

Prevention and control of noncommunicable diseases in the Kingdom of Saudi Arabia

The case for investment



The Investment Case for Noncommunicable Disease Prevention and Control in the Kingdom of Saudi Arabia

Return on Investment & Institutional and Context Analysis

June – July 2017



**UN INTERAGENCY
TASK FORCE ON NCDs**



Abstract

Noncommunicable diseases (NCDs) such as cancer, cardiovascular diseases, diabetes and chronic respiratory diseases and their risk factors are an increasing public health and economic challenge in the Kingdom of Saudi Arabia. This report provides evidence through three analyses that NCDs reduce economic output and discusses potential options in response, outlining details of their relative returns on investment. An economic burden analysis shows that economic losses from NCDs are equivalent to 2.8% of gross domestic product. An intervention costing analysis provides an estimate of the funding required to implement a set of policy interventions for prevention and clinical interventions. A cost–benefit analysis compares these implementation costs with the estimated health gains and identifies which policy packages would give the greatest returns on investment.

WHO/NMH/NMA/17.55

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Suggested citation. United Nations Interagency Task Force on the Prevention and Control of Noncommunicable Diseases. The Investment Case for Noncommunicable Disease Prevention and Control In the Kingdom of Saudi Arabia : Return on Investment Analysis & Institutional and Context Analysis, August 2017. Geneva: World Health Organization; 2018 (WHO/NMH/NMA/17.55). License CC BY-NC-SA 3.0 IGO.

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Acknowledgements

The NCD investment case mission was initiated at the request of the Ministry of Health to the UN Resident Coordinator and the Saudi Arabia UN Country Team and conducted jointly by the World Health Organization (WHO) and United Nations Development Programme (UNDP).

The authors would like to express their sincere gratitude to the Ministry of Health of Saudi Arabia, the national team who supported the data collection and analysis, and those stakeholders who took the time to be interviewed and share their views during the visit. Special acknowledgement goes to the Vision Realization Office of the Saudi Ministry of Health, who organized all the meetings during the mission.

Economic analysis was carried out by Chokri Arfa, professor and health economist at the University of Carthage, Tunis, Tunisia. This report was written by him, with contributions from; Melanie Bertram, WHO Headquarters; Alexey Kulikov, United Nations Interagency Task Force on the Prevention and Control of Noncommunicable Diseases (UNIATF); Dudley Tarlton and Elfatih Abdelraheem, UNDP.

Comments received from peer reviewer; Mayssam Tamin, UNDP in Saudi Arabia; Maartje Stutvoet, UNIATF; and Gemma Lyons, WHO in Saudi Arabia are much appreciated. The paper also benefited from the advice of, as well as insights from the approach taken for the noncommunicable disease investment cases for Mongolia and Kyrgyzstan.

The assessment was conducted under the overall guidance of; Ibrahim El-Ziq, WHO Representative in Saudi Arabia; Asmus Hammerich, WHO Regional office for the Eastern Mediterranean; and Dr Nick Banatvala of the UNIATF.

The report was financed through a voluntary contribution of the Ministry of Health of the Kingdom of Saudi Arabia.

Abbreviations

CVD	Cardiovascular Disease
COPD	Chronic Obstructive Pulmonary Diseases
IHD	Ischemic Heart Disease
IP	Inpatient
KSA	Kingdom of Saudi Arabia
MI	Acute Myocardial Infarction
MoH	Ministry of Health
NCDs	Non-Communicable Diseases
NGOs	Non-Governmental Organizations
NHA	National Health Accounts
OECD	Organization for Economic Cooperation and Development
OOP	Out-of-Pocket
OP	Outpatient
RoI	Return on Investment
VRO	Vision Realization Office
SHIS	Saudi Health Interview Survey
SDG	Sustainable Development Goals
SHA 2011	System of Health Accounts
UN	United Nations
UNDP	United Nations Development Programme
UNIATF	United Nations Interagency Task Force on the Prevention and Control of Noncommunicable Diseases
WHO	World Health Organization

Executive summary

Non-communicable diseases (NCDs) such as cancer, cardiovascular disease (CVD), diabetes and chronic respiratory disease and their associated behavioural risk factors (tobacco use, unhealthy diet and physical inactivity) are an increasing public health and development challenge in the Kingdom of Saudi Arabia (KSA). NCDs kill more than 90,000 people per year in the Kingdom, and are responsible for 78% of all deaths. Cardiovascular disease alone accounts for nearly half (46%) of all deaths in the kingdom. While the current epidemiological picture is alarming – and the future projections are cause for an emergency response – significant health and economic losses can be mitigated by implementing a set of proven interventions.

The premature death, morbidity and disability associated with NCDs have a significant negative impact on socioeconomic development. NCDs are estimated to currently cost the KSA USD 18.6 billion annually, or 2.8% of GDP. Of that, the USD 5.5 billion from direct healthcare costs was only the tip of the iceberg. The hidden additional costs from lost productivity were more than twice as high – USD 13.1 billion.

The Kingdom's national development plan – Vision 2030 – was designed to accelerate a broad set of reforms aimed at diversifying the economic base, modernizing the health sector, and putting the country's young and growing population on track to for sustainable growth and development over the coming decades. The growing burden of NCDs will threaten those transformations – and may put the goals of Vision 2030 out of reach. These diseases – and the risk factors driving them – are among the greatest economic and demographic threats facing the Kingdom.

As in many parts of the world, NCDs in Saudi Arabia are causing a surge in health care costs and social care and welfare support needs, as well as putting an increasing burden on school and work absenteeism, presenteeism and employee replacement costs. These indirect costs reduce productivity and economic competitiveness.

More than 60% of Saudis are physically inactive. Elevated blood pressure affects 15.2% of the population and another 40.5% are borderline. Obesity affects 28.7% and diabetes 13.2% of the population. Although smoking rates are right around the global average, men are 11 times more likely to smoke than women.

Accompanying Vision 2030 is a Health Transformation Plan that recognizes the burden of NCDs and the threat their growth poses. The Health Transformation Plan prioritizes NCD prevention and the engagement of the private sector in healthcare.

To effectively address the commercial and social dimensions that drive these risk factors will require a concerted effort that is led by, but extends far beyond, the Ministry of Health (MoH). Effective prevention and control of NCDs will bring significant health and economic returns, but must be driven by a whole-of-government and indeed whole-of-Saudi-society approach. Coordination among government sectors requires concerted effort, as does collaboration of key stakeholders like the private sector, civil society, academia and religious leaders.

Several strategic planning interventions are recommended to accompany the policy measures identified in this report. The current National Executive Plan for NCDs (2014-2025) should be updated to align with Vision 2030 and the Health Sector Transformation Plan. Multisectoral coordination should be mandated, meaningful and sustained. A scan of non-health policies should be undertaken to identify any incoherence driving the commercial, social and environmental factors that fuel NCDs.

As part of this investment case three analyses – each of which drew on the United Nations Interagency Working Group on Costing’s strategic planning OneHealth Tool – were performed.

- An economic burden analysis showed the scale of disruption of NCDs to the economy through assessment of their direct and indirect costs. Direct costs include government (public) health care costs for treating NCDs. Indirect costs are based on the costs of absenteeism, presenteeism, employee replacement and economic losses due to premature death among people of working age.
- An intervention costing analysis provided an estimate of the funding required to implement a set of NCD interventions.
- A return-on-investment analysis compared the estimated implementation costs during the costing analysis with the estimated health gains and economic returns of a set of interventions.

Actions to prevent NCDs in Saudi Arabia are relatively cheap, proven and cost-effective. The estimated return on investment by 2030 for the package of policy measures recommended is 2.79:1. The return on investment (RoI) is expected to surpass 1 after only one year of implementation, which means that the net benefit to the Saudi economy will be positive almost immediately.

Because tobacco control measures in particular are both inexpensive to implement and effective, each USD 1 invested now is projected to return USD 5.37 by 2030.

The analysis concluded that raising tobacco taxation would also provide an important additional revenue stream for the government. A further step would be allocation of appropriate funds to public health programmes for NCD prevention and control activities in Saudi Arabia.

The increasing and relatively young population of Saudi Arabia, as well as the increasing prevalence of NCD risk factors, suggests that unless action is taken rapidly, the costs of NCDs will grow even further, putting in jeopardy the commitments of Vision 2030. Investment now will lead to significant and compounding positive returns in both economic growth and lives saved.

1. Introduction

National and international efforts to prevent and control Non-Communicable Diseases (NCDs) have grown significantly following the World Health Assembly Resolution (WHA66.10)¹ that considers NCDs as a priority. The resolution proposed a roadmap for accelerating the work needed to overcome the global impact of NCDs. This report aims to demonstrate that there are compelling economic arguments that preventing and controlling these diseases is one of the most cost-effective of global public health programmes. This report presents the results of the **NCD Investment Case** developed using the OneHealth United Nations (UN) excel model and local data to the extent possible.

Kingdom of Saudi Arabia (KSA) is facing a high NCD prevalence and mortality, particularly among older age groups. There is high exposure to risk factors that will contribute to the future increase in incidence of NCDs, which are continuing to rise. Thus, there is high level commitment to address the rising NCDs burden at Ministry of Health (MoH) level. Non-governmental and civil society organizations are playing a key role in raising community awareness. They are also contributing some screening and early detection services, although these often overlap with services provided in the public sector.

There is strong evidence that investments in NCDs prevention and control can have significant health, economic and development benefits, and provide excellent value for money, which is collectively known as return on investment (RoI). In the 2030 Agenda, countries have committed to reduce early and avoidable deaths from NCDs by one-third. In the Kingdom of Saudi Arabia (KSA), the economic return/business case for investment in preventing and controlling NCDs is unknown; meanwhile the inaction costs are high.

The Government of Saudi Arabia has launched an ambitious national transformational plan (Kingdom of Saudi Arabia Vision 2030) which was adopted as a methodology and roadmap for economic and developmental action in the KSA. This plan encompasses, in a number of domains, strategic objectives, outcome oriented indicators and commitments from all public and private sectors. The MoH has developed the Health Sector Transformational plan which is composed of the following six thematic strategic areas:

- Consumer-centric model of care, that focus on prevention and emphasize the primary care as guardian of patients;
- Health care financing; that aims at setting up a national health insurance system with revenues identified and generated;
- Governance, creating slimmer health structures that separate policy and provision of services;
- Private sector engagement and participation, increase the health care delivery through the private sector;
- Human Capital, enhancement of quantity and quality of the human resources for health and;
- Digitalizing the service provision through user-friendly interfaces (apps) and achieve full IC capacity throughout the country.

¹ Resolution 66.10. Follow-up to the Political Declaration of the High-level Meeting of the General Assembly on the Prevention and Control of Non-communicable Diseases. In: Sixty-sixth session of the United Nations General Assembly. New York: United Nations; 2011 (WHA66.10; http://apps.who.int/gb/ebwha/pdf_files/WHA66/A66_R10-en.pdfA/67/L36).

In KSA, there is a commitment to prevent and control NCDs. There is recognition that it is becoming increasingly important to understand the benefits and the costs of preventive interventions. The MoH in KSA requested the support of the UN system in KSA in the implementation of the health sector transformational plan based on the above thematic priorities. A meeting was held in December 2016, under the joint chairmanship of the Deputy Secretary for Health and the UN resident coordinator, with participation of various resident and non-resident UN agencies. United Nations Development Programme (UNDP) presented the key service offerings which included conducting of an investment case for NCDs jointly with the World Health Organization (WHO). Accordingly, UNDP and WHO conducted a two-leg joint mission during June and July 2017, and assessed the NCDs direct costs (related to health sector expenditure on NCDs) and indirect costs (absenteeism and presentism, home-based care and others). The mission also assessed the engagement of relevant ministries and national authorities the control and prevention of NCDs.

The OneHealth Tool is designed to estimate the RoI of NCDs preventive interventions, which is considered as a guide for policymakers. This model requires a lot of data that can be collected from the national and international databases. The RoI requires a monetary estimation of the intervention's benefits and costs. The later include direct and indirect cost. The direct cost can be derived from the National Health Accounts (NHA) using a 'top-down' approach. The indirect cost refers to the loss of productivity and premature death. In this report, we use, to the extent possible, local data to estimate direct and indirect costs for a selected group of four NCDs. These are: cardiovascular diseases (CVDs), cancer, diabetes and chronic obstructive pulmonary diseases (COPD). These are referred to as "selected NCDs" throughout the text.

The aims of this report are twofold. First, we provide a general overview of the NCD political and institutional context and the methodology used to calculate the RoI of preventive interventions and treatment of the selected NCDs. Second, we develop a framework to analyse the RoI of such NCDs interventions, and to apply the analytical framework to KSA. Note that RoI was calculated only for preventive interventions for which we were able to estimate the benefits and costs.

2. Situation analysis: NCDs and risk factors

This section provides data on prevalence, morbidity and mortality from NCDs as well as outlining information on key risk factors. However, it must be noted that detailed information on NCDs in Saudi Arabia is constrained by inadequate surveillance and research, and unavailability of accurate data, which restricts effective planning. Notwithstanding, the following data reflects the most current information available and certainly indicates the dire need for greater attention to prevention and control of NCDs than is currently the case.

NCD burden

NCDs kill more than 90,000 people in KSA, constituting more than 78% of all deaths in 2012 (Fig. 1). Of all deaths, 78.0% are caused by NCDs and 9.4% are the result of injuries. The CVDs account for 45.7% of all deaths, cancers for 10.3%, COPD for 3.3% and diabetes mellitus for 4.6 %. The probability

of dying prematurely (i.e. before the age of 70 years) from one of these diseases is 17%². CVD and diabetes are the two leading chronic diseases in KSA. They are expected to continue to increase in prevalence in the near future³.

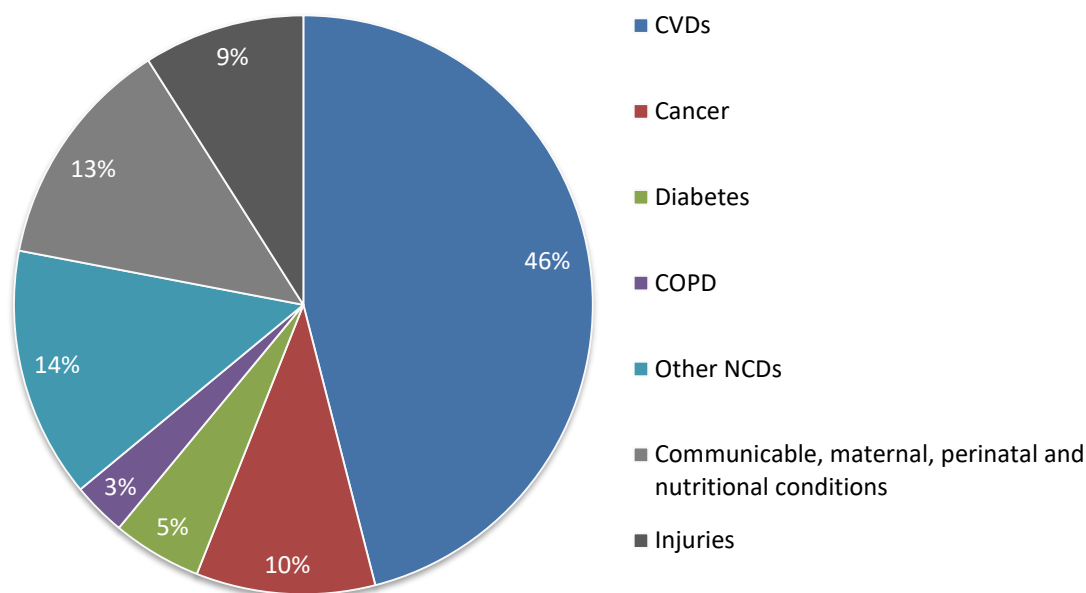


Fig. 1 Proportional Mortality (% of Total Deaths, all Ages and both Sexes), 2012. *Source: KSA WHO NCDs Country Profile 2014.pdf*

Cancer

The 2012 Globocan estimates⁴ indicate that KSA has an age-standardised incidence of cancer at 91 per 100,000, and a mortality rate of 54 per 100,000 per year. However, modelled projections suggest that the incidence is likely to increase by 160% over the period 2012 – 2030.

The highest cancer incidence and mortality within KSA is due to breast cancer, which accounts for 8.7% of all cancer deaths in the country. There are around 2,800 new cases of breast cancer diagnosed every year, resulting in around 800 deaths. Following breast cancer, the other leading causes of cancer among women are colorectal, thyroid, non-hodgkin lymphoma and corpus uteri. Among Saudi men, the most common cancers, in order of incidence, are colorectal, prostate, lung, Non-Hodgkin lymphoma and liver cancer (Fig. 2).

² Noncommunicable diseases country profiles. Geneva: World Health Organization; 2014 (<http://www.who.int/nmh/countries/en/>, accessed 31st July, 2017).

³Nasser Alqahtani (2015), Economic and Health Impact of Non-Communicable Diseases (NCDs) in Saudi Arabia. VP, ISPOR Chapter, Auburn University, AL, USA Head, ADRs Evaluation Dept., SFDA, Saudi Arabia

⁴ IARC. GLOBOCAN 2012, Saudi Arabia. [globocan.iarc.fr/Pages/fact_sheets_population.aspx]

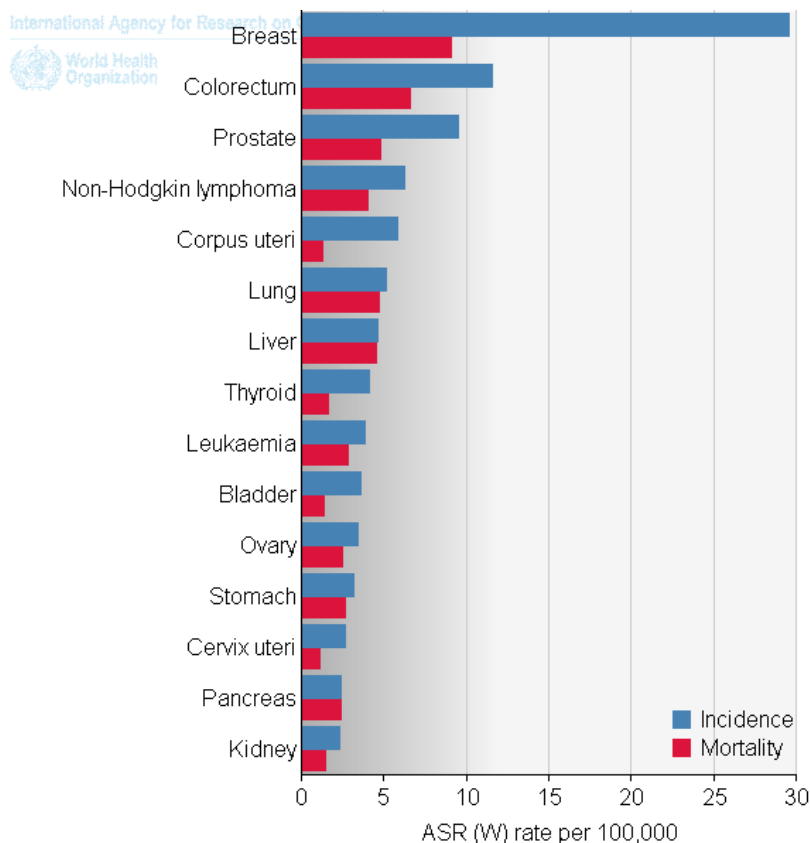


Fig. 2 Estimated age-standardised incidence and mortality rates for cancer in Saudi Arabia (both sexes). Source: *GLOBOCAN 2012, Saudi Arabia* [globocan.iarc.fr/Pages/fact_sheets_population.aspx]

Cardio-vascular diseases

For CVDs, the main conditions include ischemic or coronary heart disease (IHD), stroke (both hemorrhagic and ischemic), hypertensive heart disease or Congestive Heart Failure. Heart attacks and strokes are the most important acute CVD events. Considered both as a cardiovascular disease by itself and a risk factor for IHD and cerebrovascular disease, hypertension has a high prevalence among the general population and population working-ages with more than one million populations exposed (Annex 1, Fig. 3). Hypertension is the leading cause of disability and mortality in KSA amongst CVDs. In 2013, the prevalence of hypertension was 17.7% for males and 12.5% for females. On average, elevated blood pressure affects 15.2% of the population, while the blood pressure of 40.5% of the population is borderline. The prevalence of hypertension increases with age and it becomes 65.2% for aging population (65+).⁵

⁵ Saudi Health Interview Survey (SHIS), 2013

[<http://www.healthdata.org/sites/default/files/files/Projects/KSA/Saudi-Health-Interview-Survey-Results.pdf>]

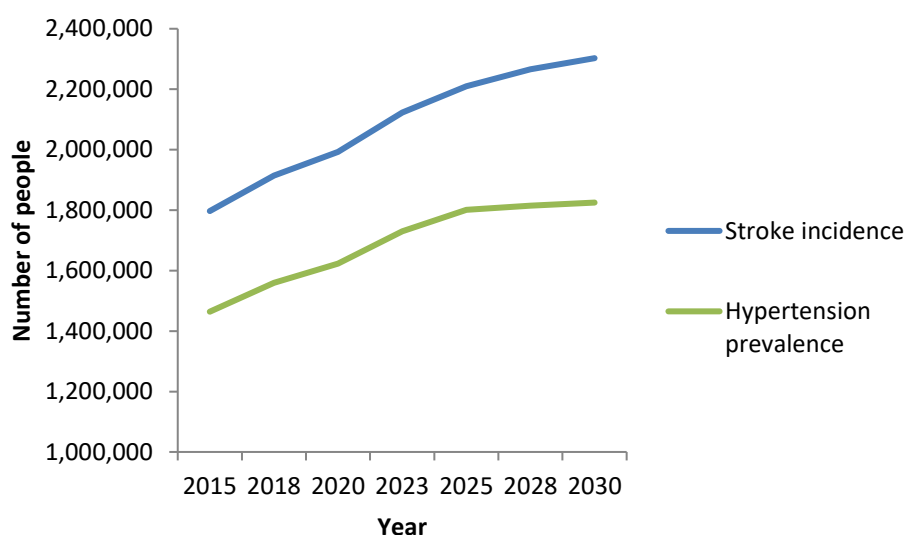


Fig. 3 The expected rise in strokes and hypertension in Saudi Arabia. *Source: see Annex 1*

Chronic Obstructive Pulmonary Diseases

COPD accounts for 3% of all deaths in Saudi Arabia (Fig. 1). Age- and gender-adjusted prevalence of COPD was 2.4% in KSA in 2010-2011. When broken down by gender, the prevalence was higher for men at 3.5%, compared to just 1% for women. The difference in prevalence can be explained by the higher smoking rates among men.⁶

The SHIS (2013) asked a self-reported question on COPD; however the prevalence self-reported was very small at only 0.02%.⁷ This indicates that a large proportion of patients with COPD might be currently undiagnosed.

Diabetes mellitus

Diabetes is fast gaining the status of a potential epidemic in KSA with more than 3 million individuals currently diagnosed with the disease (Annex 1, Fig. 4). Of the population, 13.4% has diabetes.⁸ The prevalence is higher for males than females, at 14.8% and 11.7%, respectively. The SHIS also highlighted that over 40% of people living with diabetes were not aware of it. Furthermore, of those who are aware of their diagnosis, 39% of those being treated did not have their diabetes controlled.

In addition to the population with diabetes, a 16.3% of the population has pre-diabetes. Overall, this means that 1 in 3 people are either diabetic or pre-diabetic. It is predicted that by 2030 diabetes mellitus may afflict up to 4.5 million individuals in KSA.

⁶ Wali SO, Idrees MM, Alamoudi OS, et al. Prevalence of chronic obstructive pulmonary disease in Saudi Arabia. *Saudi Med J.* 2014 Jul;35(7):684-90.

⁷ Saudi Health Interview Survey (SHIS), 2013

[<http://www.healthdata.org/sites/default/files/files/Projects/KSA/Saudi-Health-Interview-Survey-Results.pdf>]

⁸ Survey of health information in the Kingdom of Saudi Arabia 2013. Riyadh: Ministry of Health Kingdom of Saudi Arabia; 2013

(<http://www.moh.gov.sa/Ministry/Statistics/Documents/Final%20book.pdf> , accessed 31st July, 2017).

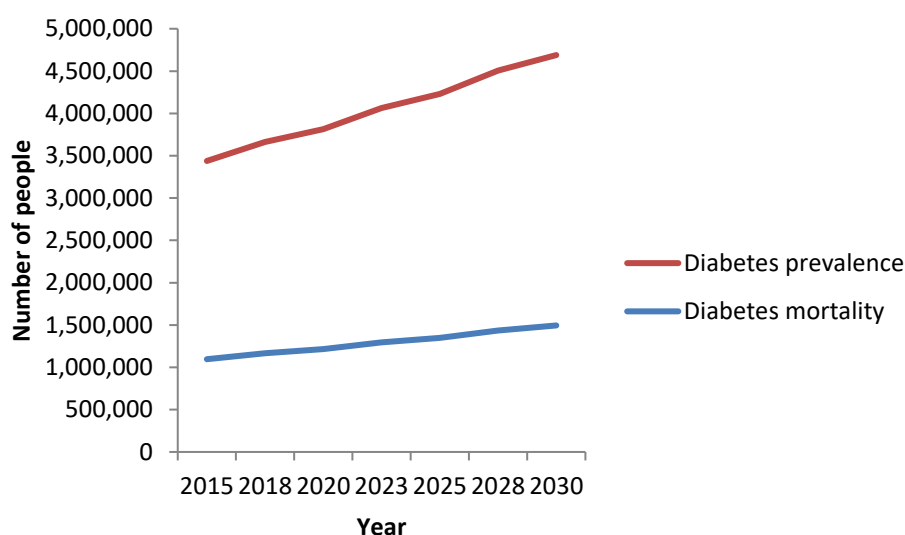


Fig. 4 The expected rise in people with diabetes in Saudi Arabia *Source: see Annex 1*

Hypercholesterolemia

The rate of high cholesterol was also measured by the SHIS in 2013, finding that 9.5% of men and 7.3% of women had high cholesterol (over 6.2 mmol/L). Age was a significant risk factor, with the prevalence of high cholesterol reaching 29% among adults aged 65 and over. Hypercholesterolemia is also a common co-morbidity alongside other NCDs. Of those diagnosed with hypertension and diabetes, the prevalence of high cholesterol was 17.3% and 21.5% respectively. Comparatively, among those without hypertension and diabetes, the rates of high cholesterol were significantly lower at 6.9% and 6.5%.⁹

Existing NCDs Cost Estimates

The Total Health Expenditure (THE) per capita increased between 2005 and 2013 from USD 453.5 to USD 807.8, out of which general government expenditure on health accounted for USD 329.7 and USD518.8 per capita respectively.

- General government expenditure on health as a percentage of THE decreased in the same period from 72.7% to 64.2% and THE as a percentage of the gross domestic product decreased from 3.5% to 3.2%.
- The share of out-of-pocket spending in 2013 was 19.8%, an increase from 16.5% in 2005.
- There are no external sources for expenditures on health.

Previous studies gave estimations on the burden of NCDs in KSA. Booz & Company (2013) used the cost of illness approach to estimate the cost of five selected NCDs¹⁰. The cost of selected NCDs was

⁹ Healthdata.org. Cholesterol at a glance.

[<http://www.healthdata.org/sites/default/files/files/Projects/KSA/Cholesterol-At-a-Glance.pdf>]

¹⁰ Cardiovascular diseases (heart disease and stroke), Malignant neoplasms (cancer), Chronic respiratory diseases (chronic obstructive pulmonary disease and asthma), Neuropsychiatric conditions, Diabetes mellitus.

estimated to cost 2.7% of Saudi GDP annually, equivalent to a total cost of USD 17.7 billion annually¹¹, including:

- USD 2.4 billion direct health sector costs
- USD 15.3 billion indirect costs to the economy

Mokdad *et al.* (2014) estimated direct and future cost of diabetes in KSA using the bottom-up approach. The estimated cost of diabetes was USD 4.5 billion in 2014. If those who are undiagnosed joined the treatment pool, the cost will increase to USD 7.2 billion. If those with glucose intolerance (pre-diabetes) progress at the current observed rate will become diabetics, the cost will be USD 11.5 billion.¹²

Rasmussen *et al.* (2016) provided a different estimation of the indirect cost measured by the loss of productivity due to absenteeism¹³ and presenteeism¹⁴. Presenteeism averaged 4.54% of GDP while 1.28% for absenteeism. The total economic impact as percentage of the GDP due to both absenteeism and presenteeism is predicted to increase from 5.7% in 2015 to 6.7% in 2030.¹⁵

NCDs Risk Factors

The prevalence of NCD risk factors (tobacco use, unhealthy diet and insufficient physical activity) in Saudi Arabia is high. The key finding on these risk factors are shown below.

Tobacco Use

The prevalence of current tobacco smoking has shown a gradual and continuous increase in both males and females.

- The overall prevalence (12.4%) is still lower than the average global prevalence of current tobacco smoking (18.7%). Males are more likely to smoke than females (22 % vs. 2 %). Prevalence of male smokers nearly doubled between 1996 and 2015¹⁶.
- 14.8% of workers are exposed to passive smoke at the workplace (Institute for health Metrics and Evaluation, 2015)
- More than 24.9% of adolescents using tobacco¹⁷

Box 1. Tobacco snapshot

Tobacco use has been gradually and continuously been increasing.

Attributable NCDs include: multiple forms of cancer; IHD, stroke and other CVD and circulatory diseases; chronic obstructive pulmonary disease and pneumoconiosis; and peptic ulcer disease, diabetes, cataract, macular degeneration, and rheumatoid arthritis.

¹¹ Strategy& Formerly Booz & Company (2013). "The \$68 billion challenge: Quantifying and tackling the burden of chronic diseases in the GCC". Originally published by Booz & Company: December 5, 2013.

¹² Mokdad AH, Tuffaha M, Hanlon M, El Bcheraoui C, Daoud F, Al Saeedi M, Alrasheedy AA, Al Hussein MA, Memish ZA, Basulaiman M, AlMazroa MA, Al Rabeeah AA. Cost of diabetes in the Kingdom of Saudi Arabia, 2014. *Journal of Diabetes & Metabolism*.2015; 6:575. doi:10.4172/2155-6156.1000575.

¹³ Absenteeism is defined as missed days of work.

¹⁴ Presenteeism is defined as reduced productivity at work.

¹⁵ Bruce Rasmussen, Kim Sweeny and Peter Sheehan (2016), "Health and the Economy: The Impact of Wellness on Workforce Productivity in Global Markets "; Report to the US Chamber of Commerce Victoria Institute of Strategic Economic Studies and Victoria University, Melbourne, Washington DC April 2016.

¹⁶ Almutairi, K. M. (2015). Trends in Current Tobacco Use, Smoking Rates and Quit Attempts among Saudi Population during Periods of 17 Years (1996–2012): Narrative Review Article. *Iranian Journal of Public Health*, 44(2), 170–175.

¹⁷ Global youth tobacco survey 2009. Cairo: World Health Organization Regional Office

- Almost one third of youth exposed to the second hand smoking

Smoking prevalence differs starkly for gender. Among men, 21.5% are current smokers and 6.8% are former smokers. However, among women these figures are much lower at 1.1% and 0.6%, respectively. A similar pattern is observed with shisha smoking; 20.9% of men and 1.4% of women reported consumption of shisha.¹⁸

Key facts are summarized in box 1.

Physical Inactivity

The Saudi health interview survey (SHIS 2013)¹⁹ shows that almost half the women are physically inactive, while 29% had low levels of physical activity. For men, 23% are physically inactive, and the same percentage had low levels of physical activity²⁰, defined as less than 150 minutes of moderate or intense activity per week. Only 25% of women claimed to undertake more than 150 minutes of physical activity each week. The prevalence of low levels of physical activity is 60.3% for both sexes.²¹ Furthermore, sedentary behavior is common with one in three people spending over 4 hours per day watching TV.

Key facts are summarized in box 2.

Box 2. Physical inactivity snapshot

Activity levels are of concern as one more than three quarters of Saudi women is insufficiently active.

Attributable NCDs include coronary heart disease, type 2 diabetes and breast and colon cancers.

Obesity and Overweight

The prevalence of obesity and overweight is showing a rapid increase in trends in both males and females. Age standardized prevalence of obesity where the Body Mass Index (BMI) ≥ 30 , has increased by 3 % in the span of five years (2010-2014). The rate of obesity in Saudi Arabia reached 28.7%, while the overweight recorded 30.7% in the age group of 15 years and above among men and women (National Health Information Survey, 2013).

Box 3. Obesity and Overweight snapshot

Overweight is rapidly becoming more common.

Attributable NCDs include coronary heart disease, type 2 diabetes, and endometrial, breast and colon cancers.

for the Eastern Mediterranean; 2012

(http://www.emro.who.int/images/stories/tfi/documents/GYTS_FS_SAA_2010.pdf , accessed 31st July, 2017).

¹⁸ Saudi Health Interview Survey (SHIS), 2013

[<http://www.healthdata.org/sites/default/files/files/Projects/KSA/Saudi-Health-Interview-Survey-Results.pdf>]

¹⁹ The SHIS covers all 13 regions of the Kingdom of Saudi Arabia and uses a multistage representative sample of adults aged 15 and older. SHIS assessed chronic diseases, health behaviors, and risk factors among adults aged 15 or older in KSA. Source: Survey of health information in the Kingdom of Saudi Arabia 2013. Riyadh: Ministry of Health Kingdom of Saudi Arabia; 2013 [<http://www.moh.gov.sa/Ministry/Statistics/Documents/Final%20book.pdf>]

²⁰ SHIS results is available from: <http://www.healthdata.org/sites/default/files/files/Projects/KSA/Saudi-Health-Interview-Survey-Results.pdf>

²¹ WHO (2015), Health profile 2015 : Saudi Arabia,

[http://applications.emro.who.int/dsaf/EMROPUB_2016_EN_19272.pdf?ua=1]

The level of obesity in Saudi Arabia is related to both physical inactivity and unhealthy diet. Daily consumption of fruit and vegetables is low in KSA, as illustrated by the SHIS. Of those surveyed, 61% of men and 57% of women do not consume at least 1 portion of vegetable daily. When considering the recommended intake of at least 5 servings of fruit, fruit juice and vegetables, only 7.6% of adults reported to consume this.

Key facts are summarized in box 3.

Salt consumption

Another element of poor diet is excessive salt consumption. In 2016, a cross-sectional study was undertaken to estimate the salt intake in KSA, which found salt consumption to be high, with a mean sodium chloride excretion of 9.3 g/day. This is almost double the maximum WHO recommendation of no more than 5g of sodium chloride per day. The study also reported that sodium intake was higher among men than women, and it was also higher among those who are overweight or obese.²²

Box 4. Salt snapshot

Salt consumption is almost double the maximum WHO recommendation.

Attributable NCDs include: include stomach cancer and increased risk of IHD, stroke and other cardiovascular and circulatory diseases due to hypertension.

Key facts are summarized in box 4.

NCD-relevant institutional context

KSA is a high-income country with total health expenditure (THE) 5% of the GDP. General government health expenditure (GGHE) is 75% and private health expenditure (PvtHE) is 25% of the THE. Out of pocket expenditure (OOPS) is 14% of THE²³. Nevertheless, KSA's THE is below the GCC average as a share of GDP per capita (Fig. 5).

²² Saeedi MY, AlMadani AJ, Alsafi YH et al. (2017). Estimation of Sodium and Potassium Intake in 24-Hours Urine, Aljouf Region, Northern Saudi Arabia. Chronic Dis Int - Volume 4 Issue 1. ISSN 2379-7983.

²³ <http://apps.who.int/nha/database/ViewData/Indicators/en>

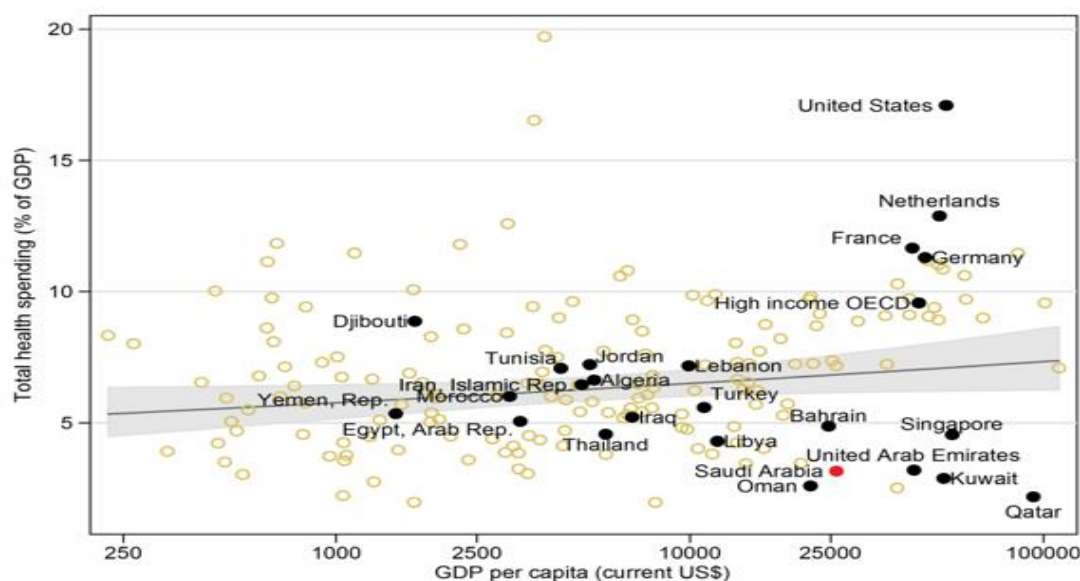


Fig. 5 GCC average as share of GDP per capita. *Source:*
<http://apps.who.int/nha/database/ViewData/Indicators/en>

KSA has a General Directorate on NCDs at the MoH that aims to unify efforts to raise awareness and advocate for prevention and control of the most common NCDs and their risk factors. The directorate operates with a stated vision: *“to protect the Saudi community against the NCDs and their complications as a joint responsibility among all the community's segments”*.

The changing patterns of disease in KSA have forced the MoH to adopt a clear vision and attempt to deliver timely solutions for emerging challenges. These challenges include issues of health workforce development, financing, accessibility, and use of electronic health resources. The national strategy has already identified several interventions and actions for strengthening the health system, particularly: health promotion and NCDs prevention and control; control of communicable diseases; health security; as well as developing solid partnerships for health development.

During the first UNDP/WHO investment case mission (4-8 June 2017) to KSA, it has been observed that there is no established system for regular collection of NCDs data. Thus, it became a necessity to collect, to the extent possible, all domestic data and to use, if not locally available, international data.

3. Policies and treatments to reduce the NCD burden

This section provides an overview of the current national planning architecture regarding NCDs. It describes the focuses of the different parties involved in the reduction of the NCD burden. Besides, it gives an overview of the key facts regarding NCDs in the KSA and the objectives for the mission.

The current NCD planning architecture

The Custodian of the Two Holy Mosques, King Salman Bin Abdul Aziz, King of Saudi Arabia approved the Health in all policies as a cross-sectoral strategy aiming at addressing the social determinants of health in the Kingdom. Three out of the four main NCDs were identified by the Health in all Policies

(HiAP) Strategy among the top fifteen burden of disease in the country. A national Public Health Agency will be established to coordinate the intra-ministerial coordination on health issues.

The Government National Transformational Plan (NTP) as part of the Vision 2030 including the health sector represents a very good framework to scale up engagement of non-health sectors into NCDs prevention and control.

However, the overall NCDs prevention and control in KSA is health-sector driven. The involvement of non-health sectors has not been adequate, especially during the design and formulation of the NCDs strategic plan. It was based on a strategic plan for the years 2014-2025, which is designed to align with the WHO and Gulf Cooperation Council (GCC) frameworks. Non-health sectors are not deeply engaged in the national NCD responses. The National plan was shared with all other ministries for approval but ministries were not properly involved in the preparation of the plan and there were no mechanisms proposed for joint implementation. The coordination and multi-sector collaboration is not strong. Many ministries expressed interest to tackle NCDs but they weakly or occasionally contributed, because they were still convinced that this is merely a health issue. It is not clear if there is a functional and national NCDs coordination mechanism that includes government sectors, private sector, academia and civil society.

The NCDs plan was developed following the GCC approach, which wasn't focused much on the engagement of the non-health sectors, nor followed a comprehensive, national situation analysis.

Key facts on the NCD context

- The adoption of the country's strategic vision (Vision 2030) and its related National Transformational Plans and reforms, provide a very good basis for effective planning, coordination and implementation of a multi-stakeholder, multi-sectoral national action plan on NCDs. Across the sectors, there are good intentions and good initiatives that could be included in such a plan. The Health transformational plan is a very good vehicle to include NCDs as cross-cutting theme, especially on the wellbeing component which generally emphasizes prevention.
- NCDs treatments are available at the primary healthcare centers network. The treatment is covered by the MoH and distributed free of charge to registered chronic patients.
- The major contributor to the emergence of NCDs as public health concern in KSA and elsewhere is the globalization of behaviours and lifestyles, including hyper-caloric diets, reduced physical activity and the use of tobacco
- The MoH has an active NCDs screening programme in place. There are coverage gaps and the programme suffers from a number of inefficiencies, and particularly lack of good coordination with other departments and with NGOs.
- There's emphasis on the multisectoralism in addressing NCDs prevention and control. The non-health sectors and non-governmental stakeholders are invited to play a major role in collaboration with the MoH.
- Many stakeholders met in KSA indicated that development and building of national capacity towards better governance and greater multisectoral action should be expected in the future NCDs prevention and control.

- In KSA, a great issue is the review of all relevant government policies to ensure consistency with NCDs prevention and control measures in keeping with the concept of 'Health in All Policies' and to secure adequate funding for NCD programme.
- There's a commitment to target the reduction in the consumption of sugar sweetened beverages and fast food (high in cholesterol and saturated fats) to tackle the burden to NCDs.
- NCDs centred activities are currently conducted in KSA by various public entities and civil society organizations with a clear predominance of curative activities over preventive ones.
- The need for urgent action as raised by several KIPs is to build capacity for chronic disease information generation and knowledge management and to strengthen the MoH NCD Surveillance System.
- To reduce the prevalence of current tobacco use in persons aged 15+ years and among adolescents 13-15 years old by implementing key measures, especially increasing price/tax, prohibiting promotion, smoke free spaces, package warning labels, and enhancing smoking cessation counselling in PHC.

Although much is known about the policies for controlling NCDs and their consequences, little is advanced on how to translate such policies to culturally acceptable practices. The major contributors to the risks for NCDs have been clearly recognized as tobacco use, sedentary lifestyle, and poor nutritional habits associated with the consumption of foods containing excess fat, salt and sugar. There is agreement to address social determinants of NCDs. Efforts should be concerted and targeted to reinforce KSA health sector but also to seek crucial contribution from others sectors. Although population-wide interventions are cost-effective, they need to be supported by care at the individual level, especially for high-risk groups and those with disease.

NCDs strategies into place

The following programmes tackling NCDs were already launched in KSA:

- **Smoking Programme:** The MoH has taken various initiatives to reduce smoking through awareness programmes: anti-smoking media campaign, a national website that offers comprehensive tobacco control services, and social media. The anti-smoking mobile clinic of the Tobacco Control Programme is one of such initiatives that has helped more than 2000 smokers, both male and female, quit smoking²⁴.
- **Obesity Control Programme:** A great deal of attention has been given to the rise in overweight and obesity: "Dr Al-Omari S, Director of obesity control program, said ***the rapid change in diets, inactivity, and lifestyle led to an increase in the number of obese and overweight people in Saudi Arabia***²⁵". There's a promoting action of healthy practices during adolescence and taking steps to better protect youth.

²⁴ Ministry programme helps over 2000 to quit smoking. <http://www.arabnews.com/food-health/news/722006>

²⁵ <https://www.moh.gov.sa/en/OCP/Pages/DirectorMessage.aspx>

- **Diet and Physical Activity Program:** The program was established in the Genetic and Chronic Diseases Control General Department in 2006. Aim and objectives of the program is the application of the National Diet and Physical Activity Strategy ²⁶.
- **Cancer Prevention Programme:** The National Cancer Awareness Campaign is an example of collaboration done under the umbrella of MoH and organizations of civil society.
- **CVD prevention programme:** “The Heart Protection Campaign” led by the Prince Sultan Cardiac Centre in Al-Qassim was launched in the beginning of 2012; the general objectives were to increase public awareness of cardiovascular diseases and their risk factors, and to detect new cases in need of medical attention.

4. Methods

A joint team comprising staff from the Government of KSA, WHO and the United Nations Development Programme (UNDP) undertook initial data collection and analysis an institutional and context analysis in KSA during 4-8 June 2017 in order to complete a three-tier NCD investment case. The team consisted of economists, epidemiologists and social development and public health experts. Further data collection and analysis took place during June to July, with a second visit in July 16-21 2017. In summary, the policy interventions assessed were as follows (Table 1):

Table 1 Summary list of interventions analyzed

Tobacco interventions	CVD interventions	Salt interventions
<ul style="list-style-type: none"> • Warning labels on packages • Warning people of the dangers of tobacco (mass media) • Increasing tobacco excise taxes • Enforcing bans on tobacco advertising • Support for people willing to quit smoking 	<ul style="list-style-type: none"> • Screening for CVD risk • Combination prevention therapy for those at $\geq 30\%$ CVD risk • Blood pressure drugs for those with SBP > 140 mmHG and $< 30\%$ absolute risk • Cholesterol drugs for those with Chol $> 6\text{mmol/L}$ and $< 30\%$ absolute risk • Aspirin treatment <ul style="list-style-type: none"> ○ post-acute IHD combination ○ post-acute Stroke combination 	<ul style="list-style-type: none"> • Warning labels on packages • Warning people of the dangers of salt (mass media)
Physical activity interventions <ul style="list-style-type: none"> • Public awareness campaign on physical activity 		Diabetes interventions <ul style="list-style-type: none"> • Standard glycemic control • Intensive glycemic control • Screening and treatment for diabetic foot • Screening and treatment for diabetic blindness

²⁶ Diet and Physical Activity Program. <https://www.moh.gov.sa/endepts/Non-Communicable/Depts/DPAS/>

The team was composed of the following members (Table 2):

Table 2 Members of the NCD investment case team

WHO	UNDP
Asmus Hammerich, WHO Coordinator, East Mediterranean Regional Office	Elfatih Abdelraheem, Programme Specialist Health and Development, UNDP
Ibrahim El-Ziq, WHO Representative, KSA	Mayssam W. Tamin, Assistant Resident Coordinator, UNDP/KSA
Alexey Kulikov, External Relations Officer, UNIATF, WHO/Geneva	Dudley Tarlton, Programme Specialist Health and Development, UNDP
Chokri Arfa, Health Economist, Consultant for EMRO/WHO, Professor at the University of Carthage, Tunisia.	

The whole team conducted the first field visit in KSA and some team members participated in the second visit with the support of the WHO Secretariat and the UN Resident Coordinator office in KS, including the authors of this report. The KSA mission primarily focused on meeting key stakeholders, discussing the purpose of the investment case and seeking their inputs. All meetings were organized by the Vision Realization Office (VRO) of the Saudi MoH. The team has spent a substantial amount of time discussing and interviewing MoH and other ministries' staff, as well as various key stakeholders including national authorities and UN agencies. Preliminary estimates for the investment case have been started. For coherence, the mission members also conducted meetings and interviews with other consulting firms who are supporting the Health chapter of the National Transformational Programme (NTP). Additionally, the mission's members reviewed the existing data and documents that are needed to develop the investment case.

Based on the interview with most stakeholders (see Feedback from Field Visits in Annex 2) and on data provided by the VRO (MoH), as well as other publicly available data, we were able to analyze the institutional context of NCD management and to calculate the RoI for some prevention and treatment interventions. Summary of discussions held in non-health ministries is provided in the Annex 3.

The OneHealth provided the following results:

- Economic indirect costs for the selected NCDs (replacement, absenteeism, presenteeism, and avoided mortality impact and costs);
- RoI by year a time series of thirteen years (2017-2030) and by interventions;
- RoI for two relevant periods coinciding with the 11th development plan (2020-2024) and the remaining period of the 2030 Agenda (2025-2030).

It required a comprehensive institutional and context analysis of:

- Prevalence of risk factors (physical inactivity, diet, obesity and smoking);

- Incidence of CVD (stroke, Ischemic Heart Disease (IHD), acute Myocardial Infarction (MI)), cancer, COPD and diabetes;
 - Both prevalence and incidence are needed for the total population as well as for target population such as working and non-working age;
- Government health spending of the selected NCDs.

Research Approach

This study utilized a three-pronged approach consisting of literature review; review and collection of data from national, regional and global sources; and applying the OneHealth Tool and calibration.

The mission team and the VRO leadership agreed on the need for four concrete steps to quantify the selected NCDs investment case:

- Estimation of the economic burden of NCDs (direct health costs and indirect costs such as cost of absenteeism, presentism and loss of productivity as result of these diseases), collectively known as the cost of inaction;
- Estimate the impact of preventive and tested interventions (target population, population in need, prevalence, incidence, reducing mortality and disability etc.);
- Estimate (costing) the budget required over time for preventive interventions, which are referred to the cost of action;
- Quantify return on investment for all possible preventive interventions.

The NCD economic burden model which was developed by the WHO & UNDP allows the estimation of:

- The direct and indirect costs of NCDs in KSA;
- The return on investment

Data

The collected and reviewed data includes demographic information (total population by age and sex), epidemiological data (incidence and prevalence rates by age and sex for NCDs, mortality rates by age and sex for NCDs etc.), programme costing budget, GDP, labour force participation rate, absenteeism, presentism and replacement costs for the selected NCDs etc. The data related to the Institutional and Context Analysis (ICA) were gathered directly using qualitative means (interviews) with the various stakeholders, from Ministry of Health (MoH) and other ministries, in addition to review of key national documents.

in addition to published and unpublished sources. Key inputs into this database included systematic reviews of the literature, analysis of household survey data, disease registries, hospital admissions data, outpatient visit data, population-based cancer registries and other administrative data. Moreover, the MoH provided detailed data on clinic visits and hospital stays, and laboratory testing by ICD10 classification, as well as the latest available 2015 National Health Accounts (NHA) data.

In KSA, information on deaths is obtained from official vital registration systems. However, it was inconsistent with the UN excel model. To the extent possible, multiple global sources of data were used in an attempt to achieve a complete all-cause and sex, age-specific mortality estimates.

Calculation of economic burden of NCDs

The total economic cost of the selected NCDs associated with three major risk factors (unhealthy diet, tobacco use and physical inactivity) includes:

- direct cost (cost of treatment)
- indirect cost caused by premature mortality, absenteeism²⁷, presenteeism²⁸

Return on investment (RoI)

RoI measures the gain or loss generated from an investment relative to the amount of money invested. We used the UN excel model to estimate RoI. It includes the estimation of social and economic gains that accrue from investing in a set of preventive interventions, already recognized as cost-effective interventions. An overview of interventions analyzed is provided in Table 1.

Benefits and the costs of NCDs interventions and their RoI were determined by year. Specifically, direct and indirect benefits as well as direct and indirect costs for those interventions were calculated. All variables in the framework are calibrated using real-world data. Relevant proxies or expert assumptions were also applied.

Based on the discussion with stakeholders and data available, the RoI for interventions was calculated based on the following formula:

$$RoI = \frac{\text{Sum of intervention's benefits}}{\text{Sum of intervention's costs}}$$

Benefits and costs are measured in monetary units.

The economic model included three interconnected components projected to 2030:

- the burden of disease,
- costs of policy interventions
- return on investment

Assumptions and model used

- The projections start in 2017 and progress in a realistic coverage based on KSA context of ongoing policy interventions (tobacco control, diet and physical activity), available financial and resource inputs, and Ministry of Health commitments;
- The burden is calculated for workers 25+ years of age;
- The estimation of government spending on NCDs is based on National Health Accounts data and utilization rates (allocation keys);
- Indirect costs included in the analysis consist of reduced workforce participation and subsequent decrease of country-level productivity, i.e. disability payments, costs of

²⁷ Absenteeism is defined as missed days of work.

²⁸ Presenteeism is defined as reduced productivity at work

absenteeism, costs of presenteeism, costs of workforce replacement, economic losses due to premature death in working age, caused by NCDs;

- The methodology used is the NCD Investment case model which was developed in 2015 by the UNDP-WHO Joint Programme on promoting multisectoral response to NCDs using the OneHealth Tool. For CVD and diabetes interventions, the OneHealth Tool impact models were used to assess health outcomes;
- For the recalculation in the attached excel file, the following assumptions were made:
 - All tobacco interventions are at level 2 and 3 baseline coverage.
 - In 2021, all interventions are at level 4 coverage.²⁹
- Sodium and physical activity interventions are scaled up to level 4 coverage by 2021.
- A scenario analysis was undertaken to test the impact of increasing intervention coverage to 100% after 2020. Scaling-up involves processes to introduce innovations with demonstrated effectiveness through a programme delivery structure.

Table 3 provides a summary of scale-up patterns.

Table 3 Scale up patterns

Intervention	Baseline	Scale up year
Warn about the dangers of tobacco	WHO Global tobacco report	
1. Package warnings	Level 3	2018 – Level 4
2. Mass media campaigns	Level 2	2018 – Level 4
Raise taxes on tobacco	KSA investment case report Currently 50% of price (100% tax)	2018 move to 75% of price
Enforce bans on tobacco advertising	WHO Global tobacco report Level 3	2018 – Level 4
Offer help to quit through brief intervention	WHO Global tobacco report Level 3	2018 – Level 4
Sodium reduction through:		
1. Labelling	Not implemented	2018
2. Mass media campaign	Not implemented	2018
Physical activity promotion		
behavior change communication campaign	Not implemented	2018

²⁹ In OneHealth tool, multilevel scaling up (from 1 to 4) is used to describe the ambition or process of expanding the coverage of health interventions. It has referred to increasing the financial, human and capital resources required to expand coverage. Here, the scenario of level 2 or 4 coverage scale up are dealing with the substantial progress on NCD preventive and control in KSA. The projections starts in 2017 and progress in a realistic coverage based on KSA context of ongoing policy interventions (tobacco control and diet and physical activity) dealing with the available financial and resource inputs and MoH commitments.

Institutional and Context Analysis

The purpose of conducting an institutional and context analysis (ICA) while running the modelling and statistical estimation of the NCD investment case is to assess the political, organizational and structural assumptions that govern the NCD response in the country. The ICA interviews are structured, open ended, policy oriented set of questions that are customized to each of the relevant sector in the government. The purpose of the questions is to first understand the current involvement of the sector in the national NCD response, their views of what the sector can contribute and if there are impediments to the NCD response.

The ICA Methodology helps to provide information needed to identify the political and other contextual challenges during the planning phase of the development programmes. A political economy analysis seeks to define how diverse institutions in the society shape the likelihood of programmatic success. Specifically, ICAs:

- Seek to define the key institutional and governance arrangements and capacities, the political economy drivers, and entry points and risks relevant to an intervention. They also seek to evaluate priorities and potential for change;
- Can be applied at country, sector and project levels, and may consider factors such as institutional and governance arrangements, interests, incentives, historical legacies, prior experience with reforms, social trends, and how all of these factors effect or impede change;
- Help to improve project design, increase the likelihood that human, technical and financial resources can be effectively utilized and project objectives delivered, explain the likely distributional aspects of reform efforts, and promote more thoughtful and effective multi-stakeholder engagement with client governments and other actors.

The ICA has a framework for collection of information related to the overall NCDs governance and coordination landscape. The framework also identifies the potential opportunities and initiatives that could be further scaled up.

Limitations

- The main limitation of this study was data availability:
 - Availability of epidemiological and economic parameters by disease, to help estimate the direct and indirect NCDs costs and impacts.
 - Availability of detailed information on consumption of drugs and their preventive use by disease. At present the drug purchase cost of the government sector was available as aggregated data.
- Many others NCD preventive interventions are not included due to limited data availability. It remains possible to add them if data provided that allows rigorous evaluations on their impact and impact into the future as well their costing budget was done.
- Related to challenges in demonstrating RoI in public health:
 - The lag between the time costs are incurred and benefits realized;
 - The measurement of costs and benefits requires good information systems;

- Too complex mechanical and circular relationships between the various parameters make calculation of the RoI difficult, especially finding adequate data on short-term and long-term impact of the selected interventions.

5. Results

Economic burden assessment

Direct and indirect costs

Based on the analysis conducted by the study, the total economic burden associated with NCDs was estimated at USD 18.6 billion. This is equivalent to 2.8% of GDP, which is supported by the 2.7% found in previous research³⁰. USD 5.5 billion (29.8%) government health care spending on NCDs and USD 13.1 billion (70.2%) due to indirect economic losses due to NCDs were modelled from reduced labour force participation, increased absenteeism and presenteeism and losses due to premature death (Fig. 6).

NCD economic burden in Saudi Arabia

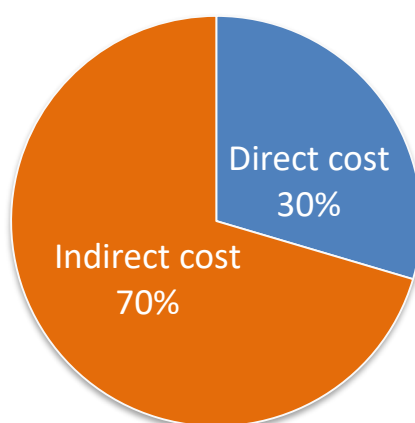


Fig. 6 The total economic burden of NCDs in Saudi Arabia

Direct costs

Calculations were based on data from National Health Accounts (NHA) 2015. Health care costs related to selected NCDs, without breakdown by disease since the NHA data does not contain that level of detail. It would have been better to receive detailed data on the consumption of drugs for an accurate allocation of drug expenditures to the selected NCDs. However, such level of detail does not exist. Moreover, drug expenditures in the NHA matrix of 2015, are believed to be underestimated.

Fig. 7 below shows an estimate of how much the KSA spends to treat specific diseases, using data from the NHA 2015 and the hospital information system (for more details see Annex 4). The analysis

³⁰Strategy& Formerly Booz & Company (2013). "The \$68 billion challenge: Quantifying and tackling the burden of chronic diseases in the GCC". Originally published by Booz & Company: December 5, 2013.

estimates that the four selected disease categories accounted for one fifth (20.5%) of Total Health Expenditure (THE) in 2015. Spending on cardiovascular diseases (CVDs) was the highest, followed by diabetes. CVD and diabetes together accounted for 12.7% of THE.

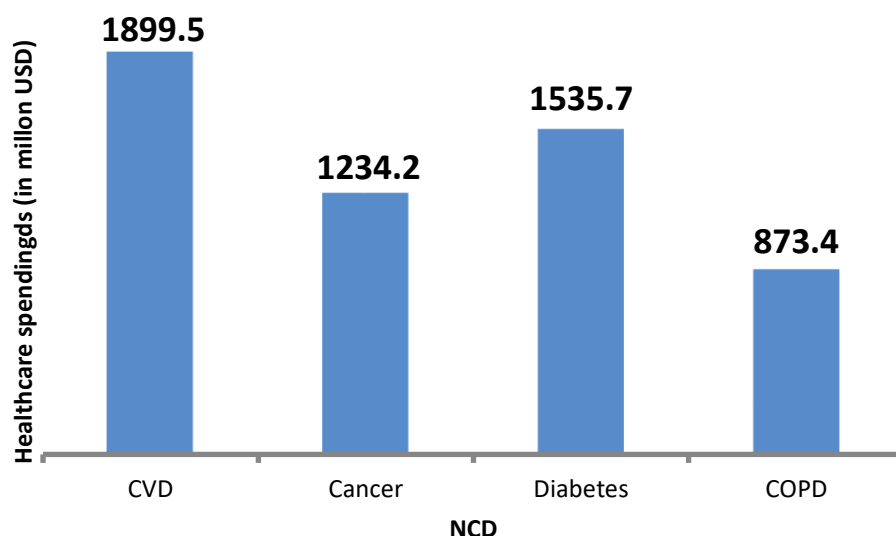


Fig. 7 Healthcare spendings related to NCDs

Indirect costs

Indirect costs of both diabetes and CVDs cost the economy of KSA USD 13.0 billion annually which is equivalent for 2% of GDP. Presenteeism is responsible for the largest share of lost economic output associated with these two diseases.

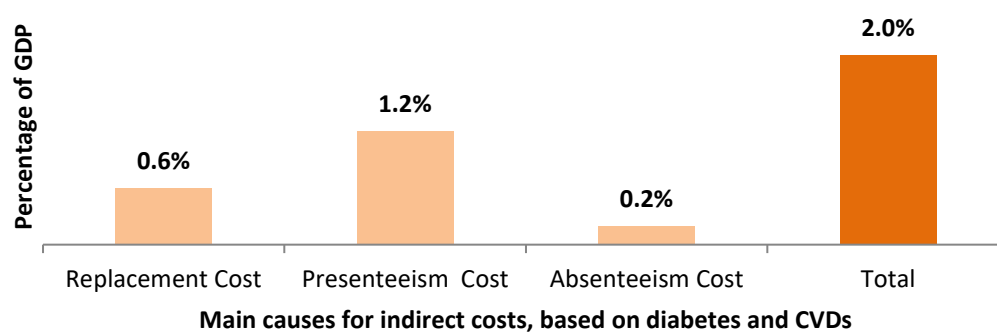


Fig. 8 Cost of Replacement, Presenteeism and Absenteeism, as % of GDP

The indirect costs of diabetes and hypertension were generated mainly by a high cost of presenteeism compared to absenteeism and replacement (Fig. 9).

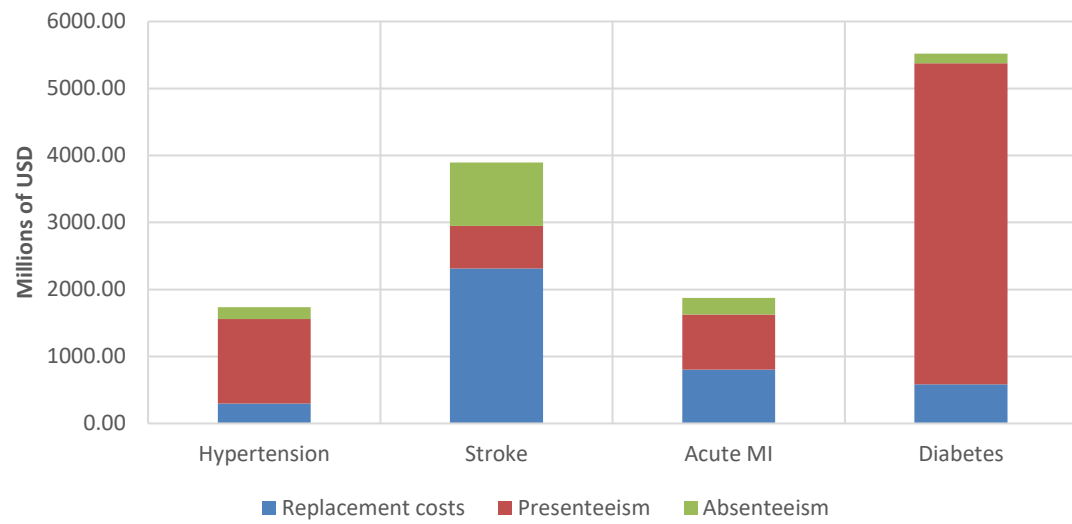


Fig. 9 Breakdown of indirect costs in diabetes and cardiovascular diseases

Intervention cost assessment

Intervention costs were estimated for the period of 2017-2030. The yearly costs of policies actions were obtained from the KSA costing using the WHO-CHOICE Model, while the yearly costs of preventive interventions was calculated using the OneHealth Tool. Table 4 shows the yearly costs up to and including 2020 as well as 2025 and 2030 (a complete overview in Annex 5).

Table 4 Intervention's costs by year (In billion USD)

	2017	2018	2019	2020	2025	2030
Tobacco Control						
Raise tobacco taxes	1.29	1.29	1.29	1.30	1.30	1.30
Package warnings	2.17	2.17	2.17	1.94	1.94	1.94
Advertising bans	2.00	2.00	2.00	2.03	2.03	2.03
Cessation programmes	7.81	7.81	7.81	8.39	9.19	8.39
Diet and physical activity						
Promote public awareness about diet & physical activity	2.98	3.23	2.98	3.15	3.15	3.40
Reduce salt intake	0.08	0.11	0.11	0.13	0.10	0.10
CVD Pharmaceutical Prevention						
Screening for CVD risk	356.94	396.24	417.08	590.38	702.68	1061.44
Combination Prevention therapy for those at ≥30% CVD risk	2579.72	2938.53	3183.74	3084.12	8023.49	12677.03
Blood pressure drugs for those with SBP > 140 mmHG and < 30% absolute risk	885.34	1830.76	3366.64	4518.46	9892.93	15844.08
Cholesterol drugs for those with Chol > 6mmol/L and < 30% absolute risk	680.23	728.72	961.42	1387.07	1593.88	4274.98
Aspirin treatment						
• Post-acute IHD combination	778.44	694.89	778.24	1112.25	2007.06	1713.58
• Post-acute Stroke combination	1703.64	1333.77	1599.28	2289.05	2877.14	4091.94
Diabetes Interventions						
Standard Glycemic Control	294.76	312.77	331.94	446.64	468.71	604.96
Intensive Glycemic Control	742.13	787.30	672.27	802.17	982.84	1519.75
Screening and treatment for diabetic foot	645.82	616.55	741.07	443.65	119.76	137.04
Screening and treatment for diabetic blindness	987.18	1024.80	1064.10	1401.64	966.77	229.45
Total Cost	9670.52	10680.94	13132.13	16092.37	27652.95	42171.42

Intervention benefit assessment

By year, the intervention's benefits are the sum of the monetary value of avoided presenteeism, of avoided absenteeism and of not replacing staff. Table 5 shows the yearly benefits up to and including 2020 as well as 2025 and 2030 (a complete overview in Annex 6).

Table 5 Intervention's benefits by year (In billion USD)

	2017	2018	2019	2020	2025	2030
Tobacco Control						
Raise tobacco taxes	1.49	3.14	3.66	4.78	9.88	19.13
Package warnings	1.00	2.34	3.22	3.69	9.12	15.97
Advertising bans	0.92	2.52	3.93	5.29	19.59	32.35
Cessation programmes	3.37	6.66	7.57	15.44	38.84	71.27
Diet and physical activity						
Promote public awareness about diet & physical activity	0.93	1.44	1.80	1.97	4.59	8.51
Reduce salt intake	90.19	141.88	222.06	240.39	515.81	912.85
CVD Pharmaceutical Prevention						
Screening for CVD risk	110.84	220.16	668.95	1014.16	4486.06	4837.54
Combination Prevention therapy for those at ≥30% CVD risk	736.90	1336.95	2771.12	4702.48	21671.61	49423.11
Blood pressure drugs for those with SBP > 140 mmHG and < 30% absolute risk	438.90	795.44	1806.29	3143.30	15561.65	39650.82
Cholesterol drugs for those with Chol > 6mmol/L and < 30% absolute risk	1365.01	1683.27	3112.58	4850.16	14886.01	27018.91
Aspirin treatment						
• Post-acute IHD combination	778.32	854.82	1477.52	2111.17	5562.08	9330.04
• Post-acute Stroke combination	1149.10	1024.78	2740.42	4918.13	18149.24	34948.67
Diabetes Interventions						
Standard Glycemic Control	648.33	678.78	720.23	854.95	986.43	1199.52
Intensive Glycemic Control	594.20	724.98	864.01	1288.90	2142.66	3274.49
Screening and treatment for diabetic foot	267.44	280.00	297.09	352.67	406.69	494.80
Screening and treatment for diabetic blindness	486.25	509.08	540.17	641.21	739.82	899.64
Total Benefit	6583.09	8124.49	15018.78	23908.53	84674.78	171225.69

Return on investment

The Return on Investment (RoI) gives an estimated net benefit of dollars saved or gained through the effects of particular intervention. The RoI is the ratio of the sum of intervention's benefits and the sum of intervention's costs.

Table 6 (more information in Annex 7) provides RoI for six preventative interventions and ten preventative treatments for CVD and diabetes. It includes all interventions for which we were able to calculate the benefit and the cost. Availability of additional data would allow more interventions to be included in the analysis.

Table 6 RoI for specific interventions (net present value for total investment in million USD)

NCDs preventive interventions	RoI 2020-2024		RoI 2025-2030	
	GDP only	GDP + Social Value	GDP only	GDP + Social Value
<u>Tobacco Control</u>				
Raise tobacco taxes	0.7	5.9	2.6	26.5
Package warnings	0.5	5.0	1.9	23.1
Advertising bans	0.5	4.1	1.8	13.2
Cessation programmes	0.1	0.5	0.3	2.0
<u>Diet and physical activity</u>				
Promote public awareness about diet & physical activity	0.0	3.1	0.1	4.4
Reduce salt intake	0.9	32	1	51.6

The estimated RoI for the selected interventions is between 0.74 and 2.97 over the period 2017-2030 (Annex 8), with a RoI of almost 1 in 2019, meaning that the investment is expected to be fully repaid and further bring additional net returns starting in year 2020. This clearly demonstrates the potential business case for KSA to invest in NCDs prevention and control.

Results suggest evidence that:

- There is high RoI for tobacco control, diet and physical activity as well as for CVD and diabetes prevention interventions.
- The highest RoI was for two population level public health interventions; these are raising tobacco taxes, tobacco package warnings and advertising bans. Cessation programmes and reduced salt intake were also associated with accepted value of RoI. It was also high for some interventions/treatments such as; post-acute Stroke treatment with aspirin, cholesterol lowering drugs for the prevention of CVD and screening for high CVD risk. RoI for diabetes interventions were lower than those for CVD interventions in general.
- A RoI superior to one for screening and treatment for diabetic blindness was achieved only in 2026, while promoting public awareness about diet and physical activity began to have positive return on investment during all the period.

The RoI values by intervention could be expressed as follow:

- The RoI for all tobacco control interventions is 5.37 at the end of the period: it means that every USD 1 invested could save up to USD 5.37 in future direct and indirect costs.
- Every USD 1 invested in tobacco package warnings saves up to USD 1.5 in future costs. Return of investment is 148%.
- Every USD 1 invested in raising taxes on tobacco saves up to USD 2.18 in future costs. Return of investment is 218%.
- Every USD 1 invested in reducing salt intake saves up to USD 1 in future costs. Return of investment is 92%.

In KSA, the system for NCD risk factor surveillance has been planned as a cooperative programme between the MoH (represented by the General Directorate of NCDs, and Field Epidemiology

Programme), King Faisal Specialist Hospital and Research Centre, and WHO. The MoH implemented several disease prevention and control programmes and awareness raising campaigns, particularly:

- To promote a healthy lifestyle and the advantages of healthier dietary habits;
- To promote healthy nutrition and physical activity under the theme "*Your Health Comes first*" and for diabetes prevention under the theme "How is your Sugar Level":
 - Through a mobile health application, the MoH provides an interactive service with prior subscription. The applicants receive updated information in medicine, health and disease, including chronic diseases prevention through daily messages (SMS);
 - MoH provides essential medications for chronic diseases: e.g. diabetes, hypertension, heart disease, through a network of nearly 1925 Primary Health Care centres across the national territory.

As discussed with the MoH and other stakeholders, the national NCDs plan of action includes, in addition to strong political commitment, plans to mobilize multisectoral support, build necessary capacity, and implement the most important feasible and cost-effective interventions.

KSA has instituted a number of policies and programmes in an attempt to respond to the NCDs epidemic. One of the major steps was the development of a National Policy and Strategic Plan for the Promotion of Healthy Lifestyle. However, there was an absence of a comprehensive plan "formal document" to address the NCDs epidemic that includes surveillance, reduction of exposure to risk factors and management of NCDs.

Annex 6 provides RoI for the two five year periods coinciding with the 11th KSA development plan 2020-2024, and SDG remainder 2025-2030. RoI varies across the range of interventions included in the analysis, due to the different levels of benefits and costs of each intervention (preventive, population level or pharmaceutical treatment). For all interventions, the RoI is growing over the period 2017-2030 and faster during the last five-year periods, indicating the potential GDP gains in NCDs investments. Interventions such as "Raising tobacco taxes, package warnings, advertising bans and reducing salt intake" provide the highest RoI.

6. Conclusion

There are significant opportunities to enhance a whole-of-government and whole-of-society response in KSA. There is the need for the following:

- The current National Executive Plan for NCDs (2014-2025) needs to be updated based on the country 2030 vision, health sector NTP. It is of paramount importance to ensure the real involvement of the key sectors in the process, with clear roles, responsibilities and accountability framework, and to ensure having a fully costed and funded plan;
- There is a need to prioritize investment in the NCDs prevention and control, this could be achieved through fully funded, national, multisectoral NCDs prevention and control, that integrate the sectoral plans of all of the relevant ministries and authorities;
- More effective accountability mechanisms, establishment of clear roles and responsibilities and division of labour among the various ministries;
- The UN system in KSA is well positioned to support the implementation of the plan, therefore, it is advisable to develop a mechanism to harness and utilize this potential;
- Analyze and tackle potential conflicting policies among various ministries that can counter impact the efforts of tackling NCDs; and

- Enhance the role of NCDs department in the MoH in KSA to be able to lead the NCDs coordination across the country.

NCDs primary and secondary preventive interventions could be viewed as longer-term investments because such programmes typically need years for the full impacts to materialize. Not surprisingly, because of the chronic nature of the medical conditions, outcomes often take longer to be achieved. These include programmes for heart disease, diabetes and other conditions. It is important to understand that some programmes typically yield higher returns than others.

As shown in this review, there is substantial variability in the benefit and in the cost of these interventions, suggesting that some are far more intense, and that perhaps they are being delivered more efficiently. The most successful strategy is likely to entail a combination in synergy of these interventions with a focus on these less costly and more favorable RoI. Specific recommendations for the government and UN agencies are provided in Annex 8.

This comprehensive picture of RoI for the selected diseases is the beginning as the analysis should be continued by referring to WHO “best buy” interventions for NCDs (WHO, 2011a). In particular, we should focus on the cost-effective interventions such as tobacco legislation, reducing salt and increasing physical activity.

This study intends to produce empirical evidence on the measurement of the epidemiologic and economic burden of NCD and RoI of preventive interventions. Measuring success of primary or secondary interventions and its guidance for health policy heavily rests on the availability of reliable empirical evidence on the demographic, economic and epidemiologic environment, on behavioural relationships and on the impact of policy interventions. For KSA, the epidemiological situation in particular is unclear, since comprehensive data on morbidity and mortality by cause are often absent.

For this technical report, we have complemented the data needed to calculate the RoI with international data from various databases. We calculated the RoI using data on a variety of different health and wellbeing parameters, including prevalence, incidence, mortality, health risks of NCDs as well as labour market parameters such as absent or sick days, presenteeism, replacement etc. To find which preventive interventions show evidence for early returns on investment, and which provide longer-term gains, the benefit and cost of each intervention should be estimated and the RoI calculated. The main results are provided for the prevention interventions and for CVD and diabetes treatment interventions.

The evidence for tobacco control showed that these programmes can achieve a positive and high RoI. The evidence of both interventions “reducing salt intake and promoting public awareness about diet and physical activity” showed a high positive RoI.

Findings suggest that increasing the tobacco taxes and the implementation of advertising bans, package warnings and the salt intake policy would yield substantial and rapid health benefits by averting future CVD deaths. Importantly, these findings suggest that, despite the rise in CVD risk factors, tobacco taxation and control is likely to be a highly effective strategy for the reduction of CVD deaths over the next twelve years.

In KSA, there are significant uncertainties about financing and functioning of programmes and their costs at different scales of delivery. An interest in reducing the intensity of smoking is evidenced by the decision of July 2017 towards the increase of the prices of tobacco and its derivatives by 100 percent in accordance with the decision of the Gulf Cooperation Council (GCC) at its 36th session. The GCC has approved the amendment of the minimum threshold for the fulfilment of unifying the tobacco tariff. It is recommended to support the excise tax, commonly known as a “sin tax,” which is imposed on “unhealthy products” that are likely to cause health problems.

Policymakers should, therefore, work towards fuller and faster implementation of the core Framework Convention on Tobacco Control provisions to boost their efforts to reduce deaths from CVD. Preventive interventions such as “combination prevention therapy for those at 30% or greater CVD risk” have high returns with a RoI greater than 18. The accuracy of these findings is likely to be affected by the many assumptions included in the excel model and by the quality of the data fed into it.

The analysis shows that the benefits were derived mainly from avoided absenteeism, presenteeism, replacement rates and avoided mortality. However, costs include all treatments and related healthcare expenditures.

Rigorous evaluations of the interventions costs and impacts not included in this report could improve analyzing NCD prevention and control in KSA. Evidence from NCD interventions implemented simultaneously for which we are able to calculate the benefits and the costs, will provide a cumulative RoI. With such information, we will be able to look for cost savings and increasing the benefits from joint a scale up of interventions. Results of this study could guide implementation of the most cost-effective interventions.

In sum, all people meet during the field visits argue the need for strengthen and reorient KSA health system to address prevention and control of NCDs through people-centred primary health care, addressing monitoring and evaluation requirements under universal health coverage as well as the development of a robust multi-sector collaboration.

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Annex

Annex 1A: NCDs Incidence, Prevalence^{31*} and Mortality^{32**} Projections³³

CVD	2015	2018	2020	2023	2025	2028	2030
Stroke incidence	1,796,949	1,914,427	1,992,745	2,123,023	2,209,875	2,265,561	2,302,685
Stroke incidence ages 15-64	1,254,365	1,336,371	1,391,041	1,481,982	1,542,610	1,643,460	1,710,693
Acute MI incidence	1,106,001	1,178,308	1,226,512	1,306,696	1,360,153	1,287,949	1,239,814
Acute MI incidence ages 15-64	969,151	1,032,511	1,074,750	1,145,014	1,191,856	1,269,775	1,321,721
Hypertension prevalence	1,464,056	1,559,771	1,623,580	1,729,724	1,800,486	1,815,163	1,824,948
Hypertension prevalence ages 15-64	1,202,670	1,281,296	1,333,713	1,420,906	1,479,035	1,575,729	1,640,191
IHD prevalence	2,050,139	2,413,396	2,655,567	2,608,243	2,576,694	2,341,150	2,184,122
IHD prevalence ages 15-64	1,969,942	2,129,476	2,235,833	2,553,919	2,099,310	2,544,079	2,507,259
Stroke mortality	941,854	1,003,429	1,044,479	1,112,763	1,158,286	779,332	526,697
Stroke mortality ages 15-64	649,892	692,380	720,705	767,822	799,233	851,484	886,318
Acute MI mortality	240,635	256,367	266,855	284,301	295,932	305,437	311,774
Acute MI mortality ages 15-64	182,616	194,555	202,514	215,753	224,580	239,262	249,050

³¹ Prevalence data comes from various sources: Word Bank [<https://data.worldbank.org/data-catalog/health-nutrition-and-population-statistics>] WHO [http://www.who.int/healthinfo/global_burden_disease/estimates/en/index1.html]

³² Mortality data from WHO. Assume 2015 mortality rates for 2015-2020, and 2030 mortality rates for 2025-2030.

³³ The population of Saudi Arabia is 31.74 million. Expatriates account for about 30% of the population. Source: General Authority for Statistics [<https://www.stats.gov.sa/en/43>]

Annex 1B: NCDs Incidence, Prevalence^{34*} and Mortality^{35**} Projections³⁶

Diabetes	2015	2018	2020	2023	2025	2028	2030
Diabetes prevalence	3,438,196	3,662,973	3,812,824	4,062,092	4,228,270	4,504,698	4,688,984
Diabetes prevalence ages 15-64	2,357,079	2,511,176	2,613,907	2,784,795	2,898,719	3,088,227	3,214,565
Diabetes mortality	1,095,914	1,167,561	1,215,325	1,294,779	1,347,747	1,435,858	1,494,599
Diabetes mortality ages 15-64	805,164	857,802	892,895	951,269	990,185	1,054,920	1,098,076

³⁴ Prevalence data comes from various sources: Word Bank [<https://data.worldbank.org/data-catalog/health-nutrition-and-population-statistics>] WHO [http://www.who.int/healthinfo/global_burden_disease/estimates/en/index1.html]

³⁵ Mortality data from WHO. Assume 2015 mortality rates for 2015-2020, and 2030 mortality rates for 2025-2030.

³⁶ The population of Saudi Arabia is 31.74 million. Expatriates account for about 30% of the population. Source: General Authority for Statistics [<https://www.stats.gov.sa/en/43>]

Annex 2: Key Facts and Feedback from the Field Visits

MoH (meetings of 5-6 and 8 June, 2017)

- **Epidemiology Department and Hospitals General Department**

The MOH in collaboration with key internal and external stakeholders has developed a comprehensive National Multisectoral Strategic and Action Plan and road map to reduce the burden of the major NCDs. This is aligned with the WHO “best buys” for NCDs, and other national, regional, global commitments, policies and plans. It also builds on existing programmes and policies.

Data from curative facilities: Each curative health facility (MoH only) routinely reports the number of admissions by International Classification of Diseases (ICD) categories and number of Outpatient Department (OPD) visits. Average number of inpatient days by disease (coded by ICD categories) were also available in excel sheets.

This secondary database containing total number the inpatient days by ICD disease categories spent at all curative care institutions in the year 2013, was created by applying average number of inpatient days (IPDs) to numbers of inpatient admissions taken from the above mentioned hospital systems. This database provided the basis for identifying proportional allocation of inpatient days by broader disease groups (based on Global Burden of Diseases Classification) by health facilities situated in different districts. The total number of OPD visits in each facility was also added to the database. The number of these OPD visits was converted to IPD equivalents based on average OPD patient care cost to inpatient care cost ratios.

The ratios of total inpatient days to in-patient equivalents of OPD visits in different types of curative care facilities were used to create mapping rules related to Health care function (HC) SHA 2011 classification. Separate HC mapping rules were created for Teaching, Provincial and General Hospitals, Base Hospitals, Divisional Hospitals and Children’s Hospitals.

Health Accounts Unit (meeting 6 and 8 June, 2017)

Discussion on:

- The latest release of the National Health Accounts (NHA) 2015 and on the general findings;
- Data used and challenges to complete the NHA framework;
- Analysis of results and perspective to improve the implementation of NHA in KSA;
- Identifying expenditure patterns on health services and how to estimate the expenditures by disease, especially NCDs;
- Data missed on preventive care: Lump sum budget and budget management are not clearly reported from the majority MoH. Separate mapping rules were created for assigning expenditure items related to different preventive programmes implemented by the MoH to disease classifications. These mapping rules were created based on the service provision indicators reflecting shared contribution to different disease conditions targeted by these programmes.

VRO Team Leaders (meeting of 7 June, 2017): the expectation from the VRO is to have NCDs economic cost with projection over the next few years, the findings of the investment case will be reported to the cabinet.

To understand the institutional context and collect data

- Ministry of Urban Planning is not involved neither in the planning nor implementation of the NCDs plan; but showed interest.
- Ministry of Municipality (**meeting of 4 June, 2017**) is not involved in the planning and coordination of the NCDs response. The ministry has a huge potential to mainstream the NCDs integration in the municipal planning.
- Saudi Sport Authority (**meeting of 5 June, 2017**)
- Ministry of Labour (**meeting of 6 June, 2017**)
- Saudi Food and Drug Authority (**meeting of 7 June, 2017**)

General Authority for Statistics (GASTAT)

Data from GASTAT

- More detailed distribution “Gross Domestic Product (GDP) by Kind of Economic Activity at current prices” , to extract health services;
- GDP at current prices using the expenditure approach;
- GDP by institutional sectors at 2010 constant prices;
- Household Expenditure and Income Survey (using the questionnaire): for instance, the healthcare services (code 06 all items), one limitation is that expenditure on prescription drugs was not available from the survey or elsewhere.

Requests from the Labour Force Survey Team:

- Review the survey questionnaire;
- Data on temporary absence by illness;
- Reason for not getting the work opportunity;
- Discussion on The “*indirect costs*” which refer to other economic consequences attributable to disease, illness, or injury, which result in lost resources, but does not involve direct payment related to the disease. This includes labour supply effects such as the value of lost production due to time in hospital, disability, and premature mortality, or as a result of presenteeism. Indirect costs would also include the value associated with informal care – that is care provided by family members for which there is no direct or formal reimbursement. Nevertheless, there is still an “opportunity cost” associated with this activity which must be measured and valued.
- Budget: chapter 4 dedicated to MoH: Appropriation for MOH and Saudi Red Crescent Authority (SRCA) in KSA Budget 1437/1438; classification of government finance statistics in 2014 AD (In thousands of SR).

Saudi Food and Drug Authority (June 8 2017)

Through administration of a national regulatory system, the drug sector aims to protect and promote public health by ensuring safety, quality, efficacy and accessibility.

The discussion of supply, distribution and consumption of drugs have contributed to clarifying that in KSA, all drugs used in government institutions are procured and distributed by the Medical Supplies Division of the Ministry of Health. A small proportion of drugs are locally purchased by hospitals. The total purchase cost of drugs, proportional distribution of drugs by major disease classes, types of facilities that received drugs were not available. One of the main constraints in describing expenditure patterns by disease was the assumption that expenditure by disease will be calculated as proportional to the number of total inpatient days utilized by each type of illness. Only for same drug, costs were calculated by applying appropriate key allocation to total patient days.

Annex 3: Role of non-health stakeholders

An overview of stakeholders consulted is provided in box 5.

Ministry of Municipalities and Rural Affairs (MOMRA)

Met on 4 June, 2017

MOMRA is not involved in the planning and coordination of the NCDs response. The ministry has a huge potential to mainstream the NCDs integration in the municipal planning. The ministry oversees the municipalities across the country including the overall planning and coordination of the municipal support. The role of the municipalities in

KSA can include ensuring the follow up of the national laws/legislations related to tobacco and unhealthy diet regulations, when licensing, or monitoring sales points.

Saudi General Sport Authority

Met on 5 June, 2017

Although have not been formally part of the national NCDs planning and coordination, the authority is stepping forward with inclusion of women, girls and the whole community in competitive and non-competitive sports with the objective of ensuring wellbeing of people. The authority is following the approach of engaging the international brands in merchandising a culturally sensitive women sport outfit. The aim is to increase the engagement of women in the sports and physical activities. With the new transition in Saudi Arabia and encouragement of women participation in public life, the authority has an important potential role in prompting and facilitating women access to sport facilities, including the scale up of the on-going initiative aiming at licensing women-only gyms.

The Ministry of Economic Planning

Box 5. Stakeholders consulted during the KSA missions

June -July 2017

- Vision Realization Office (VRO)
- Ministry of Health (MOH)
- Ministry of Municipalities and Rural Affairs (MUMRA)
- Ministry of Economic Planning
- Ministry of Labor
- General Statistics Authority (GSAC)
- General Sport Authority
- Riyadh City Development Authority
- Saudi Food and Drug Administration (SFDA)

The ministry established a nudge unit aiming at building the capacity of different sectors in applying the behavioral economics experimentation for the most effective public policy measures. It was agreed that as part of collaboration with the MoH, NCDs risk factors (physical inactivity and unhealthy diet) will be among the subjects for running experimentation in 2018.

The Riyadh Development Authority

As part of Riyadh master plan, the Riyadh Development Authority is constructing a major transportation infrastructure projects including building metro lines and establishing new bus lines. This will reduce the pollution and hopefully improve the physical activity, especially during the winter season, when the environment is favorable for walking.

Ministry of Labour

Met on 6 June, 2017

No formal or informal involvement in the national planning and coordination of NCDs. The ministry is encouraging workplace programmes among the private sector, of which 50-70% are small and medium size companies.

Saudi Food and Drug Authority

Met on 7 June, 2017

Although the authority is not formally part of the NCDs preventive and control, as part of the economic reform, the authority increased taxation on tobacco (by 100%) and some of the energy and sugary drinks that are classified as harmful products. Currently, the Saudi Food and Drug Authority is working with the MoH on a nutritional strategy.

While goodwill exists across all sectors in support of NCDs prevention and control, a planned comprehensive approach cannot be sustained without a dedicated governance structure empowered to coordinate various activities and stakeholders. Such a structure does not exist at the moment.

VRO

A meeting was held with the team leaders of the VRO to understand their expectations and also to identify how to ensure synergies with the health sector transformation plan. The Vision Realization Office (VRO) of the MoH is envisioning emphasizing the preventive services as part of the privatization process of the health care services, providers will provide curative and preventive services.

The expectation from the VRO is to have an estimate of NCDs economic cost with projection over the next few years, to be reported to the cabinet. The NCDs investment case is so far the best available model that can calculate both the direct and indirect cost in addition to the RoI.

The VRO is also very keen to promote and support multisectoral response to NCDs in KSA. It acknowledges the importance of tackling the determinants of NCDs and the risk factors, which in most cases under the jurisdiction of other non-health sectors. This will be in alignment with the strategic direction of the health sector in KSA in promoting and implementing the Health in All Policies.

Providing its broad mandate on the implementation of the vision, the VRO is also very keen to ensure that the findings and recommendations of this mission will be integrated within the broader health sector reform that's currently on-going.

The emphasis on prevention is part of the health reform:

- Through service delivery, preventive community health and dedicated school health.
- In the new health financing model; the payer will be requested to pay for preventive services as well as curative services.

Annex 4: Direct Cost of Selected NCDs 2015 (in million SAR)

		All diseases	CVD	Diabetes	Cancer	COPD	Total
HC.1	Curative care	85903.32	6423.04	4933.17	3840.17	2941.59	18137.97
HC.1.1	Inpatient curative care	43983.89	3853.82	3502.55	2419.31	1588.46	10882.78
HC.1.3	Outpatient curative care	41916.75	2248.06	1331.96	1305.66	1147.22	6348,29
HC.1.4	Home-based curative care	2.69	321.15	98.66	115.21	147.08	906.90
HC.2	Inpatient rehabilitative care	7.69	0.61	0.35	0.35	0.10	1.41
HC.2.1	Curative care and rehabilitative care	7.69					
HC.1+HC.2	Curative care and rehabilitative care	85911.02					
HC.3	Long-term care (health)	578.54	64.23	40.39	32.92	13.45	151.00
HC.4	Ancillary services (non-specified by function)	2763.56	249.78	288.49	278.22	131.26	947.75
HC.5	Medical goods (non-specified by function)	50.00	5.00	2.88	2.78	0.66	11.32
HC.6	Preventive care	NA	NA	NA	NA	NA	NA
HC.7	Governance, and health system and financing administration	12034.38	394.05	504.50	482.53	194.32	1575.40
Total		101337,50	7136.71	5769.79	4636.97	3281.38	20824.85
	%THE		7.0%	5.7%	4.6%	3.2%	20.5%

Number estimated based on National Health Accounts results 2015 and key allocation. Abbreviations: THE is total health expenditure; NA is not available.

Annex 5: Intervention's costs by year (In billion USD)

	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Tobacco Control													
Raise tobacco taxes	1.29	1.29	1.29	1.30	1.23	1.23	1.23	1.23	1.30	1.23	1.23	1.23	1.23
Package warnings	2.17	2.17	2.17	1.94	1.86	1.86	1.86	1.86	1.94	1.86	1.86	1.86	1.86
Advertising bans	2.00	2.00	2.00	2.03	1.93	1.93	1.93	1.93	2.03	1.93	1.93	1.93	1.93
Cessation programmes	7.81	7.81	7.81	8.39	8.20	8.20	8.20	8.20	9.19	8.20	8.20	8.20	8.20
Diet and physical activity													
Promote public awareness about diet & physical activity	2.98	3.23	2.98	3.15	3.23	2.98	2.98	3.23	3.15	2.98	3.23	2.98	2.98
Reduce salt intake	0.08	0.11	0.11	0.13	0.13	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10
CVD Pharmaceutical Prevention													
Screening for CVD risk	356.94	396.24	417.08	590.38	614.33	785.08	823.27	649.58	702.68	810.25	851.59	922.08	1010.32
Combination Prevention therapy for those at ≥30% CVD risk	2579.72	2938.53	3183.74	3084.12	4174.47	5444.93	6442.80	6316.83	8023.49	9605.26	11388.35	11737.38	12177.95
Blood pressure drugs for those with SBP > 140 mmHG and < 30% absolute risk	885.34	1830.76	3366.64	4518.46	5151.22	7606.74	11397.25	8811.54	9892.93	10296.43	10699.13	14409.44	14124.86
Cholesterol drugs for those with Chol > 6mmol/L and < 30% absolute risk	680.23	728.72	961.42	1387.07	1349.03	1638.23	1872.04	1450.71	1593.88	2025.01	2925.62	3372.42	3826.08
Aspirin treatment													
• Post-acute IHD combination	778.44	694.89	778.24	1112.25	1148.66	2091.56	2317.80	1869.78	2007.06	1766.74	1320.17	1393.91	1595.74
• Post-acute Stroke combination	1703.64	1333.77	1599.28	2289.05	2552.39	3340.37	3589.07	2715.69	2877.14	3065.14	3278.54	3412.47	3679.20
Diabetes Interventions													
Standard Glycemic Control	294.76	312.77	331.94	446.64	431.78	555.61	583.37	443.49	468.71	494.73	521.43	548.68	576.57
Intensive Glycemic Control	742.13	787.30	672.27	802.17	784.43	1018.38	1079.76	830.32	982.84	941.84	1103.63	1166.25	1448.60
Screening and treatment for diabetic foot	645.82	616.55	741.07	443.65	331.26	302.90	288.49	189.86	119.76	155.43	146.01	149.40	147.10
Screening and treatment for diabetic blindness	987.18	1024.80	1064.10	1401.64	1326.36	1671.89	1719.97	1300.33	966.77	410.87	328.63	241.13	235.67
Total Cost	9670.52	10680.94	13132.13	16092.37	17880.51	24471.98	30130.10	24594.66	27652.95	29587.99	32579.62	37369.43	38838.40

Annex 6: Intervention's benefits by year (In billion USD)

	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Tobacco Control													
Raise tobacco taxes	1.49	3.14	3.66	4.78	5.53	6.70	7.48	8.66	9.88	11.59	13.69	16.19	18.69
Package warnings	1.00	2.34	3.22	3.69	4.88	5.95	6.98	7.89	9.12	10.29	11.71	14.32	16.83
Advertising bans	0.92	2.52	3.93	5.29	7.00	8.91	13.07	14.81	19.59	21.35	23.36	27.33	31.30
Cessation programmes	3.37	6.66	7.57	15.44	20.36	25.33	31.24	34.54	38.84	43.60	50.35	57.21	64.07
Diet and physical activity													
Promote public awareness about diet & physical activity	0.93	1.44	1.80	1.97	2.23	2.68	3.27	3.95	4.59	5.07	5.75	6.51	7.27
Reduce salt intake	90.19	141.88	222.06	240.39	274.28	320.80	380.48	449.08	515.81	566.57	632.81	711.76	791.71
CVD Pharmaceutical Prevention													
Screening for CVD risk	110.84	220.16	668.95	1014.16	1509.21	2116.69	2795.50	3586.80	4486.06	5500.52	2971.71	3519.74	4119.74
Combination Prevention therapy for those at ≥30% CVD risk	736.90	1336.95	2771.12	4702.48	7128.50	9996.43	13366.10	17249.17	21671.61	25415.69	30295.92	35852.29	42319.74
Blood pressure drugs for those with SBP > 140 mmHG and < 30% absolute risk	438.90	795.44	1806.29	3143.30	4829.29	6887.72	9345.52	12225.77	15561.65	19369.11	23665.72	28470.31	33799.74
Cholesterol drugs for those with Chol > 6mmol/L and < 30% absolute risk	1365.01	1683.27	3112.58	4850.16	6572.70	8617.22	10659.01	12747.71	14886.01	17074.23	19594.93	22115.07	24689.74
Aspirin treatment													
• Post-acute IHD combination	778.32	854.82	1477.52	2111.17	2747.79	3379.85	4012.06	4807.39	5562.08	6320.62	7084.40	7835.55	8609.74
• Post-acute Stroke combination	1149.10	1024.78	2740.42	4918.13	7089.85	9292.60	11754.37	14813.54	18149.24	21261.15	24476.08	27736.82	31309.74
Diabetes Interventions													
Standard Glycemic Control	648.33	678.78	720.23	854.95	892.51	919.72	970.24	979.30	986.43	1068.68	1137.34	1156.77	1169.74
Intensive Glycemic Control	594.20	724.98	864.01	1288.90	1317.07	1445.42	1591.26	2029.85	2142.66	4477.99	9545.13	2486.80	2819.74
Screening and treatment for diabetic foot	267.44	280.00	297.09	352.67	368.16	379.38	400.22	403.96	406.69	440.83	469.15	477.17	479.74
Screening and treatment for diabetic blindness	486.25	509.08	540.17	641.21	669.38	689.79	727.68	734.48	739.82	801.51	853.00	867.58	879.74
Total Benefit	6583.09	8124.49	15018.78	23908.53	33164.76	43774.70	55684.36	69648.29	84674.78	101822.80	120198.88	130640.36	150319.74

Annex 7: RoI – 11th Development Plan Period (2020-2024) and SDG Remainder Period (2025-2030)

NCDs Preventive Interventions	11th Development plan 2020-2024		Remainder SDG 2025-2030	
	In Net Present Value for total investment			
	GDP only	GDP + Social Value	GDP only	GDP + Social Value
Public Health Interventions, population level				
Raise tobacco taxes	0.7	5.9	2.6	26.5
Package warnings	0.5	5.0	1.9	23.1
Advertising bans	0.5	4.1	1.8	13.2
Cessation programmes	0.1	0.5	0.3	2.0
Diet and physical activity				
Promote public awareness about diet & physical activity	0.0	3.1	0.1	4.4
Reduce salt intake	0.9	31.9	0.9	51.6
CVD Interventions				
Screening for CVD risk	3.1	5.8	4.8	8.7
Combination Prevention therapy for those at 30% or greater CVD risk	2.1	4.7	3.1	18.3
Blood pressure drugs for those with SBP > 140 mmHG but less than 30% absolute risk	1.0	2.2	2.1	13.0
Cholesterol drugs for those with Cholesterol > 6mmol/L but less than 30% absolute risk	5.6	8.8	7.1	14.8
Aspirin				
Treat post-acute IHD combination	2.0	3.4	4.5	8.8
Treat post-acute Stroke combination	3.3	4.8	7.7	13.5
Diabetes Interventions				
Standard Glycaemic Control	2.4	5.3	2.7	9.8
Intensive Glycaemic Control	3.8	4.9	6.0	9.9
Screening and treatment for diabetic foot	0.7	1.6	12.1	13.6
Screening and treatment for diabetic blindness	1.2	6.6	4.3	13.3

Annex 8: Recommendations of the NCD Investment Case mission

Recommendations for Government

The Joint Mission has prioritised a small number of recommendations in four areas, under the headings of the Framework for Action to implement the United Nations Political Declaration on NCDs of the WHO Regional Committee for the Eastern-Mediterranean. They are a subset of the latest set of evidence-based, cost-effective and feasible interventions that was endorsed by the World Health Assembly in May 2017 (Annex 6).³⁷ Additionally, the recommendations have taken into consideration the on-going initiatives as part of the Government of Saudi Arabia National Transformational Programme (NTP) 2016-2020 and the planned Health sector reform.

Overall Synergies with other initiatives, it is important to integrate the effective NCDs prevention and control measures within the planned interventions in various sectors as part of the NTP and to build cross-sectoral, effective coordination:

- **Health in All Policies:** ensure that the main NCDs indicated in the HiAP strategy are well integrated in the various areas of the strategy, including knowledge management, implementation and information and advocacy. A thorough situation analysis and sector-specific interventions need to be tied up to the National NCDs plan and should include Key Performance Indicators (KPIs) that are well aligned with the NCDs regional framework of action.
- **Model of care:** The “keep well” component of the model of care includes many measures for NCDs prevention, such as community-based and workplace wellness programmes, Health Food Promotion and Health Edutainment programmes. The Chronic condition pillar is also aligned with the guidelines of NCDs management. However, It is important to ensure that the integration of NCDs detection and management are well integrated in the Primary Health Care through the new proposed model of care. Health care providers should be requested and monitored for provision of prevention and care of the major NCDs.
- **Innovation through Behavioral Insights:** The application of Behavioural Economics in public health and particularly in addressing NCDs is an innovative way to ensure that policies are effective. When it comes to their health, people make decisions that are not always aligned with their best interest and do not support their well-being. Even though people are aware of the risks of NCDs and their future negative consequences on health, they tend to exhibit behaviours that are fast, automatic, and unconscious; contradicting their initial intentions. This intention-action gap explains the tendency of people to fail to adopt healthy behaviour despite their understanding of the importance of carrying a healthy and active lifestyle. The ministry of Economic planning established a nudge unit and it was agreed to include NCDs risk factors (physical inactivity and unhealthy diet) as focus of experimentation in the health sector.

³⁷ The interventions are intended to support countries to achieve the nine voluntary global targets on NCDs, and, in doing so, vastly improve the health and well-being of people worldwide. The list of interventions, initially featured as Appendix 3 of the WHO Global NCD Action Plan, 2013-2020, was revised based on new data and evidence using WHO-CHOICE, a WHO programme that helps countries decide priorities for action based on considerations of impact and cost-effectiveness. From a total of 88 proposed interventions, the updated Appendix 3 contains 16 interventions which are considered the most cost-effective and feasible for implementation.

In the area of Governance for NCDs, the Joint Mission recommends that:

- Formalize a national multisectoral NCD coordination mechanism, make the National NCD Action Plan operational and fully costed and ensure sustainable and sufficient financing.
- Guidance, communication, action and accountability for other ministries are strengthened through: (i) the National Public Health Agency; (ii) the unit in the MOH; (iii) a stronger and fully functional coordination mechanism for NCDs across government with high-level participation; and (iv) a separate mechanisms for bringing non-State actors (Private sector, CSOs..etc.) together.
- Ministry of Health and Ministry of Economy and Planning to con-convene a high-level conference to agree on the parameters of the multisectoral NCD coordination mechanism.
- Build on the work on mainstreaming Health in all Policies, pilot the NCDs prevention and control measures through aligning the relevant sectors' policies.
- Review and update the National NCDs Action plan, ensure the alignment of the Key Performance Indicators (KPIs) with: NCDs related targets in the SDGs, Saudi Arabia National Development Plan and its various sectoral projects.
- A coordination mechanism within the UN Country Team that brings together the necessary technical and political support from the UN system in order to provide catalytic support for national NCD action, advocacy and accountability.

For the prevention and reduction of risk factors, the Joint Mission recommends that:

- There is urgent action to implement the WHO Framework Convention on Tobacco Control, including the set of evidence-based, feasible and cost effective interventions for tobacco control. The mission welcomes the government of Saudi Arabia recent decision on increasing taxation on Tobacco and sugary drinks.
- To fast-track the development and implementation of the nutrition strategy, under the Saudi Food and Drug Administration, with involvement of other sectors such as Ministry of Education and Ministry of Commerce.
- Advance and maintain progress on population-based measures to reduce salt intake.
- Scale up action on eliminating trans-fats in domestic and imported food: the Gulf Cooperation Councils (GCC) policy on food labelling and elimination of trans fats should be fully adopted and implemented.
- Government works with Ministry of Municipality and Rural Affairs (MUMRA) to design and implement the Healthy City model.

With regard to surveillance, monitoring and evaluation, the Joint Mission recommends that Saudi Arabia:

- Conduct the NCDs Step-survey on regular basis to provide background information on the progress made towards the control of NCDs.
- Completes the WHO NCD country capacity survey for the 2018 Progress Monitor as soon as possible.
- Develops a monitoring and evaluation framework based on nationally agreed NCD targets with clear alignment with the NTP Key performance indicators for the different sectors and also with the WHO EMRO Regional framework on NCDs.
- Integrate the economic indicators that are essential for the indirect costs of the NCDs investment case in the various households surveys, in collaboration with GSTAT.
- Monitoring mechanisms enable spatial disaggregation of information, in order that inequalities in both NCD prevalence and access to treatment are better understood.

With regard to healthcare, the the Joint mission recommends that:

Recommendations for the UN System

The UN Resident coordinator should provide the political support and advocacy for a multisectoral response to NCDs, including calling for establishing a functional high level NCDs coordination committee.

The mission recommends that the WHO-UNDP Global Joint Programme document could serve as a basis for a joint programme with the government to advance the NCDs prevention and control in the country.³⁸ Further details are provided in Annex 7.

In Saudi Arabia, the Proposed Joint Programme will create strong multisectoral partnerships at the national and subnational level by convening different sectors around five key areas that can make the difference for NCD responses: (i) Revisiting and reviewing the National Executive Plan on NCDs; (ii) standardized mechanisms for stakeholders to collaborate on NCD prevention and control; (iii) municipal initiatives to address community-specific NCD challenges; (iv) cross-cutting approaches to deliver win-wins for NCDs and the Sustainable Development Goals; and (v) multisectoral actions to reduce key NCD risk factors and prevent disease onset.

The Joint Programme stimulates action beyond health and will consolidate existing national efforts in these five areas, and catalyse the development of new tools to bridge gaps. The overall objective would be to support countries to develop ambitious, coordinated responses to bring the NCD-related benchmarks in the SDGs to fruition, such that health, the economies and society improve together.

Given the ways in which the UN operates in high income settings, the mission recommends:

- Agreement is sought for the need of a joint UN programme to accelerate action for the NCD response.
- That with on-the-ground support from the Resident Coordinator's Office, WHO Country office and technical assistance of the relevant UN agencies, a joint programme is developed for funding by the Government in response to the recommendations of the mission.
- Possible implementation arrangements are explored leveraging the presence of resident agencies (WHO, UNDP, etc.)

³⁸ <http://www.who.int/ncds/un-task-force/flyer-ncds2030.pdf?ua=1>

The United Nations Inter-Agency Task Force on the Prevention and Control of Noncommunicable Diseases (UNIATF) was established in 2013 by the Secretary General and placed under the leadership of WHO to coordinate the activities of the UN System to support the realization of the commitments made by Heads of State and Government in the 2011 Political Declaration on NCDs. Joint activities included in the work plan of the Task Force are additive to various, more comprehensive efforts conducted by the UN agencies to prevent and control NCDs. These joint activities offer important opportunities to address cross-cutting issues and to advance capacity and learning in countries.



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