [80]

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 reducing subsidies for them, represents a promising approach to finance scaled-up action on NCDs. Increasing taxes on health-harming products is one of the most effective measures a government can take. Doing so reduces the consumption of such products, thereby improving population health and reducing associated costs, while increasing government revenue for national development priorities. Effective 'health taxes' require ministries of finance and health to work together and benefit from broader whole-of-government support. The UAE 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. Beyond tobacco taxation, the UAE can also strengthen taxes on other health-harming products including alcohol, sugar-sweetened beverages, and junk food.

Tobacco: From 1 December 2019, an excise tax of 100 percent was levied on tobacco and tobacco products, in addition to electronic smoking devices and tools and liquids used in such devices and tools.

Alcohol: The UAE imposes a 30 percent duty on alcoholic beverages and additional 50 percent tax on sales. Like in other Gulf countries, alcohol consumption is generally low, and below the worldwide average. A specific excise tax on the percentage of ethanol can help reduce consumption of alcoholic beverages with a high alcohol content, while also generating revenue.

Sugar-sweetened beverages (SSBs): The UAE has implemented a 100 percent excise tax on energy drinks and a 50 percent excise tax on carbonated drinks. This will help reduce the consumption of SSBs and the associated health and economic costs. Saudi Arabia implemented a similar SSB excise tax in 2017 [81] and a recently published paper examined the impact of the tax finding a decrease in sales volume of soft drinks. [82] However, because the tax in the UAE 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. [83] 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.

Junk food tax: The UAE has already implemented several health-taxes on health harming products. The UAE could also consider implementing a junk food tax to increase prices on junk food. Mexico successfully implemented an 8 percent tax on junk food items like sweet breads, ice creams, other items. The tax was associated with a reduction in taxed foods purchases by around 5 percent. A junk food tax may help reduce consumption of unhealthy foods and thus reduce risk factors for NCDs.

The Gulf Cooperation Council (GCC) makes tax decisions as a regional block. The GCC is inclined towards health taxes and considering how to design and implement a tax on sugar-sweetened beverages. The United Arab Emirates 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 the UAE 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 [84] and Egypt allocates tax revenue from tobacco products to health insurance schemes for students. [85]



Engage and collaborate by strengthening multisectoral, whole-of-government and whole-of-society action on NCDs and increasing public awareness of NCDs and their risk factors. As the causes and effects of

NCDs are not limited to health, the health sector should not be the only sector to respond to these chronic ailments. A whole-of-government and whole-of-society approach is needed for effective prevention and control of NCDs and their risk factors. The UAE has a strong National Multisectoral NCD Committee, through which it can strengthen relationships with other government sectors to ensure beneficial coordination.

As recommended by the 2017 Joint Programming Mission, the Ministry of Health should engage all local actors in the national NCDs response. This includes providing guidance and support for actors in order to integrate NCDs in their municipal plans and building capacity for NCD prevention and control. The MOHP can also identify further opportunities for the greater participation of NGOs, private sector entities, and philanthropic foundations to implement the national NCD action plan.

The UAE can increase the number and intensity of media campaigns to spread awareness of NCD prevalence and how reducing NCD risk factors can help minimize risk for development of NCDs and their related health complications. The UAE can launch new national mass media campaigns to spread awareness of the health harming effects of tobacco use and unhealthy diets, while expanding the existing mass media campaigns to promote physical activity (such as the MA'KOM initiative) and healthy lifestyles (such as Your Health comes first launched in 2016). Campaigns may prioritize women and the young in physical activity campaigns and programmes, as they are more likely to report physical inactivity. The UAE should engage civil society on the progress of NCD policies and regularly update and engage the public on the status of NCD prevention and control programmes via government websites and social media platforms.

3 >

Strengthen monitoring and evaluation and accountability across sectors.

The UAE should continue to conduct and update nationwide surveys such as the STEPS survey and youth and adult tobacco surveys on a routine basis. At the same time, the UAE should improve sodium surveillance, including a regular and representative measurement of urinary sodium excretion and dietary assessment study, and continue plans to monitor the salt content of bread to reach targets of less than 0.5 percent and expand these targets to other food products. Taxation on health-harming goods, such as sugar-sweetened beverages, should be monitored as well for changes in consumption patterns in revenue. To strengthen accountability, the UAE should continue to set national key performance indicators (NKPIs) as set in the National Agenda (2021) and continue periodic monitoring of all NKPI including NCD-related KPIs to ensure targets are achieved.

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, the UAE can benefit from applying innovations in key areas.

Urban planning to promote health: Purposeful urban planning can incentivize healthier habits (e.g. through access to urban/community gardens and fresh food markets and mobility systems which encourage walking and/or cycling), which is particularly important for the UAE where 87 percent of the population lives in urban areas. The development of smart sustainable cities such as Masdar City and The Sustainable City, which have already been launched, demonstrates the potential of urban planning and technological innovations to promote health. There are other smart cities currently in the planning and construction stage including Dubai South and Desert Rose City. Other smart city innovations include an environmentally sustainable highspeed transportation service using advanced electromagnetic technology, which is planned to cover between the emirates of Dubai and Abu Dhabi. [86] The UAE should evaluate such innovations and developments for impact and expand successful ones to additional cities.

Improving air quality: the UAE should continue to reduce air pollution by pursuing the UAE National Vision 2021 Agenda, which includes the aim to raise air quality to 90 percent by 2021 and setting even more ambitious targets.

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, considering the current lack of unhealthy diet marketing restrictions to children.

Food environment: Addressing access and availability to healthy food is key to a holistic approach to health. Innovative approaches include encouraging local food markets and incentivizing consumption of health-promoting foods (see Annex 4 for more details). The UAE should prioritize the agriculture sector, supporting and promoting the cultivation of health promoting foods such as fruit and vegetables. This is especially important given the recent decline in agricultural land and growing reliance on imports, which makes the fruit and vegetables vulnerable to price spikes when trade disputes occur.

5 >

Build back better to ensure that prevention and control of NCDs is a central element of the COVID-19 response and recovery (see Annex 1 for more details). [87] 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.¹²

The UAE has already taken important steps towards integrating NCDs into COVID-19 policy. For example, MOHAP integrated continuity of NCD services into their plan for continuity of essential primary care services during the pandemic. Amongst others, this was achieved through digital health solutions such as online consultations, home delivery of medications and patient empowerment through glucose monitoring at home. There are further steps the UAE 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 [88] to support sensitization of actors and integration of NCDs into immediate and longer-term responses.¹³ 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. [89]
- ^ 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).

12 In the UAE, yearly NCD burden is equivalent to 2.7 percent of GDP, and GDP contraction was 6.4 percent in 2020 due to COVID-19 according to the International Monetary Fund, Real GDP growth, IMF Data Mapper.

13 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.



‘The civilized, advanced nation we seek to build and the sustainable development we are keen to achieve both require concerted efforts from all sectors of the community and from all public and private entities and organizations. They require consistent and harmonious work in order to achieve our goals and promote and underpin our nation’s status with its distinct role regionally and internationally.’

His Highness Sheikh Mohammed bin Zayed Al Nahyan

Photo credit: © Ryan Miglincy on Unsplash





ANNEXES

ANNEX 1: NCDs AND COVID-19

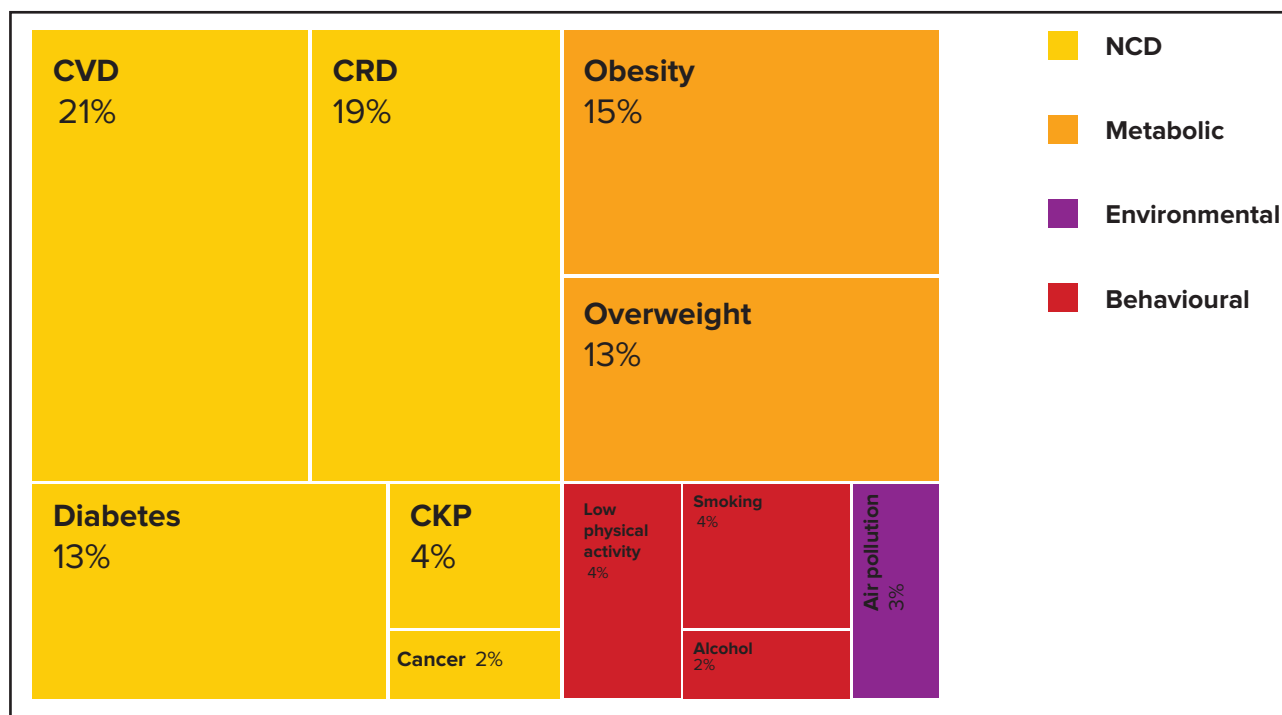
Prevention and control of NCDs is of increased importance during the COVID-19 pandemic. In addition to an increased vulnerability to severe outcomes from COVID-19, patients with NCDs suffer from disruption of or limited access to NCD prevention and treatment services. [90] A recent WHO survey across 155 countries found that the majority of countries are encountering disruptions to the delivery of NCD services, correlating with the severity of the COVID-19 outbreak. [91] The UAE imposed a curfew at the start of the pandemic from 10pm to 6am that was eventually extended by two hours. [92] With a potential increase in COVID-19 cases, similar measures may be reintroduced. [93]

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. [94], [95] In addition, smoking, [96] alcohol consumption, [97] obesity, [98] and exposure to air pollution. [99] This strong interconnection between NCDs and COVID-19 highlights the necessity to integrate considerations for NCDs into the pandemic response on all levels.

The UAE scores 6.2 in the NCD/COVID-19 Vulnerability Index, which is well above the global median, and the highest in the Gulf region. 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. Thus, the high score for the UAE suggests a strongly increased vulnerability to severe COVID-19 based on the prevalence of pre-existing conditions associated with adverse outcomes from COVID-19.

The key NCD-related risk factors contributing to this vulnerability are cardiovascular disease, chronic respiratory diseases (CRD), obesity, overweight and diabetes. Particularly noteworthy is the contribution of CRD here: prevalence of CRD is considerably higher in the UAE (more than two-fold) than the average prevalence in the Gulf region. Because chronic respiratory diseases affect lung function and are often associated with inflammation in the lungs, they are a strong risk factor for adverse outcomes in COVID-19.

Fig. 6: NCD-driven COVID-19 Vulnerability Index – breakdown of risks in the UAE

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. The UAE should communicate the elevated vulnerability of affected individuals. The Government of the United Arab Emirates 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-faceted, 'whole-of-society' and 'whole-of-government' approach. The main building blocks are:

- ^ **An interdisciplinary task force** should devise 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. [100]
- ^ **Implement multisectoral 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, the United Arab Emirates 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. [101] Indeed, the UAE are already conducting around 100,000 to 250,000 COVID-19 screening tests per day. Screening can curb viral spread and thus protect vulnerable population groups.

Contact tracing apps are becoming a commonly used tool to help contain the spread of COVID-19 and the UAE has joined an ongoing list of countries implementing this technology. [102]–[104] The UAE launched the “Alhosn” app, a joint initiative between Ministry of Health and Prevention (MOHAP) and local health authorities that provides test result feedback and contact tracing. [105] 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 UAE has taken initiative to provide the public with useful up-to-date accurate information on COVID-19. Notably by encouraging the public to join the “Alhosn” app and providing accessible COVID awareness material on the MOHAP website including a link to a series of informational videos. [106] 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, the UAE can implement resources on healthy diet [107] and exercise [108] on their Ministry of Health website or a mobile app in addition to the provided information on COVID-19. These initiatives help address concerns of both NCD and COVID-19 prevention.



Photo credit: © MOPH

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

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

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

ANNEX 3: HEALTH TAX MODELLING

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 [109] 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. [110] Health taxes are a fiscal measure that can help finance the health systems across lower middle-income countries whose funding levels for health are currently insufficient to sustain progress towards SDG3. [111] 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.” [112], [113] Identifying and increasing sustainable domestic revenue streams is more important now than ever, with COVID-19 causing economic contraction worldwide [114] and placing an additional strain on health-systems.

While health taxes hold great potential, they remain under-implemented, including in the United Arab Emirates. Still, 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 the United Arab Emirates.

ANNEX 4: INNOVATIVE POLICY SOLUTIONS TO ENHANCE DIETS IN THE UAE

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. [115] WHO recommends that an adequate intake of fruit and vegetables is about 400g of fruit and vegetables. [116] Four or five servings of fruits and vegetables is typically recommended to reach the 400g recommendation. Data from UAE however showed that more than 82 percent of adults [8] and 70 percent of adolescents [117] have insufficient daily intake of fruits and vegetables (less than 5 servings). The following table reviews a range of nutrition interventions to help prevent NCDs. It includes subtle ‘nudge solutions’ and larger measures to increase fruit and vegetable consumption, as well as policies and interventions to discourage unhealthy dietary options.

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. [118] 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.” [118]

Integrating nutrition policies in school canteens



Photo credit: © Zsuzsanna Schreck

Changing the food offered or the shifting the menus may help promote healthier options. In addition to the UAE’s efforts on school canteen food guidelines, the UAE 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. [119]

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. [120] In the United States, an evaluation of a nutrition education programme found that adding taste testing to the programme resulted in higher student consumption rates of fruits and vegetables compared to without taste testing. [121] 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. [122]

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. [123]

> Highlight healthy foods through strategic positioning



Photo credit: © I r via Flickr

A well-established environment nudge for increasing consumer propensity for buying healthy foods involves placing healthy foods next to the cash register (or at the desk) while keeping unhealthy foods elsewhere in the premises. This intervention has been found to increase sales of healthy products (although not necessarily to curb sales of unhealthy products). [118]

GROCERY SHOPPING

> Shopping cart designs and product placement in supermarkets



Photo credit: © Hyacinth50 via Flickr

In a pilot experiment led by a researcher at the New Mexico (US) State University College of Business, shopping carts were decorated with a yellow tape and a sign, indicating a space reserved for fruit and vegetable. The research found that this simple intervention made shoppers more inclined to buy more fruit and vegetables. Evidence suggests that customers could be further incentivized by making the cart even more appealing (e.g. by including pictures of fresh fruit). [124]

> Increasing local markets



Photo credit: © WHO

In Montreal, a seasonal outdoor fruit and vegetable market receiving funding from the Public Health Department was placed in a disadvantaged neighbourhood near a subway station. [125] Integrating alternate food sources, such as local markets, in disadvantaged areas offers a useful strategy to promote consumption of fruits and vegetables while addressing health inequalities. Additionally, placing these markets on travel routes may help increase awareness and access.

RESTAURANTS

> Making healthy meals the rule with default menus



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 a nutrition information. However, those who used newspaper articles, booklets and the internet as a source were more likely to consume fruit and vegetables. [126] This highlights the importance of using a variety of media when developing a public health nutrition campaign.

> **Mobile phone apps**



Photo credit: © Freepik.com

Given the global interest in mobile phone applications, there is a variety available related to nutrition and health, some being more effective than others. In Saudi Arabia, an app called 'Twazon' was developed for weight loss. The app included recommendations for healthy eating as well as a lifestyle assessment which included dietary questions such as fruit and vegetable intake. [127]

WORKPLACE

> **Promoting healthy eating in the workplace**



Photo credit: © Freepik.com

While healthy eating initiatives and dietary interventions in the workplace can vary, a common goal is to promote healthy dietary choices. Researchers in the UK completed a review of workplace dietary interventions concluded that these interventions could have a positive influence on diet [128] and a similar review found that dietary interventions in the workplace positively influenced fruit and vegetable intake. [129] An example of a national initiative is Qatar's 2011 – 2016 Nutrition and Physical Activity Action Plan which included the objective to promote healthy eating and develop specific guidelines for workplace setting. [130]

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. [131]

> 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. [132] 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.

AGRICULTURE

> **Greenhouses**



Photo credit: © Freepik.com

With hot desert climates in the Gulf States, farming is difficult and favours a food supply reliant on imports versus locally grown food. In the United Emirates, the Abu Dhabi Agriculture and Food Safety Authority aims to develop a sustainable food and agriculture sector. The Authority in cooperation with the Korea Rural Development Administration, is launching research projects on smart greenhouses that can withstand the environment of the UAE and produce fruits and vegetables. [133]

> **Breastfeeding**



Photo credit: © Freepik.com

On a population basis, the WHO recommends exclusive breastfeeding for the first six months of life. [134] One of several health benefits associated with breast feeding is that it reduces the risk of obesity later in life. The National Breast-Feeding Policy is strongly committed to health for all people by promoting, supporting and protecting breastfeeding in the UAE through the Baby-Friendly Hospital Initiative in government and private hospitals, baby-friendly communities in primary health care centers, and lactation consultant training programme to strengthen and update a team of trained professionals. MOHAP, in conjunction with WHO and UNICEF, constitutes the official body for nominating and accrediting the Baby-Friendly Health Care Facility at the national level. MOHAP's efforts in this regard have yielded the attainment of a considerable number of health facilities accredited as baby-friendly. This includes 19 government hospitals in Abu Dhabi, Dubai (82 percent of governmental hospitals) and the Northern Emirates; 3 hospitals in the private sector; and 29 primary health care centers affiliated with MOHAP, in Sharjah and Dubai, including the Dubai Health Authority. [135]

ANNEX 5: RECOMMENDATIONS FROM THE JOINT MISSION OF THE UNITED NATIONS INTERAGENCY TASK FORCE ON THE PREVENTION AND CONTROL OF NON-COMMUNICABLE DISEASES, 26–29 NOVEMBER 2017

GOVERNANCE

Recommendations

Clarify the contributions made by all government and non-government sectors to the national plan, developing a clear results framework with process and output indicators for each sector, including indicators at a lower level than KPIs (an example is provided on the Ministry of finance reporting template).

Include key government agencies as well as the private sector to join the National NCD Committee.

Review and align the NCDs interventions developed by local Health Providers with the national NCDs prevention and control plan, including indicators and reporting.

Further enhance National NCD committee mechanisms by creating geographical (across the emirates) or thematic sub-committees. As these committees are essential to ensure engagement of stakeholders at local level.

Seek further coherence with other health authorities in implementing the National NCD plan (Dubai, Abu Dhabi) as main health providers.

Integrate the multisectoral response for NCDs in local authority and municipal plans and strategies. Assist this process by engaging municipalities and local actors and providing guidance and support.

Develop an NCD investment case to demonstrate which interventions have the highest return on investment.

Identify opportunities for greater participation of NGOs, private sector entities, and philanthropic foundations in the implementation of the national NCD action plan.

PREVENTION AND REDUCTION OF RISK FACTORS

Recommendations - Tobacco control

Implement, monitor and review the impact of tobacco taxation excise tax raise following GCC agreement.

Ratify WHO FCTC Protocol to Eliminate Illicit Trade in Tobacco Products.

Pursue full implementation of the WHO FCTC and MPOWER package measures, including a set of evidence-based, feasible and cost-effective interventions for tobacco control.

Recommendations - Salt, sugar and trans-fats

Collaborate with FCC Standardization Organization Committee for Food and Agricultural Standards to sustain progress on population-based reduction of salt intake, sweetened beverages, and consumption of unsaturated fats/elimination of trans-fats.

Scale up food labelling in collaboration with the Emirates Authority for Standardization and Metrology (ESMA) and the Abu Dhabi Health Department.

Scale up action on eliminating trans-fats in domestic and imported food: GCC policy on food labelling and elimination of trans fats should be fully adopted and implemented.

Increase coordination with municipal authorities, parents and community settings to eliminate fast food serving within the vicinities of school and monitoring of child nutrition options by parents. These initiatives should be extended to private schools.

Recommendations - Other risk factors

Review, scale up and mainstream the current workplace wellness programmes (such as the healthy workplace initiative) to all employers in the public and private sectors, making linkages with the national NCD plan. This will require collaboration with relevant stakeholders such as the private sector, Ministry of Labour and the MoH.

Develop a physical activity strategic plan of action.

Share results of ongoing studies on the health impact of exposure to pollution (PM10 and PM2.5) and other environmental hazards.

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