

Prevention and control of noncommunicable diseases in Malaysia

The case for investment



**World Health
Organization**

Malaysia, Brunei Darussalam
and Singapore



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**UN INTERAGENCY
TASK FORCE ON NCDs**



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MINISTRY OF HEALTH MALAYSIA

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Foreword

Noncommunicable diseases (NCDs) are the leading cause of death and disability in Malaysia, accounting for nearly 72% of all premature deaths. This burden not only places immense emotional and financial strain on Malaysian families, but it also poses a significant threat to our economy.

As part of my health-care transformation agenda, which prioritizes precision public health, there is an urgent need to transition from a predominantly curative approach to one that is preventive, promotive and predictive. This shift is crucial to address effectively the growing challenge of NCDs and reducing their long-term impact on the health of our citizens and the nation's economy.

This NCD investment case assesses the economic impact of the main NCDs impacting Malaysia and identifies the most effective and cost-efficient policies to safeguard our nation's health, while at the same time driving economic prosperity and people's well-being.

The analysis in this report reveals that NCDs result in an alarming annual economic loss of 64.2 billion Malaysian ringgit, equivalent to approximately 4.2% of our gross domestic product. The primary driver of this substantial economic burden is productivity loss due to premature mortality. With our rapidly ageing population, these challenges are expected to escalate further.

However, we have a pathway to prevention – if we act decisively now.

Scientific research has identified a range of preventive policies that are not only effective but also affordable and equitable. These policies target key NCD risk factors, such as reducing salt and tobacco consumption, promoting physical activity and increasing cancer screening.

Building on this evidence, the NCD investment case identifies the policy interventions that will deliver the highest return on investment in the coming years. Through rigorous modelling, we have quantified the economic impact of these policies, thus allowing the most impactful prioritizations.

Furthermore, the feasibility of implementing these policies is influenced by various factors, including sociocultural contexts, implementation strategies and equity considerations. To address this, stakeholder consultations were conducted involving representatives from multisectoral government agencies and civil society. Those insights have contributed to a comprehensive set of recommendations included in this report.

Findings from the extensive analytical and consultative process will strategically guide us in making further investments in NCD prevention and control, thereby upholding our citizens' right to health, keeping our economy innovative and productive, and promoting overall well-being and happiness in our society.

YB Datuk Seri Dr Dzulkefly Ahmad

Minister of Health, Malaysia

September 2024

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Abbreviations

B40	income group representing households in which the monthly income is in the bottom 40% of a tiered classification as per the Department of Statistics Malaysia
BA	bronchial asthma
COPD	chronic obstructive pulmonary disease
CVD	cardiovascular disease
EVALI	e-cigarette or vaping product use-associated lung injury
GDP	gross domestic product
HPV	human papillomavirus
ICA	institutional context analysis
M40	income group representing households in which the monthly income is in the middle 40% of a tiered classification as per the Department of Statistics Malaysia
NCD	noncommunicable disease
NHMS	National Health and Morbidity Survey
NSPCCP	National Strategic Plan for Cancer Control Programme
PHC	primary health care
PM	particulate matter
ROI	return on investment
RM	Malaysian ringgit
SABA	short-acting beta agonist-acting beta agonist
T20	income group representing households in which the monthly income is in the top 20% of a tiered classification as per the Department of Statistics Malaysia
UNDP	United Nations Development Programme
UNIATF	United Nations Inter-Agency Task Force on Non-Communicable Diseases
WHO	World Health Organization

Executive summary

This investment case demonstrates how noncommunicable diseases (NCDs) harm Malaysia's economy, proposes possible interventions to address NCD risk factors, and shows the economic and social benefits of such changes, the potential returns on investment and the political feasibility of implementing these interventions in Malaysia.

Each year, NCDs in Malaysia cause 72% of all premature deaths. Economic analysis of data from 2021 has estimated that NCDs cause 64.2 billion Malaysian ringgit (RM) in economic losses per year, including RM 12.4 billion in health-care expenditure and disability payments, and RM 51.8 billion in productivity losses. The total social and economic losses due to NCDs are equivalent to 4.2% of gross domestic product.

**RM 30 billion
of economic
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over the next
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Modelling of the most effective and cost-effective policy interventions has demonstrated that RM 30 billion of economic output could be recovered over the next 15 years. In addition, implementing the modelled interventions would result in over 180 000 lives saved and over 400 000 healthy life-years gained.

The salt-reduction package showed the highest return in investment: for every RM 1 invested, the expected return is RM 60 within 15 years. The other interventions modelled included physical activity awareness (a return of RM 6.6 for every RM 1 invested), tobacco control (a return of RM 6 for every RM 1 invested), cancer prevention and management (up to RM 8.4 for every RM 1 invested) and several other NCD clinical interventions.

An institutional context analysis was conducted to identify relevant institutions, stakeholders and political opportunities, to engage relevant actors and to mobilize coalitions of support. The analysis showed a series of actionable “entry points” that are feasible and effective for change within the political and institutional context. Stakeholders identified the following opportunities:

- salt reduction as an area likely to gain political buy-in;
- a strong foundation for implementing new tobacco control measures and strengthening existing measures;
- opportunities to use the introduction of the *Health White Paper*, approved by Parliament in June 2023, to generate political momentum for NCD prevention and control; and
- cross-sectoral dialogue to unite stakeholders for NCD prevention and control.



Several recommendations are provided in the concluding section of the report, including strengthening the whole-of-system approach to address NCDs; operationalization of the four strategic pillars for health system reform outlined in the Health White Paper; organization of meaningful community engagement through a bottom-up approach; improvement of systems to monitor and evaluate NCD interventions and policies; increased funding and resources for NCDs, particularly for capacity-building, prevention of industry interference and promotion of transparent partnerships and dialogue in policy-making settings; and promotion of equity in all aspects of policy, especially for marginalized and vulnerable groups.

1. Introduction

1.1 Components of the case for investment

This investment case comprises economic and political analyses of current and potential interventions to prevent and control noncommunicable diseases (NCDs) in Malaysia. The interventions considered are based closely on the policy options proposed as World Health Organization (WHO) “best buys” – a list of cost-effective interventions maintained and updated since 2013 (1).

This report provides estimates of the current economic burden of NCDs, identification and costs of priority interventions, quantification of the benefits of those interventions and calculation of the return of investment (ROI) of each intervention package. Information on the country’s environment and on the interventions that are most feasible in its context is presented as a key output of the institutional context analysis (ICA).

1.2 Situation analysis: NCDs and risk factors

1.2.1 Burden of NCDs

NCDs remain the most significant contributor to premature mortality among adults under 70 years in Malaysia (2); the risk of premature mortality due to NCDs reached 18.7% in 2021 (3), causing 72% of all premature deaths (4). Rising premature mortality due to NCDs is having far-reaching consequences, countering decades of improvements to other health metrics in Malaysia, mainly life expectancy. In 2020, the average life expectancy of Malaysians at birth was 76 years (5). While Malaysians are living longer, those years are not always lived in good health. Between 1990 and 2019, the number of years in a lifetime spent in poor health increased from 9.1 years to 9.5 years (6).

With continued exposure to current NCD risk factors and an ageing population in Malaysia, the number of years an individual can expect to live in good health is expected to decrease (7). Between 2020 and 2042, the number of older

adults in Malaysia is expected to increase from 7% to 14% (8). This demographic transition is also catalysing an epidemiological transition, whereby the prevalence of NCDs will increase as the population ages, increasing the burden on an already strained health system.

In addition, the rising prevalence of NCDs risks undermining Malaysia’s economic development, which has averaged an annual growth of 5.4% since 2010 (9). NCD-related morbidity is associated with decreased labour force participation, reduced productivity, loss of household income and, ultimately, loss of economic output nationally. Within the labour force specifically, the impact of NCDs in the working age population is substantial. Individuals are more likely to miss days of work (absenteeism) or to work at a reduced capacity (presenteeism). Of additional concern, rising rates of severe disability and premature

mortality due to NCDs among Malaysians will potentially decrease the remaining working years in the labour force. NCDs also pose a significant fiscal threat to the long-term sustainability and overall stability of the Malaysian health-care system. Costs associated with the treatment of escalating NCD morbidity will continue to rise, requiring resources to be diverted from other important areas of social and economic development. In the context of the current health-care system in Malaysia, the costs of treating NCDs disproportionately impact the public health-care system and also increase out-of-pocket expenditure for people who access the private health-care system.

Cardiovascular disease

Ischaemic heart disease caused 21 485 deaths in Malaysia in 2021, rising from 18 526 deaths in 2020. Only COVID 19 caused more deaths in 2021, while, in 2020, ischaemic heart disease was the principal cause of death in both males and females, as well as in all age groups > 40 years (10).

Cancer

The International Agency for Research on Cancer reported that Malaysia recorded 48 600 new cases of cancer in 2020 and estimated that the number of new cases of cancer will increase to 66 500 cases in 2030 (11). Colorectal cancer is the most common cancer among males, followed by lung, trachea and bronchus cancers; among

women, breast cancer is the most common form of cancer, followed by colorectal and cervical cancers (12).

Diabetes

In 2019, the estimated prevalence of diagnosed and undiagnosed diabetes was 18.3%, an increase from 11.2% in 2011 (13). Of concern, almost half of all diabetes cases in Malaysia were undiagnosed (13). A study of trends in mortality among nearly 1 million individuals with diagnosed type-2 diabetes registered in the National Diabetes Registry found no evidence of decreased standard mortality rates over a 10-year period; however, the rates increased in several subgroups, including younger people, people with cardiovascular disease (CVD) and people who had had type 2 diabetes for more than 15 years (14).

Respiratory disease

“Chronic respiratory diseases” covers a wide range of diseases that affect the airways and lungs, including asthma and chronic obstructive pulmonary disease (COPD). An overall decrease in the burden of chronic respiratory disease was estimated in Malaysia between 1990 and 2019 (15). Chronic respiratory diseases are, however, still a major contributor to years of life lost due to premature mortality and years of life lived with disability in Malaysia, having caused 923.1 disability-adjusted life-years per 100 000 population in 2019 (15).

1.2.2 Trends in risk factors for NCDs

Behavioural risk factors

Tobacco, e-cigarette and vape use

In 2019, a slight reduction in the prevalence of current tobacco smokers was seen over that in 2015, from 22.8% to 21.3% (13). While there has been an overall reduction in tobacco use, tobacco consumption patterns differ by

population group. For example, the proportion of current smokers was more than 30 times higher among men (40.5%) than women (1.2%) (13). Tobacco use also differed by site, with a higher prevalence in rural areas (25.4%) than in urban areas (20.1%). Individuals in the bottom 40% (B40) and middle 40% (M40) household income groups are more likely to smoke tobacco

than those in the top 20% household income group (T20). The overall prevalence of current tobacco smokers ≥ 15 years was 23.1% in 2011, 22.8% in 2015 and 21.3% in 2019 (13).

The popularity of smoked and smokeless tobacco, mainly e-cigarettes and vapes, is increasing in Malaysia. E-cigarette or vape use among adults rose from 3.2% in 2016 to 5% in 2019 (13), and the *National Health and Morbidity*

Survey 2022: Adolescent Health Survey 2022 (16) also indicated growing use of e-cigarettes and vapes among adolescents. The survey documented a change in the pattern of tobacco products used, with e-cigarette and vape use increasing from 9.8% in 2017 to 14.9% in 2022. During the same period, use of conventional cigarettes by adolescents decreased from 13.8% to 6.2% (Table 1).

TABLE 1. Trends in tobacco, e-cigarette and vape use among adolescents (13–17 years) in Malaysia

Indicator	2012	2017	2022
Prevalence of current tobacco smoking	11.5%	13.8%	6.2%
Prevalence of e-cigarette or vape use	NA	9.8%	14.9%

Source: National Health and Morbidity Survey 2022: Adolescent Health Survey, Malaysia. Kuala Lumpur: Institute for Public Health.

Alcohol use

Data in the 2019 *National Health and Morbidity Survey* (NHMS) (13) show decreases in binge drinking, heavy episodic drinking and risky drinking as compared with 2015 (Table 2).

TABLE 2. Trends in alcohol use in Malaysia

Indicator	2011	2015	2019
Prevalence of current alcohol drinkers (> 18 years)	12.8%	8.4%	11.8%
Prevalence of binge drinkers ^a (among people who use alcohol)	50.2%	59.4%	45.8%
Prevalence of heavy episodic drinkers ^b (among people who use alcohol)	18.3%	10.8%	8.4%

^aA binge drinker was defined as a person who consumed six or more standard alcoholic drinks at one sitting.

^bHeavy episodic drinking was defined as consumption of six or more standard alcoholic drinks at one sitting at least weekly.

Source: Combined data from the National Health and Morbidity Survey. Vol. II: Non-communicable diseases, risk factors and other health problems. Kuala Lumpur: Institute for Public Health; 2011, 2019 and 2023.

Decreased consumption was also seen among adolescents who used alcohol, from 10.2% in 2017 to 7.4% in 2022 (16). While some progress has been made in reducing harmful alcohol consumption, disparities remain. NHMS 2019 indicated that males, those of the Bumiputera race in the State of Sabah and those with a household income of RM 1000–1999 were more likely to consume harmful levels of alcohol (13).

Nutrition

The Food and Agriculture Organization of the United Nations defines food insecurity as lack of regular access to enough safe and nutritious food for normal growth and development and an active and healthy lifestyle. Food insecurity is a major, under-recognized driver of NCDs and a determinant of wider health outcomes. Low dietary diversity and low consumption of

macronutrients and micronutrients and of fruit and vegetables can directly or indirectly affect health (17), which can impact an individual's nutritional status due to undernutrition or overnutrition. Both undernutrition and overnutrition contribute to malnutrition, overweight/obesity, underweight, diabetes and disordered eating, as well as adverse physical and mental health (17).

Poverty is a key contributor to food insecurity. In Malaysia, householders with a low socioeconomic background are more likely to be food insecure. In 2020, the prevalence of moderate or severe food insecurity in Malaysia was 15.4%. In addition, 17% of low-income

families were vulnerable to food insecurity as food inflation placed pressure on household income (18).

Another issue of concern is that Malaysia is also experiencing the double burden of malnutrition and undernutrition and overweight and obesity, causing diet-related NCDs (19). NHMS 2019 data (13) indicate that the prevalence of underweight, stunting and wasting has increased among children below the age of 5 years, predominantly in rural areas and in children in the B40 household income group. The levels of overweight and obesity in the country have also steadily increased since 2011, from 15.1% to 19.7% in 2019 (13) (Table 3).

TABLE 3. Trends in nutritional indicators in Malaysia

Indicator	2011	2015	2019
Prevalence of obesity (≥ 18 years)	15.1%	17.7%	19.7%
Prevalence of abdominal obesity (≥ 18 years)	45.4%	48.6%	52.6%
Prevalence of underweight (< 5 years)	11.6%	12.4%	14.1%
Prevalence of stunting (< 5 years)	16.6%	17.7%	21.8%
Prevalence of wasting (< 5 years)	9.4%	8.1%	12.4%

Source: Combined data from the National Health and Morbidity Survey. Vol. II: Non-communicable diseases, risk factors and other health problems. Kuala Lumpur: Institute for Public Health; 2011, 2019 and 2023.

Recently, there has been a documented shift towards consumption of energy-dense and processed foods in Malaysia, in line with the country's nutritional transition and preceding globalization. Recent studies document shifting trends in consumption of various food groups. For example, the amount of energy per capita supplied by rice fell by 23.7%, while that from wheat rose by 56.5%, and the available calories from sugar and sweeteners increased by 23.9% during the past three decades (20).

Simultaneously, there has been an increase in the consumption of foods high in sodium and sugar (13). This trend should, however,

be placed in the cultural context: many food items high in sodium, such as soya sauce, are staples in the Malaysian diet. In 2012, the average intake of salt was 8.7 g per day (21). The aim of Malaysia's *Salt Reduction Strategy 2021–2025* is to decrease the average salt intake to 6.0 g per day for adults by 2025 (22). According to the most recent *Malaysian Community Salt Survey*, conducted between 2017 and 2018, Malaysians were consuming 7.9 g of salt per day, well above the WHO recommendation of 5.0 g/day (23).

Physical activity

WHO currently recommends 150–300 minutes of moderate-intensity exercise per week (24).

Physical activity has been increasing steadily in recent years among Malaysians. In 2011, the physical inactivity level was 35.7%, which decreased to 33.5% in 2015 and 25.1% in 2019 (13). Data from an NHMS survey indicate a gender disparity in physical activity levels, females being more likely than males to be physically inactive (13). In addition, living in an urban environment is correlated with higher levels of physical activity than living in a rural area (13).

Metabolic risk factors

Metabolic risk-factors, including high blood pressure, high-fasting plasma glucose and high blood cholesterol, continue to be highly prevalent in the Malaysian population (Table 4). Consecutive NHMS findings show that raised metabolic risk factors are undiagnosed in more than half of people (13).

TABLE 4. Indicators of metabolic risk factors in Malaysia

Indicator: prevalence of	2011	2015	2019
Raised blood glucose (all diabetes)	11.2%	13.4%	18.3%
Known diabetes	7.2%	8.3%	9.4%
Raised blood glucose among people not known to have diabetes	4.0%	5.1%	8.9%
Overall raised blood pressure	32.7%	30.3%	30.0%
Known hypertension	12.8%	13.1%	15.9%
Raised blood pressure among people not known to have hypertension	19.8%	17.2%	14.1%
Overall raised blood cholesterol	35.1%	47.7%	38.1%
Known hypercholesterolaemia	8.4%	9.1%	13.5%
Raised total cholesterol among people not known to have hypercholesterolaemia	26.6%	38.6%	24.6%

Source: Combined data from the National Health and Morbidity Survey. Vol. II: Non-communicable diseases, risk factors and other health problems. Kuala Lumpur: Institute for Public Health; 2011, 2019 and 2023.

While metabolic risk factors for NCDs are present throughout the population, their prevalence differs among subgroups. For example, adults in the lowest household income quintile (bottom 20%) were more likely to have diabetes, raised blood pressure and hypercholesterolaemia than those in higher-income quintiles. Almost 40% of adults in the bottom-income quintile and 27%

of adults in the top-income quintile had high blood pressure. In addition, unpaid workers and homemakers had the highest prevalence of high blood pressure (34.7%) among workers in the private sector (18.8%) (13).

2. Current policies and interventions for reducing the burden of NCDs

2.1 Health system reform

Malaysia has a dichotomous health system, consisting of a government-led and -funded public sector and a separate private sector with different sources of funding. The health system has contributed to overall improvement of the health status of the Malaysian population, including decreases in infant, child and maternal mortality and the prevalence of communicable diseases. The growing burden of NCDs and their impact on life expectancy and healthy life-years lost, however, threaten the stability of Malaysia's health system (25).

The public sector provides health services for the whole population, including personal and community health care, with minimal out-of-pocket payments (25). As a result, catastrophic health expenditure in Malaysia is among the lowest of all middle-income countries (26). Malaysia's health system is, therefore, valued by the population (25).

Since 1997, total expenditure on health has gradually increased, both in RM million (constant and nominal) and as a percentage of gross domestic product (GDP) (27). Total expenditure on health as a percentage of GDP in Malaysia (5.1% in 2021) is, however, still below the global average (9.83%) and significantly lower than that of other upper-middle-income countries (28). Of concern, only 13.4% of total expenditure on health was spent on prevention and public health functions in 2022, whereas 57.8% was spent on curative care (27).

While Malaysia has made substantial progress in providing universal access to health-care for its population, there are still unmet needs. Both currently and in the past, health-care use has been inequitable among socioeconomic groups, probably due to the division of services between the public and private sectors (6). Most private providers in Malaysia are in urban areas and reflect the health demands of high-income groups that are financially able to use their services (25). Those who are unable to afford the high health-care costs and the associated financial risk in the private sector use government-funded public providers (25,29), which, however, are underfunded and under-resourced, resulting in long waiting times and backlogs.

In June 2023, a *Health White Paper* was passed by Parliament, which proposed a comprehensive reform of the health-care sector over the next 15 years. The White Paper addresses the growing burden of morbidity and mortality due to NCDs and the fact that the burden is associated with social determinants of health (particularly income level). Furthermore, the White Paper describes several challenges facing Malaysia's health-care sector, including lack of integration and communication between the public and private health sectors in terms of service delivery and health resources, increasing health expenditure and an overstretched public health-care system. Challenges were highlighted in NCD control programmes, including lack of awareness, delays in diagnosis and poor adherence to interventions (30).



To address the challenges, the *Health White Paper* proposed four strategic pillars of health system reform (30):

- Pillar 1: Transform the delivery of health-care services in the country by prioritizing and restructuring primary health care (PHC), optimizing hospital care, granting operational autonomy to public sector providers and increasing partnerships with private-sector providers, and harnessing digitalization and technology for overall improvement of service delivery.
- Pillar 2: Cultivate and integrate health promotion and disease prevention approaches at all levels by improving public health and health emergency preparedness, improving shared ownership of health outcomes among government agencies, improving methods for coordination and collaboration with stakeholder groups in communities and in society, and increasing application of incentives and disincentives to acculturate healthy behaviour and norms.
- Pillar 3: Ensure sustainable financing of the health system in order to progressively increase health funding under public sector management, explore and implement equitable diversification of sources of health funding, pool the population's health risk into a dedicated health fund that ensures affordable coverage of a comprehensive range of services, and ensure the cost-effectiveness of health expenditure by instituting a range of organizational and governance reforms, including establishment of value-based payment models and strengthening the "strategic purchaser".
- Pillar 4: Strengthen organizational, governance and stewardship of the health system by strengthening the Ministry of Health's policy-making, regulatory, data stewardship and research functions; devolve the role of health-care provider and purchaser from the Ministry of Health in order to ensure checks and balances and performance; improve policies, legislation and regulations related to health to ensure that they are relevant to the current situation; improve the health workforce ecosystem, including planning, credentialing, career development, public sector recruitment and deployment; and stimulate research, innovation and evidence-based approaches.

2.2 The National Strategic Plan for NCDs

Malaysia centred its *National Strategic Plan for Non-Communicable Diseases 2016–2025* (32) on the WHO *Global Action Plan for the Prevention and*

Control of Noncommunicable Diseases (2013–2020) (31), with several targets to be met before the year 2025 (Table 5).

TABLE 5. Summary of the targets of the National Strategic Plan for NCDs

Indicator	Global target	Malaysia baseline	Target (2025)
Risk of premature mortality from CVDs, cancer, diabetes or chronic respiratory diseases	25% relative reduction	20.00%	15.00%
Prevalence of current tobacco use among people aged ≥ 15 years	30% relative reduction	23%	15.00%
Mean population intake of sodium	30% relative reduction	8.7 g	6.0 g
Prevalence of insufficient physical activity	10% relative reduction	35.20%	30.00%
Harmful use of alcohol (prevalence of heavy episodic drinking)	10% relative reduction	< 1.2%	< 1.2%
Prevalence of raised blood pressure	25% relative reduction	32.20%	26.00%
Prevalence of diabetes and obesity	Prevent further rise	< 15%	< 15%

Source: Adapted from *National Strategic Plan for Non-Communicable Disease 2016–2025*. Kuala Lumpur: Ministry of Health; 2016. Source: Adapted from Table 3.1 in reference 32.

2.3 Primary health care

Ministry of Health clinics provide four components of PHC: curative, preventive, promotive and rehabilitative services. Curative services include basic medical care, minor surgery, detection and early intervention of NCDs and treatment of communicable diseases before referral to the next level of care. In PHC settings, NCDs are managed in accordance with clinical practice guidelines, and management is thus standardized in the public and private sectors.

Public sector clinics comprise 28% of all PHC facilities but receive almost 64% of outpatient visits (30). Furthermore, more than 65% of patients with diagnosed diabetes, hypertension or hypercholesterolaemia use public PHC facilities for treatment (13).

In recognition of the importance of extending access to NCD services and decongesting public

sector clinics, particularly for individuals in B40 households, the Ministry of Health implemented the *Skim Peduli Kesihatan* (known as PeKa B40) in 2019. A non-profit government-linked company, ProtectHealth Corporation, was established as a wholly owned subsidiary under the Ministry of Health to deliver the programme. PeKa B40 is supported by partner providers consisting of general practitioners, private laboratories, government clinics and government hospitals to deliver NCD screening, health aids, incentives for completing cancer treatment and transport incentives for the B40 population. In 2021, the NCD screening initiative led to a new diagnosis in 36.7% of the beneficiaries (33).

Additionally, Malaysia launched the National Health Screening Initiative in 2022 to address the problem of undiagnosed NCDs. This nationwide screening programme is part of *Agenda Nasional Malaysia Sihat*, or the *Healthy Malaysia National*

Agenda, to strengthen the health system by investment in PHC for early detection and treatment of NCDs. The Initiative provided free

screening for Malaysians aged ≥ 30 years in 2022; it was extended to Malaysians aged ≥ 18 years in 2023.

2.4 Cancer-specific programme

Malaysia implemented the *National Strategic Plan for Cancer Control Programme in 2016–2020* (NSPCCP), with a holistic approach to addressing primary prevention, screening, early detection, diagnosis, treatment, rehabilitation, palliative care, traditional and complementary medicine, and research (34). Within this programme, Malaysia extended many cancer services and introduced cervical cancer screening by self-sampling for human papillomavirus (HPV) testing. The programme faced several challenges during implementation, however, including organization in silos and unequal distribution of oncologists across Malaysia.

Building on the NSPCCP 2016–2020, Malaysia began implementation of the NSPCCP 2021–2025 with monitoring and surveillance of cancer and human capacity-building as new focus areas to enhance the approach to cancer prevention and control. Malaysia has also developed specific plans for colorectal cancer and cervical cancer. The *National Strategic Plan for Colorectal Cancer 2021–2025* (35) was developed, with clear targets to be achieved by 2030:

- to increase screening coverage in the target age group (50–75 years) from 10.8% in NHMS 2019 to 40.0% by 2030;
- to reduce the incidence among males and females by 2030 (baseline in the Malaysian National Cancer Registry 2012–2016: males, 14.8/100 000 and females, 11.1/100 000);
- to down-stage colorectal cancer at the time of diagnosis by 25% by 2030 (baseline stages III and IV from the Malaysian National

Cancer Registry 2012–2016: males from 72.4% to 54.4%, females from 73.1% to 54.8%);

- to improve the five-year relative survival rate from colorectal cancer (baseline 5-year relative survival for colorectal cancer over the period 2007–2011, 51.1% from the Malaysian Study on Cancer Survival, 2018); and
- to reduce by 30% the risk of premature death due to colorectal cancer by 2030, from 0.8% in 2019 to 0.5% in 2030.

In addition, Malaysia released an *Action Plan Towards the Elimination of Cervical Cancer in Malaysia 2021–2030* (36) to reduce the incidence of cervical cancer to fewer than four cases per 100 000 population. To achieve this, Malaysia has targets of 90% of girls fully vaccinated with HPV vaccine by the age of 15, 70% of women screened with a high-performance test by the age of 35 and again by 45 years, and 90% of women with diagnosed cervical disease receive treatment.

Through its free national school HPV vaccination programme for 13-year-old girls, 85.8% of the cohort of 2010–2016 has been vaccinated (approximately 200 000 girls vaccinated each year). This programme was, however, temporarily halted due to high, unaffordable prices of the vaccine and was further hindered by school closures during the COVID-19 pandemic. Efforts are under way to provide catch-up vaccinations (37).

3. Current policies and interventions for addressing NCD risk factors

3.1 Tobacco

Tobacco use is regarded as one of the most significant drivers of premature mortality in Malaysia. It is estimated that, in 2019, almost 29 500 people in Malaysia died prematurely due to tobacco use (38). Smoking also imposes significant economic losses on Malaysia. Estimates suggest that smoking-attributable productivity losses alone has cost Malaysia RM 275.3 billion (39).

Malaysia is currently working to achieve the target of reducing smoking prevalence to < 5% by 2040 (40). The Government signed the *WHO Framework Convention on Tobacco Control* in 2003, ratified it in September 2005 and became a Party in December 2005. Malaysia has also been recognized as a highest-achieving country for several tobacco control measures (41):

- Monitor: Recognized as a best-practice country; tobacco use prevalence is monitored by ensuring recent, representative, periodic data for both adults and young people.
- Protect: Smoking is banned in public spaces, and the law does not allow designated smoking rooms, except if the health authority allows them by administrative act (no such administrative action has yet been taken).
- Offer help to quit: Nicotine-replacement therapy and/or some cessation services are available in health-care facilities.
- Warn: Recognized as a best-practice country; graphic health warnings on cigarette

packaging, which must cover 55% of the principal display area are mandatory.

- Enforce bans: Tobacco advertising is banned in all national television, radio and newspapers.
- Raise taxes: Total tobacco taxes account for 51.6% of the retail price (41), which includes a specific excise, sales tax and import duty (42).

In March 2023, the Government removed liquid nicotine used in e-cigarettes and vape from the Poisons List of controlled substances in order to tax e-liquids. Before this change, any preparation containing nicotine could be supplied only for medical treatment by licensed pharmacists and registered medical practitioners. On 30 November 2023, the Parliament of Malaysia passed the Control of Smoking Products for Public Health Bill 2023. This became the first stand-alone legislation to address the sale, use and promotion of tobacco products, substitute tobacco products and smoking substances, which includes cigarettes, vapes and e-cigarettes.

The Ministry of Health has also developed clinical practice guidelines on the management of “e-cigarette or vaping product use-associated lung injury” (EVALI) (43). An EVALI is described as a serious medical condition resulting from damage to the lungs from the substances contained within an e-cigarette or vape. A total of 14 EVALI cases have been reported from 2019

until September 2022 in Malaysia. The estimated average cost of treating EVALI in hospital

for 4 days is RM 50 297.37 (approximately US\$ 11 200) (43).

3.2 Alcohol

In 2017, Malaysia implemented several policies in line with the WHO *Global Strategy to Reduce Harmful Use of Alcohol* (44). This included raising the permissible drinking age in Malaysia from 18 to 21 years, introducing a health warning label on alcoholic drink packages and ensuring that hard liquor is sold only in 700-mL glass bottles. This

was done as part of alcohol policy development for the *Malaysia Alcohol Control Action Plan 2013–2020*. The Malaysian Government also imposes an excise duty on alcoholic beverages, at RM 175.00 per 100% volume per litre for beer and RM 150.00 per 100% volume per litre for wine and spirits.

3.3 Nutrition

The *National Plan of Action for Nutrition of Malaysia III 2016–2025* was launched to address diet-associated NCDs in Malaysia and nutritional deficiencies (45). The Ministry of Health is responsible for monitoring implementation of all the activities in the National Plan. The Plan encompasses 46 nutritional indicators and a comprehensive set of targets related to:

- maternal, infant and young child nutrition;
- promoting healthy eating and active living;
- preventing and controlling nutritional deficiencies; and
- preventing and controlling obesity and diet-related NCDs.

Malaysia has also issued salt reduction strategies. It first implemented the *National Salt Reduction Plan 2015–2020*; however, an evaluation of the strategy in 2018 indicated that Malaysia had made only moderate progress in establishing mechanisms to both spread health messages to the population and ensure that they were adopted and in engaging food manufacturers in reformulation. The major challenges to implementation included limited interaction between monitoring and awareness, competing priorities and budget constraints (22). The National Plan was then revised, and the National

Plan for 2021–2025 was implemented. The aim is to support the global target of a 30% decrease in salt/sodium intake and a 25% reduction in the prevalence of hypertension by 2025.

An excise duty of RM 0.40 per litre on sweetened beverages containing more than 5 g of sugar or per 100 mL of sugar-based sweeteners was introduced in 2019 and is planned to be further increased. Carbonated, flavoured and other non-alcoholic beverages have also been taxed, as well as juices and vegetable-based drinks containing ≥ 12 g of sugar (46). In 2021, the Government announced that it would also introduce a tax on pre-mix preparations, although implementation has been postponed on three occasions.

Currently, Malaysia has no policy to ban or limit the sale of food containing industrially produced trans-fats. WHO recommends a 2-g limit on industrially produced trans-fat per 100 g of total fat in all food products or a complete ban on use of trans-fat (47). There is no law in Malaysia to compel food industry producers to label food products containing trans-fats. Elimination of trans-fats as a policy was previously considered but was met with pushback by the food industry. Currently, lack of evidence and data on the presence and impact of trans-fats in Malaysia is hindering political buy-in.

3.4 Physical activity

The level of physical activity has been increasing in the Malaysian population overall. The aim of the *National Strategic Plan for Active Living 2016–2025* (48) is to continue this trend by addressing six areas in education, communities, workplaces

and health care. The overall aim of Plan is to both foster a collaborative, population-based approach and contribute to global targets for a 10% relative reduction in the prevalence of insufficient physical activity.

3.5 Air pollution

The Malaysian Department of Environment maintains 68 air quality monitoring systems across the country to monitor air quality in real time (49). The Department reported either a good or moderate air pollution index throughout 2022 at 99.8% of stations, only 0.2% of stations showing unhealthy indexes. This classification of air quality is, however, based on the National Malaysian Ambient Air Quality Standards, in which the allowable annual concentration of

fine particulate matter (PM_{2.5}) is about three times higher than the *WHO Air Quality Guidelines 2021* (50). Furthermore, ambient air quality standards in Malaysia are not embedded in national legislature (51). WHO reported that the annual mean concentration of PM_{2.5} of 22 µg/m³ and 21% of deaths from stroke and ischaemic heart disease in Malaysia are caused by air pollution (51).

3.6 Initiatives led by civil society organizations

Dedicated civil society organizations in Malaysia are working to address current gaps in NCD prevention, treatment and control, particularly in rural and underserved communities. The initiatives of these organizations are micro-level approaches to tackle local and context-specific problems that may be overlooked

at a higher level. The momentum created by these organizations to address locally relevant problems for communities with a rising prevalence of NCDs is a success that can and should be leveraged in a multifaceted approach to combating NCDs.

4. Methods

This section outlines the methods and economic models used at various stages of the economic analysis: calculating the economic burden of NCDs in terms of direct costs and indirect costs (absenteeism, presenteeism and

premature death); costing of clinical and policy interventions; assessing the health impact of scaling up interventions; and ROI analysis. This section also outlines the method for the institutional context analysis (ICA).

4.1 Economic burden of NCDs

A model developed by WHO and United Nations Development Programme (UNDP) was used to calculate the economic burden of NCDs in Malaysia, including the current direct and indirect costs of NCDs. The calculations were based on data provided by national authorities through the WHO country office and the Ministry of Health. The main inputs were incidence rates by age and sex for heart attacks and stroke and the prevalence by age and sex of diabetes, hypertension, chronic respiratory diseases and cancer. Mortality rates by age and sex were applied for each condition. Demographic and economic indicators were also collected for use in the model, including population, GDP and labour statistics from the Department of Statistics Malaysia. Notably, all data sources used for calculating the economic burden are secondary sources. Additionally, the economic burden was estimated using a top-down approach that, by means of aggregate national or sector-wide data, provides a comprehensive overview on a large scale, but may not capture specific variations within subpopulations or regional contexts.

The economic burden of NCDs was calculated in the following steps.

- Total government health expenditure and the share of total expenditure on health

on NCDs were obtained from Malaysia National Health Account Report 2011-2021. Direct non-health-care costs included social insurance payments in 2021 by people who could not work because of a long-term illness or disability from a NCD. These data were obtained from the Social Security Organization database, which records the diagnosis of end-organ damage that allows invalidity scheme benefits to be paid. Invalidity payments for cancer, endocrinological diseases, cardiovascular diseases, hypertension, cerebrovascular diseases, respiratory diseases and end-stage renal failure in 2021 were used in this analysis.

- The share of spending breakdown was estimated using proxy data based on Muka et al. (2015). The publication of more recent studies following the conclusion of the analysis phase may result in slight variations from the actual cost estimates; however, these estimates generally reflect overall spending accurately.
- The annual value (in terms of economic output) of each full-time worker in Malaysia was calculated from GDP per employed person, defined as the country's GDP (RM 1.55 trillion in 2021, local data)

divided by the total employed labour force. Local data on the total labour force aged ≥ 15 years (RM 16.7 million), the unemployment rate (3.6%) and the labour force participation rate (69.8%) were used to determine the total employed labour force.

- Data on the extent to which NCDs reduce worker productivity were included. Rates were found in the academic literature (53) to describe the reduction in full-time hours worked because of absenteeism and the reduction in productivity due to presenteeism.
- The number of people with NCDs who were working in Malaysia in 2021 was determined from rates of labour force participation, unemployment and mortality. From the number of people of working age with NCDs, those who chose not to participate in the labour force or were unemployed

were subtracted, then those who could not participate in the labour force specifically because of their NCD, and then those who had died in that year. The result was the estimated number of active workers with NCDs.

The final steps were calculation of the economic losses due to premature deaths from the numbers of workers who had died and would-be workers who could not participate in the labour force and then the costs of absenteeism and presenteeism for surviving active workers with NCDs. The model applied the relevant productivity figures found in the second step to the populations determined in the third step and multiplied this by the GDP per employed person. This calculation resulted in the total indirect costs of each NCD.

4.2 Inclusion of policy and clinical interventions in analysis

The following interventions were included in the analysis: policy interventions to prevent behavioural risk factors for NCDs (tobacco use, harmful use of alcohol, excess salt intake and physical inactivity); and primary and secondary clinical prevention interventions and clinical treatment interventions for CVDs, diabetes,

COPD, asthma, cervical cancer, breast cancer and colorectal cancer. Annex 1 lists the policy-based and clinical interventions included in the analysis. Baseline and target coverage and intensity were determined for each policy and clinical intervention in consultation with Ministry of Health experts.

4.3 Costing of policy and clinical interventions

The costs of scaling up and implementing policy interventions were calculated with the WHO NCD Costing Tool (54, 55). Packages of population-level interventions also included brief interventions in primary care, which can be provided to any person in contact with primary care. The OneHealth Tool (55) was used to calculate the costs of scaling up clinical interventions by identifying, quantifying and valuing each resource required for the intervention.

For policy interventions, the costs considered included human resources, training, external meetings, mass-media campaigns (such as television and radio time and newspaper advertisements) and miscellaneous equipment for enacting policies and programmes.

For clinical interventions, the OneHealth Tool includes assumptions set by experts on the quantities of inputs required to implement and enforce each intervention.

All unit prices were provided by the Ministry of Health. When those data were not available, the calculation was made with data from the WHO-

CHOICE database (54,57) or from the price data in the OneHealth Tool (56).

4.4 Analysis of return on investment

ROI and cost–benefit ratios are measures of the expected returns of health-care investments, as the magnitude and timing of the benefits of health interventions are compared directly with the magnitude and timing of investment costs. The cost–benefit ratio is the ratio of the net discounted (present) value of the benefits to the investment costs. Future costs and benefits are discounted at 3%, as a unit of currency in the future is worth less than a unit today because of the time value of money.

Analysis of the returns on investment, based on a Microsoft Excel model developed by WHO for this analysis, provided estimates for the economic gains that accrue from investing in the set of cost–effective interventions identified by WHO (“best buys”). Annex 1 lists the policy-based and clinical interventions included in this calculation.

The ROI model was developed in 2015 by WHO and UNDP. Further details on use of the OneHealth Tool are available in the OneHealth Tool manual (56) and are discussed in a guidance note for investment cases for preventing and controlling NCDs (58).

To determine the ROI, the costs of investing in NCD interventions are compared with the economic benefits arising from those investments. The economic benefits are directly proportional to the overall health impact of implementing or scaling up the interventions because of their impact on labour productivity and, eventually, economic output or GDP. The calculation begins with identification of the populations and their health states that are affected by an NCD risk factor. Scaling-up of an

intervention is then modelled either as adjusting down a risk factor as directly affecting the health of an individual or as the number of individuals whose health state does not become worse. As interventions change these parameters, the projected incidence and prevalence of NCDs are reduced, which contributes to decreasing absenteeism and presenteeism in the labour force.

The first component of the economic benefit of investing in NCD interventions can be estimated by combining the relative average productivity per worker (GDP per employed person) and the reductions in rates of absenteeism and presenteeism.

The second component of the economic benefits of NCD interventions is their impact on the size of the labour force. As scaling up policies and interventions will lead to modelled decreases in mortality attributable to NCDs and decreases in the incidence and prevalence of NCDs, the expected avoided decreases in the labour supply can be estimated. By adding the number of avoided premature deaths in the active labour force as a result of policy implementation to avoided withdrawals from the labour force due to prevented incidence of disease, we were able to estimate gender and age cohort-specific numbers of people whose participation in the labour force is not lost as a result of investment in NCD interventions. For each cohort, the number of additional years of working life that would not be lost due to death or illness were then calculated, which, together, yield the expected total lifetime income not lost due to NCDs.

The projected economic gains from implementing NCD interventions are therefore the sum of avoided presenteeism, avoided

absenteeism and avoided decreases in the labour force, accrued over 15 years.

4.4 Analysis of institutional context

The goal of an ICA is to determine the institutions and stakeholders that are relevant to NCDs in the country context, identify political opportunities, engage key actors and mobilize coalitions of support.

A desk review, conducted in early 2023, was the first step in the ICA to identify relevant, evidence-based information on NCD prevention and control in Malaysia. A total of 62 sources were identified, including reports from global organizations such as WHO and the United Nations, academic papers, local news articles and national policy plans.

The desk review was supplemented by stakeholder interviews for a final ICA report, which further supported the findings of the final investment case report. In consultation with national partners, 15 interviews were conducted with stakeholders in several ministries and civil society organizations. The interviews were critical, as they uncovered opportunities and challenges for policy action and advocacy-centred recommendations that were missing from the desk review. Findings from the ICA are interwoven throughout this report.

5. Results of the economic analysis

This section presents the results of the quantitative analyses of the NCD Investment case: the economic burden of NCDs, the costs of scaling up and implementing the policy

and clinical intervention packages, their economic and other benefits, and the resulting ROI for each package.

5.1 Assessment of economic burden

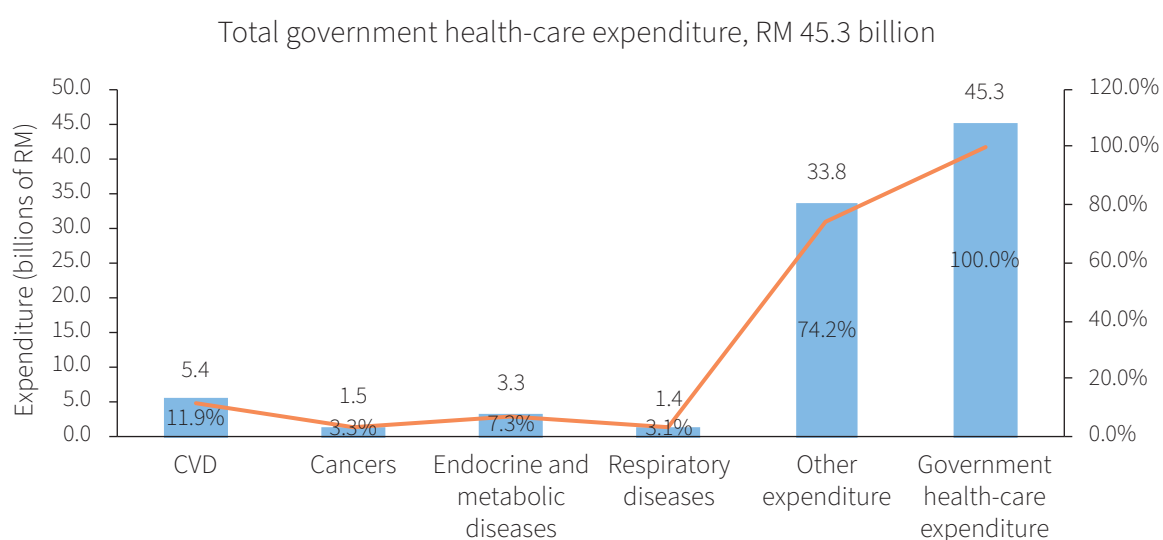
5.1.1 Direct costs

First, the direct costs associated with NCDs in Malaysia were established. The estimate applies only to government health-care expenditure and disability payments; it does not include private out-of-pocket health-care expenditure, costs to third-party insurers or non-health-care costs, such as transport.

Total expenditure on health in Malaysia was RM 78.2 billion in 2021. Government health expenditure was RM 45.3 billion and accounted for 57.9% of total expenditure on health (59).

The share of total expenditure on health for each NCD group (CVDs, diabetes, cancer and chronic respiratory diseases) was available from national health accounts. Annual spending on the four main groups of NCDs in 2021 was RM 11.6 billion: RM 5.4 billion (11.9% of the government health expenditure) on CVD, RM 1.5 billion (3.3% of the government health expenditure) on cancer, RM 3.3 billion (7.3% of the government health expenditure) on endocrine and metabolic diseases (mainly diabetes) and RM 1.4 billion (3.1% of the government health expenditure) on chronic respiratory diseases (Fig. 1).

FIG. 1. Government health-care expenditure in Malaysia, in RM billions, 2021



Source: Calculation by the authors based on published and unpublished data.

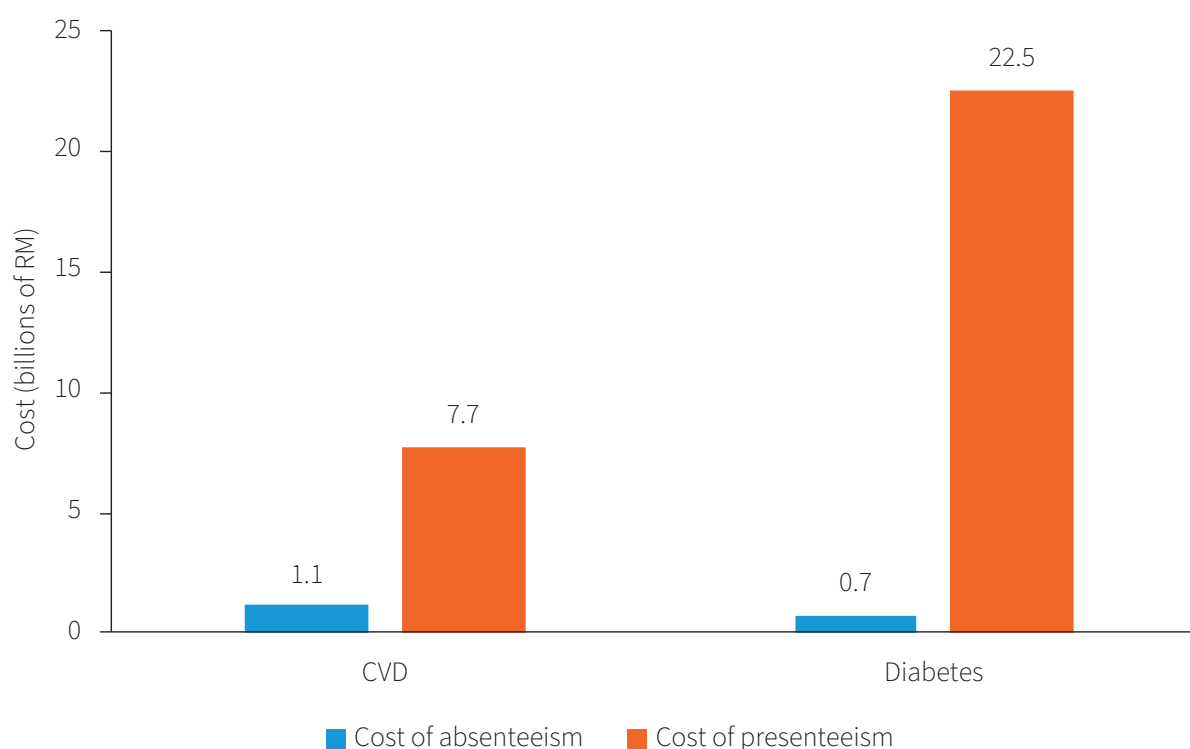
5.1.2 Indirect costs

NCDs also burden the economy indirectly, by affecting productivity and the ability to contribute to the workforce. For this study, indirect economic losses due to NCDs were calculated from increases in absenteeism and presenteeism and losses due to premature death (Fig. 2).

Absenteeism and presenteeism were calculated according to the human capital approach and the proportion of the workforce living with NCDs.

Fig. 2 shows the results for 2021. Results could be calculated only for CVD and diabetes, because no relevant studies on chronic respiratory diseases or cancer were found in the literature search. The cost of absenteeism resulting from CVD was an estimated RM 1.1 billion. Presenteeism resulting from CVD accounted for a burden of RM 7.7 billion. For diabetes, the costs of absenteeism and presenteeism were estimated at RM 0.7 billion and RM 22.5 billion, respectively.

FIG. 2. Costs of absenteeism and presenteeism for CVD and diabetes in RM billions, 2021

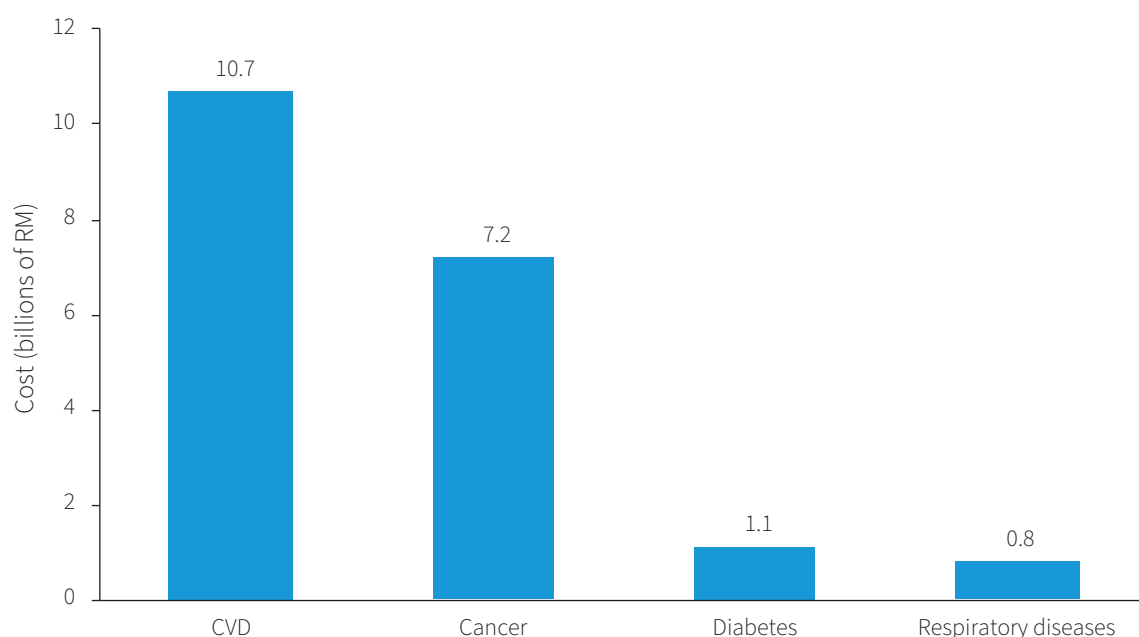


Source: Calculation by the authors based on published and unpublished data.

Losses due to premature death were estimated by the human capital approach. These are equivalent to the total output that would have been generated by workers during their lives until they reached retirement age. The costs of premature death were calculated by determining the proportion of the years of life lost before retirement age (labour force

participation rate times the age-specific employment rate) due to the four main NCDs in 2021 and multiplying the figure by the GDP per working person.

The total cost of premature death was estimated to be RM 19.8 billion (Fig. 3). Most of these costs were due to CVD and cancer.

FIG. 3. Costs of premature death due to four NCDs in RM billions, 2021

Source: Calculation by the authors based on published and unpublished data.

5.1.3 Total economic costs

Table 6 summarizes the total direct and indirect costs of NCDs in Malaysia. The indirect economic costs are four times higher than the direct costs (health-care expenditure and disability payments). The estimated direct costs, measured as government expenditure for the four main NCDs, are already RM 12.4 billion, and additional

losses to the economy due to absenteeism, presenteeism and premature death amount to RM 51.8 billion. The total would be even higher if the costs of absenteeism and presenteeism could be estimated for cancer and chronic respiratory diseases.

TABLE 6. Economic burden of NCDs in Malaysia, in RM billions, 2021

Cost	Cardiovascular diseases	Cancer	Diabetes mellitus	COPD	Total
Direct costs					
Government expenditure	5.4	1.5	3.3	1.4	11.6
Disability payments	0.4	0.3	0.05	0.04	0.8
Total direct costs	5.8	1.8	3.4	1.4	12.4
Indirect costs					
Absenteeism	1.1	NA	0.7	NA	1.8
Presenteeism	7.7	NA	22.5	NA	30.2
Premature deaths	10.7	7.2	1.1	0.8	19.8
Total indirect costs	19.5	7.2	24.3	0.8	51.8
Total cost	25.3	9.0	27.7	2.2	64.2

NA, not available

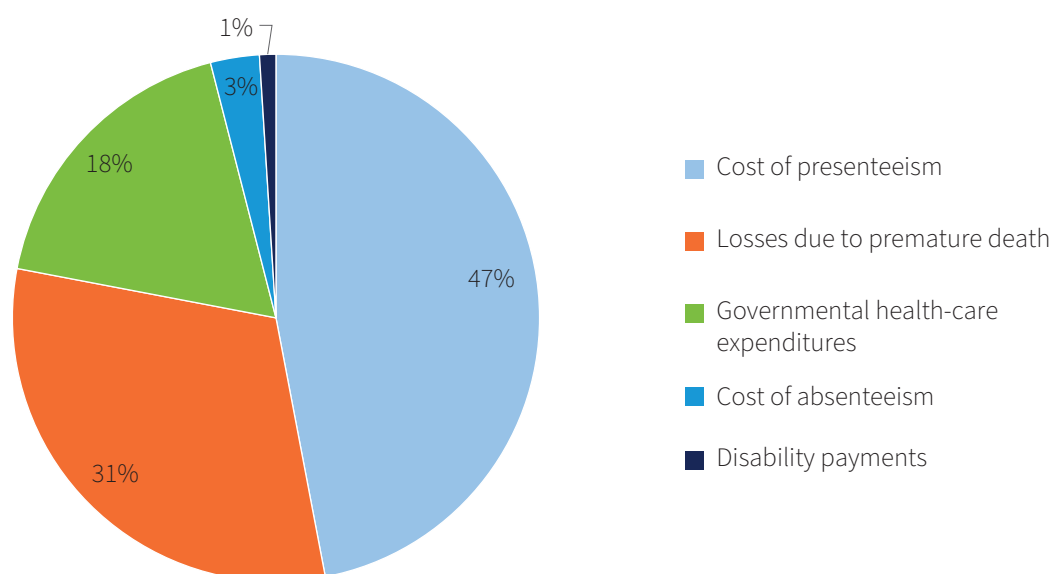
Source: Calculation by the authors based on published and unpublished data.

The total burden of NCDs on the economy of Malaysia was RM 64.2 billion, equivalent to 4.2% of the country's GDP in 2021.

NCDs (government health-care expenditure and disability payments) represented 19.3% of all NCD-related costs, confirming that most of the burden is indirect.

Fig. 4 shows the structure of the economic burden of NCDs in Malaysia in 2021. The direct costs of

FIG. 4. Structure of the economic burden of NCDs in Malaysia, 2021



Source: Calculation by the authors based on published and unpublished data.

5.1.4 Cost of interventions

The cost of scaling up or implementing NCD interventions was estimated for the period 2023–2037. Table 7 shows the costs for each of the first five years of this period and the five-year and 15-year totals.

The CVD and diabetes clinical intervention and the COPD and bronchial asthma (BA) clinical intervention packages would incur the largest estimated costs. The “All policy interventions” is the scenario in which all NCD policies are implemented and scaled up.

TABLE 7. Estimated costs of policy and clinical interventions in RM millions, 2023–2037

Intervention	2023	2024	2025	2026	2027	Total for 5 years	Total for 15 years
Tobacco control package	21.09	25.59	27.39	29.38	30.35	133.79	569.43
Alcohol control package	105.49	136.98	134.23	143.28	151.58	671.57	3 150.13
Physical activity awareness package	7.35	13.10	25.42	14.33	15.20	75.39	317.08
Salt-reduction package	3.63	8.27	6.94	7.17	7.41	33.42	122.43
<i>All policy interventions, total</i>	137.56	183.94	193.98	194.16	204.54	914.17	4 159.07

Table 7. Estimated costs of policy and clinical interventions in RM millions, 2023–2037 (Con't)

Intervention	2023	2024	2025	2026	2027	Total for 5 years	Total for 15 years
CVD and diabetes clinical intervention package	466.81	472.72	478.88	475.03	481.41	2 374.85	8 243.38
COPD and BA clinical intervention package	312.45	356.58	402.17	449.21	497.74	2018.14	9 971.79
Breast cancer	100.75	122.13	146.18	172.19	199.96	741.21	4 547.82
Cervical cancer	13.28	18.57	24.61	31.33	38.75	126.54	1 045.61
Colorectal cancer	63.15	70.38	78.11	86.44	95.44	393.53	20 01.99
<i>Clinical intervention package, total</i>	956.44	1 040.38	1 129.95	1 214.20	1 313.3	5 654.27	25 810.59
Total	1 094.00	1 224.32	1 323.93	1 408.36	1 517.84	6 568.44	29 969.66

Source: Calculation by the authors based on published and unpublished data.

5.2 Health benefits

All the interventions would significantly reduce the number of lives lost to causes related to NCDs (Table 8). Of the policy interventions, the salt-reduction package would have the

greatest impact in terms of mortality (37 478 lives saved), followed by tobacco interventions (9565) and the physical activity awareness interventions (3255) (Table 8).

TABLE 8. Estimated health benefits over 15 years

Intervention package	Strokes averted	Acute ischaemic heart disease averted	Mortality averted	Healthy life-years gained
Tobacco control package total	4 494	3 821	9 565	36 575
Alcohol control package total	65	7	120	240
Physical activity awareness package total	3 073	4 851	3 255	22 673
Salt-reduction package	7 047	8 032	37 478	80 265
CVD and diabetes clinical intervention package	24 279	7 471	25 925	99 646
COPD and BA clinical intervention package	–	–	34 984	23 820
Breast cancer	–	–	37 780	54 567
Cervical cancer	–	–	10 611	93 470
Colorectal cancer	–	–	26 775	12 797

Source: Calculation by the authors based on published and unpublished data.

Each set of interventions would also add healthy life-years. The salt, alcohol, tobacco, physical activity, and CVD and diabetes clinical intervention packages prevent strokes and

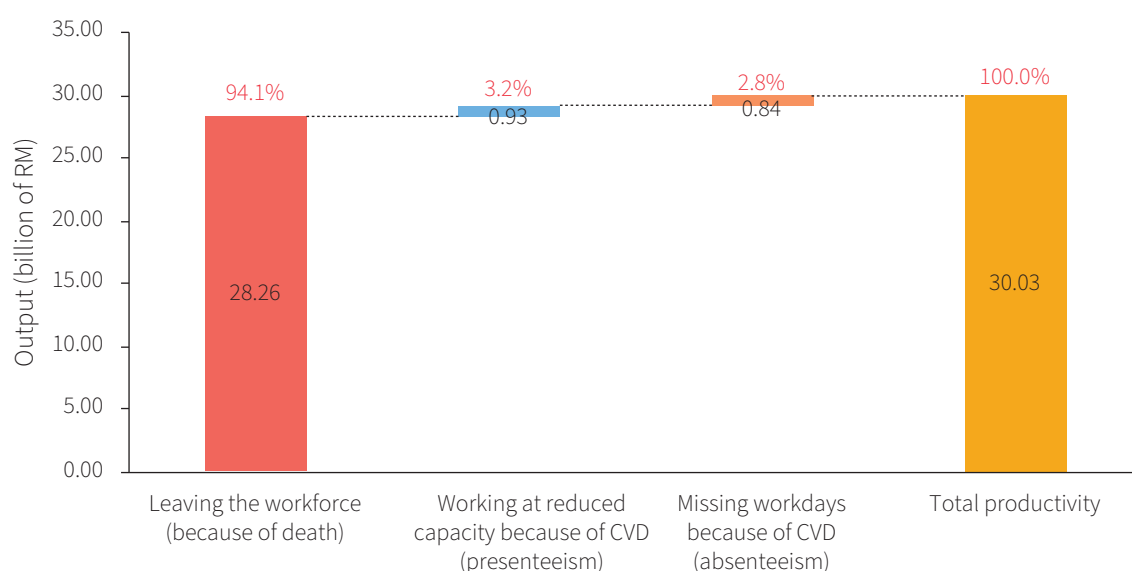
cardiovascular events; thus, individuals would avoid disabling states (such as partial paralysis from stroke) that can increase pain and suffering, reduce mobility and impair speech and thought.

5.3 Economic benefits

The NCDs included in this analysis reduce the labour workforce and productivity due to premature mortality, fewer days of work (absenteeism) and reduced productivity while at work (presenteeism). Fig. 5 shows the gains in labour productivity that would result from the prevented deaths and cases

of disease expected from implementing the modelled policy and clinical interventions over 15 years (Table 8). The greatest positive impact on productivity is from reduced mortality (94.1% of total productivity gains), followed by reduced presenteeism (3.2%) and absenteeism (2.8%).

FIG. 5. Recovered economic output expected from policy and clinical interventions over 15 years



Source: Calculation by the authors based on published and unpublished data.

5.4 Return on investment

Comparison of the costs and benefits of each package of interventions shows that many of the intervention packages included in the analysis have benefits that exceed the costs of

implementation over 15 years (Table 9). Policy packages for salt reduction, tobacco control and promotion of physical activity offer the highest ROI over 15 years.

TABLE 9. Costs, benefits and cost–benefit ratios at 5 and 15 years, by intervention package (RM millions)

Intervention package	5 years			15 years		
	Total cost	Total benefits	ROI	Total cost	Total benefits	ROI
Tobacco control package	121.94	147.55	1.21	437.73	2 595.74	5.93
Alcohol control package	612.44	0.98	0.00	2 398.03	23.98	0.01
Physical activity awareness package	68.58	96.01	1.40	242.84	1 612.46	6.64
Salt-reduction package	30.44	136.98	4.50	95.45	5 732.73	60.06
CVD and diabetes clinical intervention package	2 174.37	413.13	0.19	6 416.84	7 058.52	1.10
COPD and BA clinical intervention package	1 835.97	220.32	0.12	7 586.85	1 744.98	0.23
Breast cancer	672.18	168.04	0.25	3 410.72	3 854.11	1.13
Cervical cancer	114.18	115.32	1.01	771.88	6 483.79	8.40
Colorectal cancer	358.27	114.65	0.32	1 518.04	926.00	0.61

Source: Calculation by the authors based on published and unpublished data.

The highest cost–benefit ratio of any intervention was for the salt-reduction package: for every RM 1 invested, the expected return is RM 4.5 for the first five years and RM 60 for 15 years. The next highest cost-benefit ratio was for the physical activity awareness package, which is expected to produce RM 6.6 within 15 years, followed by the tobacco control package, which is expected to produce RM 5.9 within 15 years. The alcohol control package provides a return on investment of RM < 1 per RM 1 invested for the first five years and 15 years.

The package of clinical interventions, although important in fulfilling the right to health, provides a lower return on investment of RM < 1 per RM 1 invested for the first five years. This is a frequent result in health economics because

of the high costs of medical treatment. Further, these treatment options (treatment, secondary prevention after acute events and others) have little potential to increase labour force participation after a stroke, a myocardial infarct or diabetes. Lack of a ROI does not, however, mean the absence of cost-effectiveness: these interventions may still be cost-effective in other types of economic analysis. Additionally, some of the clinical interventions still offer a positive return on investment, such as the cervical cancer control package which is expected to generate a return of RM 8.4 within 15 years.

Policy packages for salt reduction, tobacco control and promotion of physical activity are clearly the best buys, offering the highest ROI over 15 years.

6. Merging the economic analysis and the ICA by entry point

Merging of an in-depth ICA with a robust economic analysis clarified the potential for extending NCD prevention and control policy in Malaysia. Growing awareness of the diverse, system-wide causes and consequences of NCD morbidity and mortality is matched by increasing

political will to prioritize NCDs. Overall, the investment case demonstrated multiple entry points for feasible, meaningful policy solutions that are best aligned with the Malaysian political economy context and are economically feasible.

Salt reduction package intervention

Of all the intervention packages analysed, the salt-reduction package had the highest ROI: 60.06 over 15 years. Crucially, this package would have the greatest impact on population health in terms of both mortality (37 478 lives saved) and healthy life-years gained (80 265).

The entry point analysis (Table 10) is based on use of the barriers, challenges and enablers of implementation derived from the ICA component

of the investment case to evaluate political receptiveness to the salt-reduction package. The analysis showed growing recognition of the urgency of addressing the health impacts of increased salt consumption. Stakeholders also noted greater interest in salt reduction as the next key NCD policy area for Malaysia. Taken together, the ICA findings suggest a policy environment primed for implementation of the salt-reduction package.



TABLE 10. Entry point analysis summary: salt reduction

➔ Surveillance ➔ Harness industry for reformulation ➔ Adopt standards for front-of-pack labelling ➔ Adopt standards for strategies to combat misleading marketing ➔ Knowledge: education and communication ➔ Environment: salt reduction strategies in common eating spaces	
ROI (5 years): 4.50 ROI (15 years): 60.06 Overall health impact: 37 478 lives saved and 80 265 healthy life-years gained Productivity benefits (RM millions): 136.98 (5 years) vs 5 732.73 (15 years)	
Identified enablers ➔ Stakeholders identified salt reduction as the next policy focus area. ➔ Growing awareness of the dangers of salt among policy-makers and the population ➔ Fourteen products already identified for proposed reformulation due to high salt content ➔ Work under way to set a maximum salt level in soya sauce and other high-salt products ➔ The high ROI makes this policy attractive for ministers. ➔ Development of a Nutrition Act is planned, which will facilitate introduction of several nutrition-related policies.	Identified barriers ➔ Salt is a staple in many Malaysian diets and products, such as soya sauce. ➔ Reformulation is currently voluntary for industry, which may be insufficient to change product formulas. ➔ No guidelines or targets for industry reformulation ➔ Insufficient product labelling reduces consumers' capacity to make informed, healthy choices. ➔ Risk of political hesitation and differing opinions on drafting the Nutrition Act ➔ Imposition of a tax on salt is considered difficult by stakeholders.
Recommended strategies to overcome barriers ✓ Strengthen industry engagement in salt reduction to promote voluntary reformulation, or set maximum limits on the salt content of products. ✓ Develop clear guidance and targets for maximum salt and sodium levels in food categories according to WHO global benchmarks (60). ✓ Engage relevant stakeholders to prioritize and finalize the Nutrition Act. ✓ Impose front-of-pack labelling and warning labels for products with excessive salt content. ✓ Improve health literacy and education to warn about the dangers of excessive salt consumption. ✓ Stop misleading marketing of high-salt foods, including to children. ✓ Develop and initiate regulatory changes to reduce the salt content in communal eating spaces, including schools and hospitals. ✓ Ensure regular measurement and monitoring of salt intake by the Malaysian population, the dietary sources of salt and the salt content of foods. ✓ Ensure continuous monitoring of the salt and sodium content of out-of-home dining food.	

Tobacco control intervention package

Malaysia has initiated various tobacco control policies, in line with MPOWER (61). The entry point analysis indicated the political context and the significant momentum as strategic opportunities to shape further tobacco policy

reform. The tobacco control intervention offers a high ROI (5.93 over 15 years), and the total tobacco control intervention package would avert the loss of 9565 lives and result in 36 575 healthy life-years gained (Table 11).



TABLE 11. Entry point analysis summary: tobacco control

- Monitor tobacco use and prevention policies.
- Protect people from tobacco smoke.
- Offer help to quit tobacco use: mCessation.
- Warn about dangers: warning labels.
- Warn about dangers: mass media campaign.
- Enforce bans on tobacco advertising.
- Enforce restriction of access by young people.
- Raise taxes on tobacco.
- Introduce plain packaging of tobacco products.
- Offer help to quit tobacco use: brief intervention.

ROI (5 years): 1.21

ROI (15 years): 5.93

Overall health impact: 9565 lives saved and 36 575 healthy life-years gained

Productivity benefits (RM millions): 147.55 (5 years) vs 2 595.74 (15 years)



Table 11. Entry point analysis summary: tobacco control (Con't)

ICA-identified enablers	ICA-identified barriers
➔ Malaysia has already laid strong foundations for successful tobacco reforms, including adherence to MPOWER. ➔ Several strategic initiatives are being implemented to target use of e-cigarettes and vapes. ➔ Increased public awareness of the health effects of tobacco, e-cigarettes and vapes ➔ The Control of Smoking Products for Public Health Bill 2023 has been passed by Parliament. The resulting media coverage on tobacco, e-cigarettes and vapes has increased public awareness of the issue. ➔ Overall, there is strong public and political support for tobacco control policy.	➔ Significant increases in e-cigarette and vape use, particularly in the younger population, require new, innovative policy approaches. ➔ Substantial resources are required to introduce regulations and bans on vape products and to monitor compliance. Implementation of policies risks public backlash. ➔ Legal and regulatory challenges may restrict implementation. ➔ Industry interference, especially from tobacco companies that promote vapes and e-cigarettes as “harm-reduction products”, has been increasing, as reflected in Malaysia’s performance in the Global Tobacco Industry Index: Malaysia had a higher score in 2023 (76) than in 2021 (66), indicating greater industry interference. ➔ Taxation on tobacco products is regarded as a source of income for the country by certain sectors of the Government. This has been confounded by removal of nicotine from the Poisons Act.
Recommended strategies to overcome barriers	
✓ Protect the design and implementation of tobacco control policies from the tobacco industry where possible. ✓ Establish measures, such as a code of conduct, to limit interactions with the tobacco industry. If an interaction is necessary, ensure that it is transparent. ✓ Strengthen compliance with the ban on use of e-cigarettes and vapes in schools. ✓ Conduct regular surveys to collect accurate data on the use of e-cigarettes, vapes and tobacco by age and population group. ✓ Analyse retail sales data for tobacco products, e-cigarettes and vapes. ✓ Conduct research to understand the behaviour, attitudes, perceptions and growing demand for e-cigarettes and vapes of both adults and young people. ✓ Collaborate with the Ministry of Education to introduce education on the harms of e-cigarettes and vapes into the school syllabus. ✓ Raise taxes on tobacco, e-cigarettes and vapes to a minimum of 75% of the retail price. ✓ Develop behaviour-informed national educational campaigns that target e-cigarette and vape users, especially children and young people.	

Physical activity intervention package

Physical activity has been increasing steadily among Malaysians; however, women, lower income groups and rural populations still face significant, complex barriers to engaging in physical activity and, as a result, are likely to be physically inactive. Although larger, systemic issues are the root causes of physical inactivity, the current policy tends to emphasize

individual responsibility rather than the broader determinants of physical (in)activity. The ICA indicates that significant work remains to be done to foster a systems-based approach to physical activity, although this is currently not a priority. The physical activity package offers a high ROI (6.64 over 15 years) would result in 22 673 healthy life-years gained (Table 12).



TABLE 12. Entry point analysis summary: physical activity

→ Physical inactivity: Awareness campaigns to encourage increased physical activity → Physical inactivity: Brief advice as part of routine care	
ROI (5 years): 1.40 ROI (15 years): 6.64 Overall health impact: 3255 lives saved and 22 673 healthy life-years gained Productivity benefits (RM millions): 96.01 (5 years) vs 1 612.46 (15 years)	
ICA-identified enablers → The <i>National Strategic Plan for Active Living</i> has been included in the <i>Agenda Nasional Malaysia Sihat</i>, or the <i>Healthy Malaysia National Agenda</i>, a whole-of-nation approach for 2020–2030 with the involvement of agencies, nongovernmental and private sectors. → Ministry of Health collaboration with other sectors in physical activity initiatives (e.g. the Ministry of Education, Ministry of Youth and Sports, community clubs and organizations) could be increased.	ICA-identified barriers → Lack of a systems-based approach to physical activity → Many system-wide barriers prevent some people (e.g. women and low-income individuals) from being physically active. → Political will appears to be low to average. → Weak cross-sectoral collaboration, which is necessary in view of the nature of physical activity (including infrastructure and school and workplace engagement) → Insufficient funding for focused, systematic approaches for specific population groups
Recommended strategies to overcome barriers ✓ Emphasize a systems-based approach to physical activity. ✓ Ensure cross-sector stakeholder collaboration. ✓ Improve the environments and infrastructure for physical activity, and remove systemic barriers to participation. ✓ Incorporate recommendations from WHO global action plans on physical activity. ✓ Raise public awareness and encourage tax relief for purchase or rental of sports equipment, entry fees to sport facilities and fees for registration in sports competitions.	

Cervical cancer intervention package

Cervical cancer is currently the third most common cancer in women in Malaysia. The ROI (8.40 over a 15-year period) for the cervical cancer package is higher than those of other clinical intervention packages. The overall impact on the health of the population is significant,

as the package would avert the loss of 10611 lives. Release of the *National Strategic Plan for Cancer Control Programme* (34) and previous work to increase HPV vaccination in schools highlight growing awareness of the importance of addressing cervical cancer (Table 13).



TABLE 13. Entry point analysis summary: cervical cancer intervention

→ HPV DNA test → Papanicolaou test (Pap smear) → Cryotherapy → Loop electrosurgical excision procedure → Cervical cancer treatment: stage I → Cervical cancer treatment: stage II → Cervical cancer treatment: stage III → Cervical cancer treatment: stage IV → Post-treatment surveillance for cervical cancer → Basic palliative care for cervical cancer → Extended palliative care for cervical cancer	
ROI (5 years): 1.01 ROI (15 years): 8.40 Overall health impact: 10 611 lives saved and 93 470 healthy life-years gained Productivity benefits (RM millions): 115.32 (5 years) vs 6 483.79 (15 years)	
ICA-identified enablers → Release of the NSPCCP has created momentum and awareness, especially for early diagnosis and screening in women's health clinics. → Malaysia is firmly committed to the 90-70-90 target in the <i>Action Plan towards the Elimination of Cervical Cancer in Malaysia 2021–2030</i> (36).	ICA-identified barriers → HPV vaccination programme stopped due to high vaccine prices and school closures during the COVID-19 pandemic.
Recommended strategies to overcome barriers ✓ Resume HPV vaccination programmes (as possible) in accordance with WHO recommendations (61), and increase awareness of preventive measures. ✓ Ensure regular research and data collection on the prevalence of cervical cancer, including through electronic health records and the National Cervical Cancer Registry. ✓ Build on the momentum created by the <i>Health White Paper</i> and other strategic plans. ✓ Scale up HPV testing, including improving access to screening facilities to meet the requirements of different populations according to WHO recommendations (62, 63). ✓ Ensure effective governance to promote and oversee effective implementation of the <i>Action Plan towards the Elimination of Cervical Cancer in Malaysia 2021–2030</i>. ✓ Ensure a midterm evaluation of the Action Plan.	

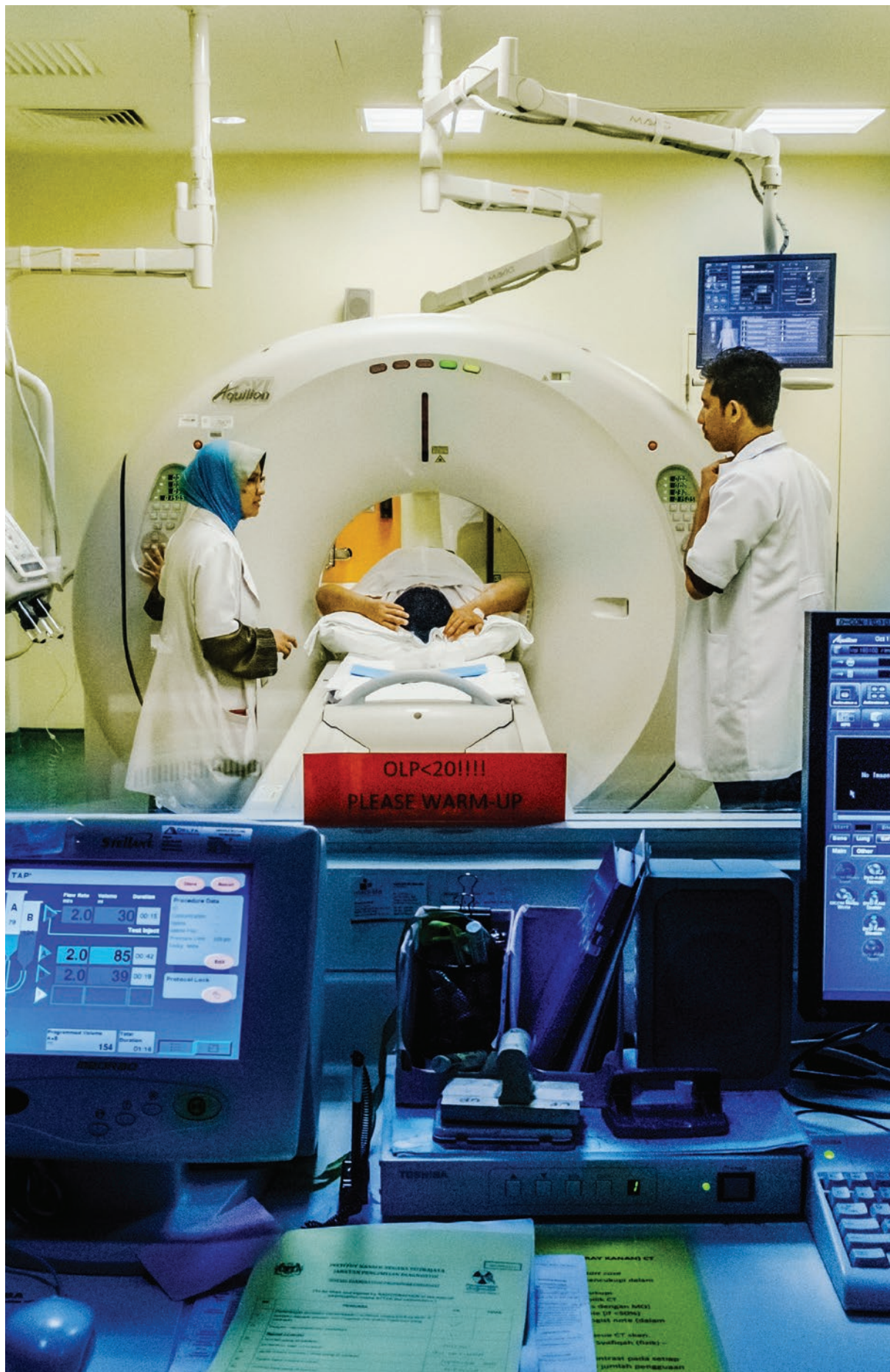
Breast cancer intervention package

Breast cancer is currently the most common cancer in women across Malaysia. As with other clinical intervention packages, the ROI (1.13 over 15 years) for the breast cancer package is lower than those of other non-clinical intervention packages. Again, this is due to the economic costs associated with clinical

interventions, and health system improvement is a prerequisite. The overall impact on the health of the population is, however, significant, as the breast cancer package would avert the loss of 37 780 lives and result in 54 567 healthy life-years gained (Table 14).

TABLE 14. Entry point analysis summary: breast cancer intervention

→ Basic breast cancer awareness → Screening: clinical breast examination → Screening: mammography → Diagnosis: screening and a clinical breast examination → Diagnosis: screening and a mammogram → Breast cancer treatment: stage I → Breast cancer treatment: stage II → Breast cancer treatment: stage III → Breast cancer treatment: stage IV → Trastuzumab → Post-treatment surveillance of breast cancer patients → Basic palliative care for breast cancer → Extended palliative care for breast cancer	
ROI (5 years): 0.25 ROI (15 years): 1.13 Overall health impact: 37 780 lives saved and 54 567 healthy life-years gained Productivity benefits (RM millions): 168.04 (5 years) vs 3854.11 (15 years)	
ICA-identified enablers → Release of the NSPCCP created momentum and raised awareness, especially in early diagnosis and screening in women's health clinics.	ICA-identified barriers → Fragmentation among stakeholders and in the political environment can make it difficult to gain buy-in for an intervention with a low ROI.
Recommended strategies to overcome barriers ✓ Ensure regular research and data collection on the prevalence of breast cancer, including from electronic health records. ✓ Build on the momentum created by the <i>Health White Paper</i> and other strategic plans. ✓ Increase access to screening facilities. ✓ Ensure effective governance to promote and oversee effective implementation of the Action Plan for the NSPCCP. ✓ Ensure a midterm evaluation of the Action Plan for the NSPCCP.	



Colorectal cancer intervention package

The prevalence of colorectal cancer has been increasing in Malaysia, and it currently contributes significantly to mortality. As for other clinical intervention packages, the ROI for the colorectal cancer package is lower (0.61 over a 15-year period) than those of non-clinical intervention packages. The overall impact

on the health of the population is, however, significant, as it would avert the loss of 26 775 lives. The health benefits of the intervention and the release of the *National Strategic Plan for Colorectal Cancer 2021–2025* indicate that the context would be receptive to the colorectal intervention package (Table 15).

TABLE 15. Entry point analysis summary: colorectal cancer intervention

➔ Screening: faecal immunochemical test ➔ Screening: colonoscopy ➔ Diagnosis of colorectal cancer screened with a faecal immunochemical test ➔ Diagnosis of colorectal cancer screened by sigmoidoscopy ➔ Colorectal cancer treatment: stage I ➔ Colorectal cancer treatment: stage II ➔ Colorectal cancer treatment: stage III ➔ Colorectal cancer treatment: stage IV ➔ Post-treatment surveillance for colorectal cancer ➔ Basic palliative care for colorectal cancer ➔ Extended palliative care for colorectal cancer	
ROI (5 years): 0.32 ROI (15 years): 0.61 Overall health impact: 26 775 lives saved and 12 797 healthy life-years gained Productivity benefits (RM millions): 114.65 (5 years) vs 926.00 (15 years)	
ICA-identified enablers ➔ Release of the <i>National Strategic Plan for Colorectal Cancer 2021–2025</i> has generated political momentum and raised awareness. ➔ Release of the NSPCCP has created momentum and raised awareness.	ICA-identified barriers ➔ Fragmentation among stakeholders and within the political environment can make it difficult to gain buy-in for an intervention with a low ROI.
Recommended strategies to overcome barriers ✓ Ensure regular research and data collection on the prevalence of colorectal cancer. ✓ Build on the momentum created by the <i>Health White Paper</i> and other strategic plans. ✓ Ensure effective governance to promote and oversee effective implementation of the <i>National Strategic Plan for Colorectal Cancer 2021–2025</i>. ✓ Conduct a mid-term evaluation of the <i>National Strategic Plan for Colorectal Cancer 2021–2025</i>.	



Cardiovascular disease and diabetes intervention package

CVDs, particularly ischaemic heart disease, are currently the leading cause of mortality in Malaysia. Therefore, addressing CVDs should be a high priority. Currently, there is no strategy or policy specific to CVDs, which is a policy gap that could be filled by the CVD and diabetes intervention package. As for other clinical

intervention packages, the ROI (0.23 over 15 years) for the CVD and diabetes package is lower than those of other non-clinical intervention packages. The overall impact on the health of the population is, however, significant, as it results in 99 646 healthy life-years gained and 25 925 lives saved (Table 16).

TABLE 16. Entry point analysis summary: CVD and diabetes intervention

➔ Screening for risk of CVD and diabetes ➔ Follow-up care for people at low risk of CVD and diabetes (absolute risk: 10–20%) ➔ Treatment for people with very high cholesterol but low absolute risk for CVD and diabetes (< 20%) ➔ Treatment for people with high blood pressure but a low absolute risk of CVD or diabetes (< 20%) ➔ Intensive glycaemic control ➔ Screening for retinopathy and photocoagulation	
ROI (5 years): 0.19 ROI (15 years): 1.10 Overall health impact: 25 925 lives saved and 99 646 healthy life-years gained Productivity benefits (RM millions): 413.13 (5 years) vs 7 058.52 (15 years)	
ICA-identified enablers ➔ Lack of a CVD-specific policy or strategy provides an opportunity to create an innovative policy. ➔ The significant health impact of CVD and diabetes may encourage political action. ➔ Success of the National Health Screening Initiative ➔ Availability of the National Diabetes Registry for data collection	ICA-identified barriers ➔ Fragmentation among stakeholders and in the political environment can make it difficult to gain buy-in for an intervention with a low ROI.
Recommended strategies to overcome barriers ✓ Ensure regular research and data collection on the prevalence of CVD and diabetes, including through electronic health records. ✓ Consider drafting a CVD-specific and/or a diabetes-specific action plan for Malaysia that addresses policy and regulations, delivery of high-quality care at all levels and patient factors for control of CVD and diabetes.	



Respiratory disease clinical intervention package

Although the respiratory disease intervention package yields a lower ROI (0.23 over 15 years) than the intervention packages cited above, it has the second highest health impact in terms of averted mortality (34 984 lives saved) and results in 23 820 healthy life-years gained. The lower ROI for clinical interventions than for non-clinical interventions is due to the expense associated with the improvements to the health system necessary to make these interventions effective.

Despite the low ROI, this intervention would add many healthy life-years to the population and save thousands of lives. From a public health perspective, this intervention has significant policy potential and should be a high priority for decision-makers. The ICA findings indicate some fragmentation of Malaysia's political environment, often resulting in difficulty in gaining stakeholder buy-in when the ROI is low, despite the health benefits (Table 17).

TABLE 17. Entry point analysis summary: respiratory disease intervention

➔ Asthma: inhaled short-acting beta agonist (SABA) for intermittent asthma ➔ Asthma: low-dose inhaled beclometasone + SABA ➔ Asthma: high-dose inhaled beclometasone + SABA ➔ Asthma: theophylline + high-dose inhaled beclometasone + SABA ➔ Asthma: oral prednisolone + theophylline + high-dose inhaled beclometasone + SABA ➔ COPD: smoking cessation ➔ COPD: inhaled salbutamol ➔ COPD: low-dose oral theophylline ➔ COPD: ipratropium inhaler ➔ COPD: treatment of exacerbation with antibiotics ➔ COPD: treatment of exacerbation with oral prednisolone ➔ COPD: treatment of exacerbation with oxygen	
ROI (5 years): 0.12 ROI (15 years): 0.23 Overall health impact: 34 984 lives saved and 23 820 healthy life-years gained Productivity benefits (RM millions): 220.32 (5 years) vs 1 744.98 (15 years)	
ICA-identified enablers ➔ Increased awareness of respiratory diseases due to increased awareness of the health impact of tobacco, e-cigarettes and vapes	ICA-identified barriers ➔ Gaining buy-in for the low ROI may be a challenge. ➔ Lack of up-to-date, reliable data on the prevalence of respiratory diseases
Recommended strategies to overcome barriers ✓ Ensure regular research and data collection on the prevalence of respiratory disease. ✓ Build on the momentum created by the Health White Paper and other strategic plans. ✓ Adoption of 2021 WHO Ambient Air Quality Guidelines	



Alcohol intervention package

The alcohol intervention package has both a low ROI (0.01 over 15 years) and a relatively low overall impact on the health of the population. Because of the cultural and religious context of Malaysia, alcohol consumption by the population is relatively low, although the practices of heavy episodic and risky drinking are increasing. The environment is not conducive for a population-level alcohol package, and any policy that is implemented should target those who engage in heavy episodic and/or risky drinking (Table 18).



TABLE 18. Entry point analysis summary: alcohol intervention

➔ Hazardous alcohol use: Enforce restrictions on availability of retailed alcohol ➔ Hazardous alcohol use: Enforce restrictions on alcohol advertising ➔ Hazardous alcohol use: Enforce drunk-driving laws (sobriety checkpoints) ➔ Hazardous alcohol use: Raise taxes on alcoholic beverages ➔ Screening and brief intervention for hazardous and harmful alcohol use	
ROI (5 years): 0.00 ROI (15 years): 0.01 Overall health impact: 120 lives saved and 240 healthy life-years gained Productivity benefits (RM millions): 0.98 (5 years) vs 23.98 (15 years)	
ICA-identified enablers ➔ High alcohol tax already in place ➔ Alcohol use is not common in Malaysia due to religious and cultural norms.	ICA-identified barriers ➔ Little political will because of low alcohol use in Malaysia ➔ Little public support ➔ A targeted approach should be used for specific population groups, such as heavy episodic drinkers and risky drinkers
Recommended strategies to overcome barriers ✓ Any policy that is implemented should target heavy episodic and risky drinking rather than the general population.	

7. Conclusions and recommendations

In addition to the intervention packages recommended above, additional, broader recommendations should be implemented to target the wider determinants of NCDs.

Strengthen the whole-of-system approach to address NCDs

A main priority for Malaysia is adoption of a whole-of-system approach to NCDs. One of the barriers identified during the ICA component of the investment case was the siloed approach to NCDs, which leads to policies that emphasize individual behaviour change rather than addressing the drivers of NCDs that often lie beyond individual control, especially for marginalized populations. To reduce inequity in NCDs in Malaysia, a health-in-all policies approach should be fostered to target the conditions that contribute to NCDs, in addition to interventions that target individual behaviour. As this approach comprises systemic determinants of NCDs, implementation of interventions should not be the sole responsibility of the Ministry of Health and will require stewardship and sustained commitment from the highest levels of Government to be effective.

Operationalize the Health White Paper

Effective, sustainable NCD prevention and control require an equitable, strong, functioning health system. The four strategic pillars of health system reform outlined in the *Health White Paper* should be priorities. Pillar 2, to advance health promotion and disease prevention, is particularly relevant to NCD prevention and

control (30). To advance this pillar, the bottom-up, whole-of-system approach described above should be applied to ensure equitable implementation and avoid focusing on individual behaviour change. In addition, Pillar 1 is crucial for many of the clinical intervention packages cited above, as it prioritizes PHC and extended services, which are pivotal for the success of the clinical intervention packages. Overall, the findings of this investment case provide further guidance for operationalizing aspects of the *Health White Paper*.

Organize meaningful community engagement, and use a bottom-up approach

Many stakeholders considered that the approaches, interventions and policies for NCDs had a top-down design that was unsuitable for real communities. Therefore, Malaysia should prioritize and promote a bottom-up approach to NCD prevention and control, including meaningful engagement with the people at greatest risk of NCDs and not seeing them as mere recipients of interventions but increasing their agency over their health. Decision-makers should thus promote participatory methods for active involvement of communities in policy design, implementation and evaluation. Malaysia should consider establishing formal mechanisms for engagement with nongovernmental organizations and civil society to activate and build on local assets to ensure the success and sustainability of interventions. It is also important to address the barriers to

engagement, so that all individuals are equally and collectively involved in their health.

Improve implementation, particularly monitoring and evaluation

A consistent challenge to the Malaysian health system that was found in this research is inefficient implementation of NCD interventions and policies, partly because policies and interventions often lack sufficient monitoring and evaluation plans. As a result, policy-makers cannot learn from any failures and cannot monitor the impact of interventions, especially among different population groups over time. It is recommended that decision-makers prioritize and ensure resources for sufficient monitoring and evaluation plans. They could also consider promoting and supporting high-quality research and development, which is one of the objectives of the National Strategic Plan for NCDs. Both monitoring and evaluation strategies and cost analyses are lacking, although they are essential to inform policy-making.

Increase funding and resources for NCDs, with a focus on capacity-building

Many stakeholders reported that lack of adequate funding and resources for NCD prevention and control was a central barrier to improving implementation. Malaysian officials should ensure that funding allocations are better aligned with the scale of action required to target NCDs and that the resources are sufficient to drive change. Investment in the health system could be increased gradually to 5% of Malaysia's GDP (as outlined in Pillar 3 of the *Health White Paper*) and a framework developed to ensure that adequate funding is earmarked for NCD prevention and control.

Prevent industry interference, and promote transparent partnerships and dialogue

Another challenge identified in the ICA was the interference of industry in policy-making. This should be prevented wherever possible, especially when engaging with industry. Several guidelines have been published to prevent interference by the tobacco and other industries, including guidance in the *WHO Framework Convention on Tobacco Control* on preventing tobacco and other industry interference, such as in food and alcohol, documented in the Model Policy of the UNIATF and WHO (64). The recommendations include establishing mechanisms and measures between government ministries and industry to ensure that any interactions are strategic, transparent and documented and protecting the design and implementation of NCD control and prevention policies from industry whenever possible.

Promote equity

Arguably, one of the most important priorities for Malaysia is to promote equity in all aspects of policy and in NCD prevention and control. Any policy that is implemented should account for and evaluate its impact on all population groups, especially marginalized and vulnerable groups, and raise any barriers those groups may face in engaging in and benefitting from the policy. Malaysia's response to NCD prevention and control will be strengthened by ensuring that all population groups can participate equitably within and beyond the health system.

Most importantly, as highlighted in this report, poverty alleviation and improvement

of socioeconomic conditions are essential for prevention and control of NCDs. The increases in the Malaysian economy have not been distributed equitably in the population, resulting in significant income disparities. As a result, poverty remains a significant challenge

in Malaysia and a wider determinant of NCDs in the population. This is reflected in growing food insecurity in the population, which increases the risk of NCDs. Significant work is necessary to ensure poverty alleviation, income equality and food security as national priorities in Malaysia.

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Annexes

Annex 1. NCD interventions costed with the OneHealth Tool

CVD and diabetes

- Screening for risk for CVD and diabetes
- Follow-up care for people at low risk of CVD or diabetes (absolute risk: 10–20%)
- Treatment for people with very high cholesterol but a low absolute risk of CVD or diabetes (< 20%)
- Treatment for people with high blood pressure but a low absolute risk of CVD or diabetes (< 20%)
- Intensive glycaemic control
- Retinopathy screening and photocoagulation

Breast cancer

- Basic breast cancer awareness
- Screening: Clinical breast examination
- Screening: Mammography
- Diagnosis: Screened with clinical breast examination
- Diagnosis: Screened with mammogram
- Breast cancer treatment: stage I
- Breast cancer treatment: stage II
- Breast cancer treatment: stage III
- Breast cancer treatment: stage IV
- Trastuzumab
- Post-treatment surveillance for breast cancer patients
- Basic palliative care for breast cancer
- Extended palliative care for breast cancer

Cervical cancer

- HPV DNA test
- Papanicolaou test (Pap smear)
- Cryotherapy
- Loop electrosurgical excision procedure

- Cervical cancer treatment: stage I
- Cervical cancer treatment: stage II
- Cervical cancer treatment: stage III
- Cervical cancer treatment: stage IV
- Post-treatment surveillance for cervical cancer
- Basic palliative care for cervical cancer
- Extended palliative care for cervical cancer

Colorectal cancer

- Screening: Faecal immunochemical test
- Screening: Colonoscopy
- Diagnosis of colorectal cancer screened with faecal immunochemical test
- Diagnosis of colorectal cancer screened by sigmoidoscopy
- Colorectal cancer treatment: stage I
- Colorectal cancer treatment: stage II
- Colorectal cancer treatment: stage III
- Colorectal cancer treatment: stage IV
- Post treatment surveillance for colorectal cancer
- Basic palliative care for colorectal cancer
- Extended palliative care for colorectal cancer

Respiratory disease

- Asthma: Inhaled short-acting beta agonist for intermittent asthma
- Asthma: Low-dose inhaled beclometasone + SABA
- Asthma: High-dose inhaled beclometasone + SABA
- Asthma: Theophylline + high-dose inhaled beclometasone + SABA

- Asthma: Oral prednisolone + theophylline + high-dose inhaled beclometasone + SABA
- COPD: Smoking cessation
- COPD: Inhaled salbutamol
- COPD: Low-dose oral theophylline
- COPD: Ipratropium inhaler
- COPD: Treatment of exacerbation with antibiotics
- COPD: Treatment of exacerbation with oral prednisolone
- COPD: Treatment of exacerbation with oxygen

Policy interventions – population level

Tobacco

- Tobacco: Monitor tobacco use and prevention policies
- Tobacco: Protect people from tobacco smoke
- Tobacco: Offer to help quit tobacco use: mCessation
- Tobacco: Warn about danger: Warning labels
- Tobacco: Warn about danger: Mass media campaign
- Tobacco: Enforce bans on tobacco advertising
- Tobacco: Enforce restriction of access by young people
- Tobacco: Raise taxes on tobacco
- Tobacco: Plain packaging of tobacco products
- Offer to help quit tobacco use: Brief intervention

Alcohol

- Hazardous alcohol use: Enforce restrictions on availability of retailed alcohol
- Hazardous alcohol use: Enforce restrictions on alcohol advertising
- Hazardous alcohol use: Enforce drunk-driving laws (sobriety checkpoints)
- Hazardous alcohol use: Raise taxes on alcoholic beverages
- Screening and brief intervention for hazardous and harmful use of alcohol

Physical activity

- Physical inactivity: Awareness campaigns to encourage more physical activity
- Physical inactivity: Brief advice as part of routine care

Sodium

- Sodium: Surveillance
- Sodium: Advocate with industry for reformulation
- Sodium: Adopt standards: Front-of-pack labelling
- Sodium: Adopt standards: Strategies to combat misleading marketing
- Sodium: Knowledge: Education and communication
- Sodium: Environment: Salt-reduction strategies in communal eating spaces

Annex 2. Limitations of the economic analysis

As noted throughout this report, the method for making investment cases has several limitations. It does not include all NCDs and their risk factors, nor does it capture all productivity losses associated with NCD-associated morbidity and mortality, such as unpaid productivity or reduced productivity as a result of drunkenness or road traffic injuries. It focuses on the four major NCD categories and workplace productivity losses, as these are simpler to estimate.

Moreover, the investment case model estimates only health-care treatment costs and not other direct costs associated with NCDs, such as non-medical costs (e.g. transport to a health provider, foregone wages of carers) and retirement benefits, nor does it include intangible costs, such as care provided by relatives and quality of life.

Readers should not interpret this cost-benefit analysis as a budget costing exercise. The estimated costs of the interventions are not based on current actual expenditure on nor the potential benefits already arising from these interventions when they are partially implemented. Moreover, interventions for which evidence of benefits was lacking were excluded from the analysis. On the benefits side, the model does not estimate reductions in direct health-care costs for treating prevented NCDs.

These limitations imply that the estimates made with the model are conservative and that both the burden of NCDs and the benefits of investing in NCD prevention and control are higher than those that are estimated.

