

HEALTH EVIDENCE NETWORK SYNTHESIS REPORT 58

What national and subnational interventions and policies based on Mediterranean and Nordic diets are recommended or implemented in the WHO European Region, and is there evidence of effectiveness in reducing noncommunicable diseases?

Jessica Renzella | Nick Townsend | Jo Jewell | João Breda | Nia Roberts | Mike Rayner | Kremlin Wickramasinghe



The Health Evidence Network

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Abstract

This review focuses on national and subnational Mediterranean diet (MD) and Nordic diet (ND) interventions and policies in the WHO European Region. In the context of increasing noncommunicable disease (NCD) burden and unhealthy diets, there is a need to continue identifying optimal, evidence-informed diets and interventions for the prevention and control of NCDs. The MD and ND have been identified as region-specific healthy diets. To support decision-makers in shaping context-specific diet and nutrition policies, this review provides a summary of the NCD burden and activities in the Region; outlines the NCD-related health benefits of the MD and ND; describes interventions and policies in 15 countries; reviews four identified studies into the effectiveness of MD and ND policies on NCD outcomes; and discusses policy implications and options. In the context of MD and ND interventions for NCDs, there remains a Region-wide need to increase translation of evidence into action, monitor and evaluate the impact of existing policies on NCD outcomes and share activities through public platforms to support information sharing.

Keywords

DIET – METHODS, DIET – MEDITERRANEAN, FOOD, CHRONIC DISEASE – PREVENTION AND CONTROL, HEALTH PROMOTION, HEALTH POLICY, NUTRITION POLICY

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ABBREVIATIONS

CVD	cardiovascular diseases
EPIC	European Prospective Investigation into Cancer and Nutrition
FAO	Food and Agriculture Organization of the United Nations
FBDG	food-based dietary guidelines
MD	Mediterranean diet
NCD	noncommunicable disease
ND	Nordic diet
NND	New Nordic Diet
NNR	Nordic nutrition recommendations
PREDIMED	Prevención con Dieta Mediterránea [Prevention with the Mediterranean Diet] (study)
SDG	Sustainable Development Goal
SMART	specific, measurable, achievable, relevant and time bound (policy)

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SUMMARY

The issue

Noncommunicable diseases (NCDs) are currently the leading cause of death globally. Of the six WHO regions, the WHO European Region is most affected by NCDs. The European Food and Nutrition Action Plan 2015–2020 aims to reduce preventable diet-related NCDs and all other forms of malnutrition prevalent in the Region through a whole-of-government, health-in-all-policies approach. It outlines a set of priority actions that contribute to improved food system governance, and population diet and nutritional status. Studies have established the health-promoting properties of two European diets: the Mediterranean diet (MD) and the Nordic diet (ND). However, guidance is lacking on how to effectively translate the health benefits of these diets into specific, measurable and achievable policies and interventions for improving dietary behaviour at the population level.

The synthesis question

To allow decision-makers to shape national and regional policies, this report will synthesize the best available evidence to create a comprehensive picture of national and subnational policies and interventions based on the MD and ND within the WHO European Region in order to address the following question: “What national and subnational interventions and policies based on Mediterranean and Nordic diets are recommended or implemented in the WHO European Region, and is there evidence of effectiveness in reducing noncommunicable diseases?”

Types of evidence

Evidence was obtained by a review (scoping and systematic) of the academic and grey literature, including official documents available from the websites of ministries of health and national health institutes. A total of 27 dietary guidelines, interventions, policies and programmes and four articles on intervention effectiveness were considered for this review.

Results

A total of 15 countries in the WHO European Region currently recommend or implement MD or ND policies, interventions or programmes based on the health evidence supporting these diets and, in some cases, the cultural significance of these diets. Many countries have created policies and guidelines independently;

in contrast, the Nordic countries demonstrate collaborative policy-making through the Nordic nutrition recommendations (NNR), the Keyhole nutrition label scheme/ Finnish Heart symbol and the New Nordic Food programme. However, the impact of MD and ND policies and interventions in the Region is not well defined.

This review:

- identified 13 countries within the Region with food-based dietary guidelines (FBDG) based on the MD or ND;
- identified different types of programme and intervention (country specific and regional) based on the MD or ND;
- found that most countries have not developed a validated system or tool to assess the impact of adherence to these guidelines on NCD outcomes, or monitored and evaluated the impact of programmes and policies on NCD outcomes; and
- identified four academic papers that assessed the impact of MD- or ND-based national guidelines, recommendations or pyramids on NCDs, providing examples of adaptable tools and methods for assessing the health impact of dietary guidelines.

Policy considerations

The Food and Agriculture Organization of the United Nations (FAO) and WHO have actively promoted the concept of FBDG since 1992. Despite this, identifying an optimal diet for disease prevention and developing evidence-informed, appropriate and practical nutritional advice remains an important challenge for policy-makers. There is evidence of clear health benefits for both the MD and ND. Therefore, action is needed to (i) translate this evidence into policies and interventions on diet and nutrition and (ii) monitor and evaluate the impact of these policies on NCDs. The main policy options suggested from the review for consideration by the WHO European Region Member States are to:

- consider the existing MD and ND based dietary guidelines for either adoption or enhancement of the existing nutrition policies;
- access and make use of adaptable evaluation tools and methods as well as evaluation results through a shared, publicly accessible platform;
- monitor and evaluate the effectiveness of MD and ND policies and interventions on NCD outcomes and promote implementation research to improve and scale up interventions; and
- take into account the cultural contexts of health and existing culinary traditions in formulating and implementing MD or ND policies.



1. INTRODUCTION

1.1. Background

1.1.1. NCDs in the WHO European Region

NCDs are currently the leading cause of death globally, responsible for 68% of the total deaths and 16 million premature deaths (i.e. those occurring before the age of 70 years) each year (1). The four main types are cancer, cardiovascular diseases (CVD; including heart attack and stroke), chronic respiratory disease (e.g. asthma, chronic obstructive pulmonary disease) and diabetes (2). The number of deaths from NCDs is projected to increase from 38 million worldwide in 2012 to 52 million by 2030 (3). Following the first High-level Meeting of the General Assembly on the Prevention and Control of Noncommunicable Diseases in 2011, governments declared a commitment to reducing NCD risk factors and creating health-promoting environments by introducing policies and actions aimed at promoting healthy diets (4). In 2013, WHO produced a NCD Global Monitoring Framework that included nine global targets for 2025 (against a 2010 baseline), of which target 7 is to “halt the rise in diabetes and obesity” (5,6). The 2030 Agenda for Sustainable Development also recognizes the global impact of NCDs, setting a target to reduce premature deaths from NCDs by one third by 2030 (Sustainable Development Goal (SDG) target 3.4) (7).

Of the six WHO regions, the WHO European Region is the one most affected by NCDs. The prevalence and associated mortality for NCDs are high across all 53 Member States of the WHO European Region for which data are available, despite differences in their economic, social and political conditions (8). The four main types of NCDs account for an estimated 86% of deaths and 77% of disease burden in this Region. In 2012, Health 2020 was adopted by all Member States of the Region with the aim to “significantly improve the health and well-being of populations, reduce health inequalities, strengthen public health, and ensure people-centred health systems that are universal, equitable, sustainable, and of high quality” (9). Inspired by the Health 2020 vision, the European Food and Nutrition Action Plan 2015–2020 focuses on reducing preventable diet-related NCDs and all other forms of malnutrition prevalent in the Region (10). It calls for a whole-of-government, health-in-all-policies approach, and it outlines a set of priority actions that contribute to improved food system governance, and population diet and nutritional status.

The key objectives of the European Food and Nutrition Action Plan 2015–2020 (10) are to:

- create healthy food and drink environments;
- promote the gains of a healthy diet throughout the life-course, especially for the most vulnerable groups;
- reinforce health systems to promote healthy diets;
- support surveillance, monitoring, evaluation and research; and
- strengthen governance, intersectoral alliances and networks for a health-in-all-policies approach.

Together, these initiatives have created positive momentum for reducing NCDs in the lead-up to the third High-level Meeting of the General Assembly on Noncommunicable Diseases in 2018.

Despite the overwhelming and increasing burden of NCDs, a mere 10% of global health financing is directed towards NCD-related programmes. This trend is reflected in the Region, with most Member States allocating limited funds for NCD prevention and health promotion activities. More encouragingly, however, 97% of health ministries have a NCD prevention and control unit or department (11). Investment in NCD prevention is important because 80% of premature heart disease, stroke and type 2 diabetes cases is preventable (2).

The biggest killers in the Region, cancer and CVD, are both influenced by unhealthy diets. The leading risk factors for diet-related NCDs are excess consumption of unhealthy fats, sugar and salt and low consumption of fresh fruit and vegetables. These NCDs accounted for 27% of all deaths in the Region in 2015 (12). National surveys in most European countries indicate excessive fat intake, low fruit and vegetable intake, and increasing rates of overweight and obesity (10). In 2011, governments made a commitment to reducing NCD risk factors, creating health-promoting environments and strengthening national policies in the Political Declaration of the High-level Meeting of the General Assembly on the Prevention and Control of Noncommunicable Diseases (4). Health-promoting activities based on diet and nutrition are now widespread throughout the Region (13,14). The recent release of the European Food and Nutrition Action Plan 2015–2020 (10), the announcement of the United Nations Decade of Action on Nutrition (15) and the subsequent increase in global attention may further increase the volume, capacity and funds for these and related activities to effectively tackle diet-related NCDs.



NCD rates are rising in low- and high-income countries alike (8). No country has reduced obesity rates in the past 33 years (16). This poses a significant economic burden: CVD costs European Union countries €169 billion; cancer costs €124 billion annually; and obesity accounts for 2–8% of overall health costs (17). Moreover, global issues such as climate change, conflict, migration and political instability threaten to exacerbate NCD morbidity and mortality rates.

Obesity and type 2 diabetes. Obesity rates are high or increasing worldwide and no country is on track to achieve voluntary target 7 of the NCD Global Monitoring Framework (5); Iceland and Malta are the only two European countries on course to halt the rise in type 2 diabetes; and Liechtenstein, Monaco and San Marino have no data available on overweight, obesity and type 2 diabetes (18).

Conflict and migration. The risks associated with population movement from regions of conflict both predispose individuals to developing NCDs and worsen pre-existing chronic conditions (19,20). The associated psychological stress, reproductive health issues, drug and alcohol abuse, interruption of health services, food insecurity and nutrition disorders all increase NCD vulnerability.

Climate change. Climate change poses a catastrophic risk to human health by exacerbating the global burden of NCDs (21,22). Of note is the threat that climate change poses to healthy food systems. Unpredictable and unfavourable weather patterns threaten food security, most notably the availability and cost of health-promoting fresh fruits and vegetables (22,23).

Political instability. A unified, whole-of-government approach to NCD prevention is the best way to ensure sustained and stable funding, resources and public health and research priorities (4). Therefore, political instability can threaten efforts to reduce the NCD burden.

Population ageing. Populations are ageing rapidly worldwide but increased longevity is not always accompanied by good health. Although older people contribute to society in many ways, an ageing population increases the burden on health care systems. For example, it is estimated that over 75 million people will be living with dementia in 2030, and this figure expected to triple by 2050 (24).

The added strain of these issues on already overburdened health care systems creates an uncertain and unsustainable future for NCD health care. Therefore,

further investment in promoting healthy diets to improve health and well-being will, in turn, help in preventing NCDs.

1.1.2. MD and ND have beneficial effects against NCDs

Unhealthy diet is the leading cause of ill health globally (2) and a major modifiable risk factor for NCDs, notably cancer, CVD and type 2 diabetes (25). The health-promoting properties of two indigenous diets have been studied extensively: the MD (26) and the ND (27–31). As both diets have gained in popularity (10), they have captured the attention of mainstream media and entered the language of the general population.

The traditional MD originated in the olive-growing areas of the Mediterranean region and has a strong cultural association with these areas. Various definitions have developed as the MD has been adopted beyond the Mediterranean region and become increasingly medicalized as both a treatment and a prevention intervention (32). Despite these variations, the MD remains based on fresh, seasonal and local food (33). In accordance with the MD pyramid (as recommended by the Mediterranean Diet Foundation; Fig. 1), the diet is characterized by a high intake of plant-based foods (fruit, vegetables, nuts and cereals) and olive oil; a moderate intake of fish and poultry; a low intake of dairy products (principally yoghurt and cheese), red meat, processed meats and sweets (for which fresh fruit is often substituted); and a moderate wine intake, normally consumed with meals (34). Social and cultural factors closely associated with the traditional MD, including shared eating practices, post-meal siestas (afternoon naps) and lengthy meal times, are also thought to contribute to the attributed positive health effects recorded in the Mediterranean region (33). The recommendation to practise conviviality (i.e. the quality of being friendly and lively) continues to form part of the modern-day MD pyramid (35). In 2010, the MD in Croatia, Cyprus, Greece, Italy, Morocco, Portugal and Spain was inscribed on the United Nations Educational, Scientific and Cultural Organization's Representative List of the Intangible Cultural Heritage of Humanity (36).

The MD is inversely associated with all-cause mortality (26) and has been linked to numerous health benefits, including a lower incidence of cancer (37), cognitive disease (38) and CVD (39), as well as for metabolic syndrome, obesity and type 2 diabetes (34,40). Despite abundant literature in this field, the most widely researched health benefits of the MD relate to CVD, reflecting the high global burden (12). Research suggests that the following NCDs and intermediate risk factors can be reduced, prevented or treated by the MD.

Cancer. Strict adherence to the MD is significantly associated with a lower risk of all-cause cancer mortality, specifically breast, colorectal, gastric, head and neck, and prostate cancer (37). Reinforcing the importance of dietary factors in gastric carcinogenesis, the European Prospective Investigation into Cancer and Nutrition (EPIC) study has demonstrated a strong association between MD adherence and reduced cancer risk (41).

Cognitive disease. Strict adherence to the MD is associated with a reduced risk of developing Alzheimer's and Parkinson's diseases (42) and is reported to slow or halt the progression of a range of cognitive diseases from mild cognitive impairment to Alzheimer's disease (38).

CVD. The Prevención con Dieta Mediterránea (PREDIMED; Prevention with the Mediterranean Diet) study investigated the effects of the MD in the primary prevention of CVD (43). It found that a MD containing nuts reduced the mortality risk of CVD, myocardial infarction and stroke by 30%; the MD containing olive oil reduced CVD by 30%; and the risk of stroke was reduced by 49% compared with a reference group on a low-fat diet based on American Heart Association guidelines (44). PREDIMED and other studies support the benefits of the MD in the primary prevention of CVD (39,45). The beneficial effects of the MD on cardiovascular health are transferable to non-Mediterranean populations (46).

Type 2 diabetes. The benefits of the MD on type 2 diabetes are twofold: prevention in unaffected individuals and improved glycaemic control in patients with established diabetes (47). Studies have demonstrated that MD intervention is associated with a 52% reduction in diabetes incidence in patients with high-risk CVD (34), a delayed requirement for drug therapy in newly diagnosed overweight patients (48) and improved blood glucose levels (49). Compared with low-fat diets based on American Heart Association guidelines (44), the MD appears to be more beneficial for patients with type 2 diabetes (49).

The literature overwhelmingly suggests that Mediterranean-like dietary patterns are beneficial in preventing and controlling diet-related NCDs, thus presenting a strong case for their increased adoption (50).

The ND shares many characteristics with the MD but comprises foods traditionally sourced in Denmark, Finland, Iceland, Norway and Sweden. Based on the Baltic Sea diet pyramid (Fig. 2), staple components of the ND include berries and fruits,

fatty fish (herring, mackerel and salmon), lean fish, legumes, vegetables (cabbage and root vegetables) and whole grain cereals (barley, oats and rye) (51). A notable point of difference between the ND and MD is the use of rapeseed (canola) oil instead of olive oil.

Fig. 2. The Baltic Sea diet pyramid^a



^a Created by the Finnish Heart Association, the Finnish Diabetes Association and the University of Eastern Finland.

Source: Kanerva et al. (2014) (51).

The ND is predominantly plant based and locally sourced, thus ensuring more environmentally friendly production with reduced waste when consumed within the Nordic region (52). For non-Nordic populations, the principles of the ND may be more readily adaptable, healthful and sustainable than the food components themselves.

The New Nordic Diet (NND; Box 1), a gastronomic interpretation of the ND, was developed in 2004 by leading Nordic chefs who signed the Manifesto for a New Nordic Diet (Box 2) (52–55). The NND is based upon four core principles: health, gastronomic potential, sustainability and Nordic identity. The Manifesto, which was adopted by the Nordic Council of Ministers as the ideology of the New Nordic Food programme, further emphasizes wild, foraged, local, fresh and highly palatable cuisine (53). As created and supported by leading chefs and ambassadors (Case study 1), including René Redzepi and Claus Meyer, the NND has entered mainstream consciousness and captured global media attention (54).

The health benefits of the ND have also been studied (56,57), albeit to a lesser extent than those of the MD. However, the ND has been linked to improvements in risk factors for both CVD and diabetes (39).

CVD. The ND has been shown to promote cardiovascular health by reducing intermediate risk factors (56). The NORDIET randomized control trial demonstrated positive effects of the ND on cardiovascular risk factors such as improved lipid profiles, blood pressure and insulin sensitivity in hypercholesterolaemic subjects (27). These findings have been confirmed in population-based studies (28).

Type 2 diabetes. The Nordic food index, created in accordance with the MD score, uses a validated food frequency questionnaire to obtain data on ND exposure variables (apples and pears, cabbage, fish, oatmeal, root vegetables and rye bread). Adherence (0–6 scale) is associated with a lower risk of type 2 diabetes: strict adherence (score of 5–6) confers a reduced risk of 25% for women and 38% for men compared with poor adherence (0 points) (29). Additionally, the NND produces weight loss in centrally obese men and women (30). However, statistically significant evidence on the long-term impact of ND adherence on type 2 diabetes incidence will require larger prospective studies (31).



Box 1. Guidelines for the NND

1. Eat more fruit and vegetables every day
2. Eat more whole grain produce
3. Eat more food from the seas and lakes
4. Eat higher-quality meat, and less of it
5. Eat more food from wild landscapes
6. Eat organic produce whenever possible
7. Avoid food additives
8. Eat more meals based on seasonal produce
9. Eat more home-cooked food
10. Produce less waste

Sources: Mithril et al. (2012) (52); Ministry of Food Agriculture and Fisheries of Denmark (2012) (53).

Box 2. The New Nordic Cuisine Manifesto

The Manifesto states that the NND must:

- express the purity, freshness and simplicity that we associate with our region;
- reflect the changing of the seasons in the meals;
- be based on ingredients that are particularly excellent in our climate, landscapes and waters;
- combine palatability with modern knowledge about health and well-being;
- promote the diversity of Nordic products and producers and increase awareness of the underlying cultures;
- promote animal well-being and sustainable production in the seas and in cultivated and wild landscapes;
- develop new uses of traditional Nordic foods;
- combine the best Nordic methods of food preparation and culinary traditions with impulses from other regions;
- combine local self-sufficiency with the regional exchange of high-quality produce; and
- invite consumers, other food-producers, agriculture, fishing, small and large food industries, retailers and wholesalers, researchers, educators, politicians and the authorities to become partners in a joint project for the benefit and joy of the entire Nordic region.

Sources: Ministry of Food Agriculture and Fisheries of Denmark (2012) (53); The Nordic Council (2017) (55).

Case study 1. The New Nordic Food programme: ambassadors

Diet and nutrition policies should build on cultural heritage and foster its safeguarding. An evidence-informed discourse alone (nutrition guidelines) is not sufficient to change behaviour if it does not connect with cultural values and lifestyles. As such, identifying context-specific champions and cultural leaders who can help with dissemination and influence the uptake of diet and nutrition policies is one method of changing behaviour in the context of culture.

In 2006, inspired by the New Nordic Cuisine Manifesto, The New Nordic Food programme was launched by the Nordic Council of Ministers with a three-year budget of €3 million (54). These funds have supported a wide range of food projects (available at newnordicfood.org), ranging from food and culture nights to local food markets. Key to the implementation and success of this programme are the Nordic food ambassadors, who are tasked with promoting Nordic food and gastronomy throughout the region, as well as internationally, to put the ND on the world map.

Ambassadors are from many disciplines and across the Nordic region (Åland Islands, Denmark, Finland, Faroe Islands, Greenland, Iceland, Norway and Sweden) and many disciplines, including academia, agriculture, design, entrepreneurship, hospitality and the media. Chef and restaurant ambassadors, who form the majority of this group, are key to driving shifts in local food culture by setting tangible examples and influencing dietary trends.

Beyond the health and environmental benefits of the ND, the programme acknowledges that “the food we eat is important for our sense of identity and our pride in Nordic culture”. The use of ambassadors from multiple sectors helps to achieve and reinforce this.


Country ambassadors

Denmark: René Redzepi, chef at the Noma restaurant in Copenhagen; Karen Kjældgård-Larsen and Tine Broksø, Claydies ceramics designers;

Finland: Juha Korkeaoja, Member of Parliament and farmer; and Kim Palhus, chef and lecturer, Laurea University of Applied Sciences;

Faroe Islands: Leif Sørensen, owner and chef, Koks gourmet restaurant in Torshavn.

Greenland: Anne Sofie Hardenberg, Arctic Food Specialities and branding Greenland.



Case study 1. (contd)

Iceland: Baldvin Jonsson, Managing Director, Áform branding project; and Sigurdur Hall, restaurant owner, television chef, author and organizer of Food&Fun in Reykjavik.

Norway: Eivind Hålien, Director, Professional Forum for Food and Drink; and Wenche Andersen, cook on TV2's *God Morgen Norge* (*Good Morning Norway*).

Sweden: Tina Nordström, presenter, Nordic and international television series on food; and Carl Jan Granqvist, Initiator of the Department of Restaurant and Culinary Arts at Grythyttan/Örebro University and Professor of Food Arts at University of Stavanger.

1.1.3. Existing diet and nutrition policy

Within the WHO European Region, over 30 countries have national FBDG or food pyramids targeted to the general population: the Nordic countries follow the Nordic NNR 2012 (58); and the European Food and Nutrition Action Plan 2015–2020 provides a set of recommendations compatible with different cultures and eating patterns (10). Over the years, dietary guidelines have shifted from providing recommendations about nutrition adequacy to providing more comprehensive dietary and, in some cases, lifestyle advice (including physical activity) to reduce NCD risk factors (59). These guidelines provide a basis for developing a unified system of national food-based education programmes; dietary interventions; and health, food and nutrition policies that promote a unified health and nutrition message.

Despite this, only a limited number of policies have been formulated around the MD and ND, except in Nordic countries. Lack of guidance on how to effectively translate the health benefits of these diets into SMART (specific, measurable, achievable, relevant and time bound) policies and interventions to drive changes in dietary behaviour at the population level may partly explain the noticeable gap between evidence for dietary benefits and the available evidence on ND and MD policies. Nutrition policy is a domain in which it is especially important to take into account the cultural contexts of health.

As diet and cuisine are closely linked to cultural traditions and ethnic identities, the cultural contexts of health are key to understanding the potentials and pitfalls of policy-making in this domain (60). Food and diet are closely held

aspects of individuals' daily lives and identities, and even solid scientific evidence is often insufficient to change eating patterns. The MD and ND offer examples of how cultural resources can be harnessed towards novel and beneficial ends. Food cultures are based in tradition but are equally open to change and adoption of new ideas, as evidenced in the rise of the ND and the many variations of the MD, simultaneously new and culturally authentic. Policy-makers should try to align as much as possible nutrition policy to local cultural contexts. To increase adoption by the populations concerned, it is essential that nutrition policy aligns to local cultural contexts.

Evidence-informed dietary policies provide a key opportunity for public health intervention. To allow decision-makers to shape their own context-specific policies, this report will synthesize the best available evidence to create a comprehensive picture of national and subnational policies and interventions based on the MD and ND within the WHO European Region.

1.2. Methodology

Based on search terms and a strategy established in late September 2016, a literature search of available peer-reviewed and grey literatures was carried out between 4 and 31 November 2016 to identify relevant articles, with no restrictions on language, geographical region, publication date or document type.

The initial search of academic literature returned 4011 journal articles, 789 conference papers and documents, and 10 books and theses. Of these, 32 studies were considered relevant based on title and abstract screening. Full text reading reduced this number to a total of four publications (61–64), with the majority being excluded because effectiveness was not addressed. Search of the websites of governments and ministries of health for the 53 European Region Member States found 15 with a policy, programme and/or intervention based on the MD or ND (Table 1) and four regional initiatives (Table 2) (54,58,65–89).

Annex 1 has full details of the methodology.

Table 1. MD and ND: country-specific guidelines and activities

Country/ diet	Policy/ programme/ intervention	Target population	Setting	Description
Belgium/ ND	Nutritional recommendations for Belgium, 2016 (65)	Health professionals, policy-makers on nutrition, teachers in nutrition, managers in the food industry, the collective catering sector	Scientific advisory report on public health policy	In this report, the Superior Health Council of Belgium provides an extensive update of the nutritional recommendations for the Belgian population; the document references the NNRs throughout
Cyprus/ MD	National nutrition and exercise guidelines (66)	General population	National guideline	Encourage consumption of a traditional MD with lots of fish, fruit, legumes, olive oil, vegetables and whole grains
Denmark/ ND	Official dietary advice (67)	Healthy population over 3 years of age	National guideline	Based on the 2012 NNR
Estonia/ ND	Estonian diet and nutrition recommendations (68)	Adult population	National guideline	Based on the 2001 NNR
Finland/ ND	Food for health: Finnish nutrition policy in action (69)	Whole population	Multiple (including schools, workplaces, prisons)	Published by the Ministry of Social Affairs and Health and the Ministry of Agriculture and Forestry; outlines Finnish nutrition policy and how it works in practice
	Healthy food, Finnish nutrition recommendations 2014 (70)	Healthy general public, including children under 6 months of age	National guideline	Based on the 2012 NNR

Table 1. (contd)

Country/ diet	Policy/ programme/ intervention	Target population	Setting	Description
Finland/ ND (contd)	School meals in Finland: investment in learning (71)	School students	School meal programme	Finnish legislation guarantees school students the right to free meals during the school day. Statutory obligations are based on the Basic Education Act (628/1998), the General Upper Secondary Schools Act (629/1998) and the Vocational Education and Training Act (630/1998). Schools meals follow national dietary guidelines and the healthy plate model
	Heart symbol: a better choice (72)	Whole population	Nutrition label	Introduced by Finland's Heart Association and Diabetes Association in 2000; informs consumers that the product marked with the symbol is the better choice in its product group (stores and catering); criteria for awarding the symbol are based on the Finnish nutrition recommendations
	Well-being through nutrition: a guide for municipal decision-makers (73)	Elected councillors, managers and employees of municipalities and municipal federations in Finland	Municipal guidelines	Describes specific measures by which municipal decision-makers can promote municipal resident well-being through good nutrition, based on National Nutrition Council recommendations and national dietary guidelines
Greece/ MD	Dietary guidelines for adults in Greece (74)	Adult population	National guideline	Aligned with the traditional MD
Iceland/ ND	Recommendations about diet and nutrients (75)	Healthy population over 2 years of age	National guideline	Based on the 2012 NNR

Table 1. (contd)

Country/ diet	Policy/ programme/ intervention	Target population	Setting	Description
Ireland/ MD	Health A-Z (76)	Whole population	Online	Provides public health and social care services to everyone living in Ireland. Prevention and treatment benefits of the MD can be found under the health topics high cholesterol, arthritis, leukoplakia, cancer and heart attack
Israel/ MD	Challenge Tender to help coping with obesity (77)	Entrepreneurs	To be determined	In 2016, the Ministry of Health called on entrepreneurs to compete in a Challenge Tender to offer solutions that assist in tackling obesity in Israel, with an emphasis on the MD
	Towards students' return to school, the Ministry of Health recommends the adoption of a balanced diet at schools and kindergartens (78)	Children, adolescents, parents	Home, school	Ministry of Health recommendations on a balanced diet during the school year
Malta/ MD	A healthy weight for life (79)	Whole population	National campaign	The Department for Health dedicated the month of May 2016 to the campaign, which aimed to increase awareness of the issues and services available related to excess weight
	Dietary guidelines for Maltese adults: information for professionals involved in nutrition education (80)	Adults	National guideline	The main aim of the guidelines and accompanying healthy plate model is to encourage people to embrace health-promoting patterns of eating, drinking and physical activity – the Mediterranean way
Norway/ ND	Recommendations about diet, nutrition and physical activity (81)	General public and children from 1 year of age	National guideline	Based on the 2012 NNR

Table 1. (contd)

Country/ diet	Policy/ programme/ intervention	Target population	Setting	Description
Spain/ MD	Eat healthy and move: 12 healthy decisions (82) Feeding your children: healthy nutrition from childhood to adolescence (83)	General population, children and adolescents	National guideline	Food pyramid and dietary recommendations aligned with the traditional MD
Sweden/ ND	Find your way to eat greener, not too much and to be active! (84) Good school meals: guidelines for primary schools, secondary schools and youth recreation centres (85)	Healthy adults, adolescents, and children 2 years and over School students (age 6–15 years); municipalities and individual schools	National guideline School/ youth meal programme	Based on the 2012 NNR According to the Education Act, all children attending primary school (aged 6–15 years) are entitled to a free school lunch every day; updated in 2011 to specify that school meals must be both free and nutritious, and meet Swedish nutrition recommendations/NNR; the School Inspections Agency (<i>Skolinspektion</i>) checks school compliance with the Education Act; the National Food Agency develops meal guidelines for primary schools, secondary schools and youth recreation centres to promote healthy eating habits within schools; suggested good choices often comply with Keyhole symbol/label criteria; School Food Sweden (<i>SkolmatSverige</i>) is an online system that enables schools and municipalities to evaluate their school food provision

Table 1. (contd)

Country/ diet	Policy/ programme/ intervention	Target population	Setting	Description
The former Yugoslav Republic of Macedonia/ MD	Guidelines for feeding the population in the Republic of Macedonia (86)	Healthy population over 2 years of age	National guideline	Refer to the MD as a healthy diet with evidence-based health impacts
Turkey/ MD	Turkey-specific nutrition guide (87)	General population	National guideline	Promotes the MD model, making specific reference to the importance of olive oil. Under Nutrition for Athletes, the guideline specifically recommends adhering to the MD

Table 2. MD and ND region-wide initiatives

Policy/programme/intervention	Target population	Financial resources (if known)	Setting	Description
NNR 2012: integrating nutrition and physical activity (58)	Whole population	The Nordic Council of Ministers fund the extensive scientific effort behind the NNR	Region-wide guidelines	NNR have been published every eight years since 1980; they set the guidelines for dietary composition and recommended intakes of nutrients that form the basis for national dietary recommendations in Nordic countries
Keyhole nutrition label (88)	Whole population	Country-specific spending; responsibility for compliance lies with producers	Nutrition labelling in Denmark, Iceland, Norway and Sweden	The Keyhole labelling scheme helps people to eat more healthily in accordance with the NNRs; in 2015, stricter requirements were introduced to lower salt content and increase whole grain consumption
Health, food and physical activity: Nordic plan of action on better health and quality of life through diet and physical activity (89)	Whole population	Unknown	Region-wide guidelines and information	Developed by the Nordic Council of Ministers for Fisheries and Aquaculture, Agriculture, Food and Forestry and the Nordic Council of Ministers for Health and Social Affairs; supports national efforts and cooperation to develop the best diet and physical activity policies
New Nordic Food programme (54)	Whole population	Initial three-year budget of €3 million, half controlled by the programme steering group and half by the Nordic Innovation Centre	Region-wide and country-specific programmes	Launched one year after the Nordic Cuisine Manifesto was created, the programme funds and supports a wide variety of projects that promote Nordic food and Nordic food culture

2. RESULTS

This review identified 13 countries within the Region that have dietary guidelines based on the MD or ND (Tables 1 and 2); however, most countries have not developed a validated system or tool to assess the diet quality of their dietary guidelines or the impact of adherence on NCD outcomes (61). The four academic papers included in this review have assessed the impact of national guidelines, recommendations or pyramids on NCDs (Table 3), and together provide examples of adaptable tools and methods for assessing the health impact of dietary guidelines.

Evidence related to each of the two parts of the synthesis question will be described separately. Section 2.1 examines what national or subnational interventions and policies based on the MD and ND are recommended or implemented in the WHO European Region. Section 2.2 looks at whether there is evidence of effectiveness in reducing NCDs.

Table 3. Effectiveness of guidelines

Dietary guideline/policy	NCD outcome	Impact
Spanish dietary guidelines (61)	Obesity, abdominal adiposity	14% lower likelihood of obesity, as measured by body mass index (men only); lower likelihood of abdominal obesity for both men and women
Swedish dietary guidelines (62)	Cardiovascular events	Risk reduction of 32% in men and 27% in women
NNR (63)	Ischaemic heart disease	Reduced concentrations of low density lipoprotein cholesterol compared with the average Danish diet (2.77 mmol/L vs. 3.04 mmol/L)
Nordic dietary recommendations (64)	Atherosclerosis	Non-adherence increases unhealthy diet consumption and risk of atherosclerosis

2.1. What interventions and policies based on the MD and ND are recommended or implemented in the WHO European Region?

Across the WHO European Region, with the exception of Nordic countries, the total number of national and subnational policies, programmes and interventions based on the MD or ND were limited. The review found that 13 countries within the Region (Belgium (65), Cyprus (66), Denmark (67), Estonia (68), Finland (69,70), Greece (74), Iceland (75), Malta (80), Norway (81), Spain (82), Sweden (84), the former Yugoslav Republic of Macedonia (86) and Turkey (87)) have FBDG based on the MD or ND. To complement these guidelines or promote the MD or ND, eight countries (Denmark, Finland, Iceland, Ireland, Israel, Malta, Norway and Sweden) have MD- or ND-based programmes, campaigns, nutrition labels, competitions or easily accessible online information available through their respective government websites (Tables 1 and 2). Supra-national MD-based guidelines and information were also uncovered on the Mediterranean Diet Foundation website (35).

These results can be grouped into the following three categories: country-specific guidelines, country-specific activities and region-wide initiatives. Within each category, there are similarities and differences in how the MD and ND are integrated; the target population of guidelines and interventions; what resources are required to realize these activities; and the platforms through which promotion and implementation occur.

2.1.1. Country-specific guidelines

Dietary guidelines are the primary platform through which countries promote the MD and ND (Table 1). The extent of MD and ND integration within these guidelines, as well as their target audiences, differs across countries. However, three common factors are:

- guidelines target the general healthy population;
- ND-based guidelines are based on the 2012 NNR; and
- MD-based guidelines do not reference a common document.

The guidelines are collated and are searchable by country and region on the FAO Food-based dietary guidelines website (90); however, there is no common platform for specifically collating MD- or ND-based guidelines.



2.1.2. Country-specific activities

Evidence of FBDG translation and country-specific activities was limited to Ireland, Israel, Malta and the Nordic region (Table 1). Activities included a campaign (Malta) (79), a competition (Israel) (77), school meal programmes (Finland and Sweden) (71,85) and accessible online information (Ireland) (76); however, not all of these are based on national MD- or ND-based FBDG. Use of FBDG is not the only way to incorporate the MD and ND into national policy: countries may have an intervention or programme based on the MD or ND but not a MD- or ND-based FBDG. For example, Ireland and Israel have based activities on MD principles despite no national FBDG based on the MD. With the exception of school meal programmes (Case study 2), the following key observations can be made on these activities.

- Country-specific activities were of shorter duration (i.e. time bound) compared with region-wide initiatives.
- The activities were not systematically searchable because content retrieval required navigation through multiple online links. Activities in Ireland, Israel and Malta were retrieved by entering the selected search terms into the search function on the respective government and ministry of health websites.
- Notably, these activities are not (or were not) the cornerstone of diet-related country activities.
- Most activities appeared to be promoted exclusively online.

Case study 2. Swedish school lunches

In Sweden, free school lunch provision is a mandatory component of food policy legislated by the Education Act. The most recent update of the Act further specifies that school meals should be nutritious and meet Swedish nutrition recommendations/NNR.

Publicly accessible national guidelines and tools support the implementation and evaluation of this initiative. These include national dietary guidelines (84); the NNR (58); the National Food Agency Good school meals: guidelines for primary schools, secondary schools and youth recreation centres (85); the SkolmatSverige web-based assessment tool (91); and Swedish Schools Inspectorate (*Skolinspektionen*) checks.

Guidelines

The Swedish National Food Agency has developed voluntary guidelines for primary schools, secondary schools and youth recreation centres to promote

Case study 2. (contd)

healthy meals and eating habits. These guidelines focus on food safety, taste, nutrition, sustainability, quality and environments; they suggest opportunities for integrated learning and suggest good food choices for planning nutritious school menus. Many of these choices comply with Nordic Keyhole symbol/label criteria.

Assessments

The Swedish Schools Inspectorate checks school compliance with all aspects of the Education Act. Schools can also undertake self-assessments of school meal provision and quality using SkolmatSverige (91). The tool was developed by the Karolinska Institute and Stockholm County Council on behalf of the Swedish Association of Local Authorities and Regions and the Swedish National Institute for Public Health, with assistance from the Swedish Board of Agriculture. It is based on the National Food Agency guidelines and assesses food choice, nutritional quality, food safety, meal service, food sustainability and internal organization structures and policy. In 2013, the tool was utilized by 26% of Swedish schools (92).

Culture and innovation

Free school meals have been provided in Sweden for over 60 years and may therefore be considered an integral part of Swedish food culture (93). During this period, the main aim has changed from tackling undernutrition to addressing obesity and other NCDs. The policy has also seen a shift towards shared responsibilities for children's eating behaviours and nutrition between the home and school. Swedish parents can now download a mobile application, Skolmaten, to view school lunch menus and plan home meals accordingly.

Case study 2 is an example of translating ND-based FBDG into policy. The programmes consider both ND health evidence and cultural significance. It is also possible to track programme uptake via routine inspections and assessments. The primary difference between the school-based programmes in Finland and Sweden and the activities in Ireland, Israel and Malta is that individuals need to be motivated to search for and participate in the activities of the latter group of countries. The school programme is nationwide and mandatory, thus requiring a lower level of individual agency to benefit from the intervention.



2.1.3. Region-wide initiatives

Nordic countries promote the ND through a combination of cross-country collaborations and innovative promotions and rewards mechanisms (Table 2). Key observations are that:

- the initiatives explicitly highlight their regional focus;
- the initiatives were tailored for local populations at the country level;
- the funding and resources required for these activities were easily searchable and publicly available (see Case studies 1 and 3);
- despite the online availability of information, it is difficult to obtain a comprehensive, up-to-date and centralized overview of all regional initiatives (past, present and future);
- most activities promoted the NNR or the New Nordic Cuisine Manifesto; and
- health was not always the primary motivation for ND initiatives – the promotion of culture and tourism were notable driving factors.

By engaging different sectors (e.g. industry, food safety, health and trade), the Keyhole cross-country collaboration demonstrates multisectoral action to improve population diets (Case study 3). For countries with established MD- or ND-based guidelines or with traditional local diets based on MD and ND principles, Case study 1 highlights an innovative and engaging way to rejuvenate interest and investment in these diets among a range of communities, including the general public, the agricultural sector, the chef community, the business sector and local innovators. It is also important to note that beyond health, cultural and social similarities across countries may also facilitate the extrapolation of existing evidence and provide a platform for collaboration. The New Nordic Food programme cites “similar social and health care sectors that are based on values that permeate the Nordic welfare model” as the basis for common Nordic policy (54).

Case study 3. The Keyhole Nordic nutrition label: “Healthy choices made easy”

The Keyhole label (<http://www.nokkelhullsmerket.no>) makes it easier for consumers in Nordic countries to meet national dietary guidelines and the NNRs (94,95). The similarity in diet across the four Nordic countries involved in the scheme (Denmark, Iceland, Norway and Sweden) facilitated the adoption of a common labelling initiative originally developed in Sweden. Since its conception, context-specific differences have been taken into account and label criteria are continuously updated. The Keyhole label also confers trade benefits because labelled products have cross-border commonality.

Case study 3. (contd)



Features of the Keyhole label

The label highlights healthier alternatives within a product group. Products must contain less salt and sugar, less or healthier fats, and more whole grains and fibre than comparable products. Keyhole utilization is both free and voluntary; however, responsibility for compliance lies with producers. Other features include:

aim: to contribute to healthier diets by making it easier to choose healthy foods;

objectives: to ensure that the population knows about Keyhole labelling; motivate consumers to buy Keyhole-labelled foods; and encourage the food industry to reformulate/develop healthier food products and encourage their promotion;

target population: general population of Denmark, Iceland, Norway and Sweden;

target outcomes: consumers experience that the Keyhole symbol makes it easier to choose healthier foods; consumers actively use the Keyhole as a guide when shopping; food industry labels all products that meet the Keyhole criteria and reformulate and develop new products that meet the Keyhole criteria; and the sale of Keyhole-labelled products increases;

approach: at the Nordic level, regular meetings between Nordic authorities to develop and implement common criteria; at the national level, notification of Keyhole regulations to the European Union, regular dialogue with industry, mass media campaigns and usage monitoring;

resources: the Norwegian Directorate of Health and the Food Safety Authority together spend 1.5 full-time equivalents annually on developing and implementing the Keyhole labelling scheme;

staff: the Norwegian Food Safety Authority is responsible for Keyhole legislation; the Norwegian Directorate of Health is responsible for setting nutrition criteria and communicating with consumers and industry;

monitoring and evaluation: outcomes are measured via surveys and sales data; data collected over five years demonstrated that 98% of the adult population was aware of the scheme and that 30% considered the label when making purchase decisions;

feasibility: implementation and communication (including website, slogan, television commercials, brochures) are annually funded with federal money in the state budget; the food industry also funds promotion; and transferability: the scheme has been adopted across four Nordic countries.



2.2. Is there evidence of effectiveness in reducing NCDs?

Examples of research into the impact of MD and ND policies on NCDs were found for only three countries: Norway, Spain and Sweden. The four studies included in this review (Table 4) (61–64) assessed the impact of national MD- or ND-based guidelines, recommendations or pyramids on NCDs (Table 3). Together, they provide examples of adaptable tools and methods for assessing the health impact of MD- and ND-based dietary guidelines.

2.2.1. Spanish dietary guidelines

Spain's food pyramid and dietary recommendations (82) promote the traditional MD (61) through three key messages: (i) eat good fats (found in foods such as fish, nuts and olive oil); (ii) eat plenty of cereals, preferably whole grain; and (iii) try to eat five portions of fruits and vegetables every day.

Using the 2004 revised version of the Spanish food pyramid score to measure guideline adherence of questionnaire results (96), Molina-Montes et al. concluded that the guidelines might act as an effective obesity prevention tool in countries with rising rates of obesity. Increased adherence was associated with lower odds of obesity (body mass index: >30 kg/m²) and abdominal adiposity (waist circumference: >102 cm for men, >88 cm for women), which are key risk factors for CVD, diabetes and some cancers.

2.2.2. Swedish dietary guidelines

The Swedish national dietary guidelines are based on the 2012 NNR, with consideration of Swedish food culture and the ability of local consumers to adhere to recommendations (62). The guidelines promote three key messages: (i) eat more berries, fish, fruit, nuts, seeds, shellfish and vegetables; (ii) switch to whole grains, healthy fats (i.e. rapeseed oil) and low-fat dairy products; and (iii) eat less red and processed meat, as well as less salt, sugar and alcohol.

Hlebowicz et al. applied a diet quality index (known as DQI-SNR) based on the 2005 Swedish nutrition recommendations (SNR (97)) and the Swedish dietary guidelines to determine the relationship between adherence to a high-quality diet (based on Swedish dietary guidelines) and CVD events (non-fatal or fatal myocardial infarction, ischaemic stroke, death from ischaemic heart disease) (62). The study found that adherence to the high-quality diet may reduce the risk of CVD events (by 32% in men and 27% in women).

Table 4. Parameters of identified studies into the effectiveness of dietary intervention on NCD outcomes

Study	Method	Findings
Cross-sectional study; 6717 aged 35–69 years (77% women) (61)	Physical activity, alcohol consumption and SFP score for 12 food groups recorded; logistic regression estimated OR of obesity by quintiles and by 10-point increment in adherence to SFP score, controlling for potential confounders	10-point increase in adherence to SFP score associated with a 14% lower odds of obesity in men (OR, 0.86; 95% CI, 0.79–0.94) and a 12% overall odds of abdominal obesity (OR, 0.88; 95% CI, 0.84–0.93); effect of 10-point higher adherence was stronger in physically inactive men (OR, 0.79; 95% CI, 0.68–0.92) and women (OR, 0.89; 95% CI, 0.84–0.95)
Malmö diet and cancer cohort, 17 126 aged 44–74 years (59% women) (62)	Ranking of DQI score as low (0–1), medium (2–3) or high (4–6); Cox proportional hazard regression examined DQI categories and risk of incident cardiovascular events, controlling for potential confounders	A high-quality diet decreased risk of a cardiovascular events: 27% in women (HR, 0.73; 95% CI, 0.59–0.91), 32% in men (HR, 0.68; 95% CI, 0.49–0.73)
Case–control, crossover; 21 average age 53 years (52% women) (63)	Blood tested for risk markers of ischaemic heart disease before and after a 2-week low-fat, high-fibre diet (based on the NNR) or a high-fat diet (average Danish diet); non-parametric statistical analysis used because of skewed distribution of blood variables	Low-fat, high-fibre diet resulted in lower low density lipoprotein cholesterol (0.31 mmol/L decrease; 95% CI, 0.17–0.39) and high density lipoprotein cholesterol (0.17 mmol/L decrease; 95% CI, 0.09–0.23), higher fasting triglycerides (0.12 mmol/L increase; 95% CI, 0.24–0.07) and reduced atherogenic and thrombogenic tendencies



Table 4. (contd)

Study	Method	Findings
Case-control; 1986, aged 9–13 years (177 with type 1 diabetes, 1809 controls) (64)	Food intake recorded for 4 days in pre-coded food diaries	Percentage of energy from fat and saturated fat for children with type 1 diabetes was lower than recommended but higher than in the control group

CI: confidence interval; DQI: diet quality index; HR: hazard ratio; OR: odds ratio; SFP: Spanish food pyramid.

2.2.3. Nordic dietary recommendations and the NNR

The NNR encourage a varied diet including plenty of berries, fish, fruit, wholegrain products and vegetables and limited amounts of processed meat, red meat, salt and sugar. In Norway, dietary recommendations for the general population are also recommended for children and adolescents with type 1 diabetes. Overby et al. found that non-adherence to Nordic dietary recommendations (i.e. high saturated fat intake and low intake of fibre, fruits and vegetables) increased the risk of developing atherosclerosis in patients with an NCD (diabetes) (64). In 1994, Marckmann et al. demonstrated that prescribing a diet based on the 1989 NNR was effective in the primary and secondary prevention of ischaemic heart disease (63). Taken together, these two studies suggest that ND policies could be beneficial for NCD prevention and treatment.

2.3. Do current MD- or ND-based policies and programmes influence national NCD outcomes?

Table 5 outlines country NCD profiles and the evidence for intervention effectiveness on NCD outcomes for each country identified in this review as having a MD or ND national or subnational policy, programme or intervention. The effectiveness of most existing MD and ND policies, programmes and interventions in the WHO European Region on NCD outcomes has not been evaluated. Given the high percentage of NCD deaths in these countries and throughout the Region, the results demonstrate that the mere presence of policies, programmes and interventions does not guarantee the prevention and control of NCDs.

Table 5. NCD data for countries with identified national and subnational MD or ND policies and programmes

Country	Population (n)	Deaths from NCDs (%) ^a	Total NCD deaths (n) ^b	Risk of premature death from target NCDs (%)	Evidence of effectiveness on NCD outcomes
Mediterranean^c					
Cyprus	1 161 000	91	7 000	11	No
Greece	11 218 000	94	113 000	12	No
Spain	46 398 000	92	363 000	10	Yes ^d
Nordic					
Denmark	5 689 000	90	44 000	12	Yes ^e
Finland	5 482 000	93	48 000	10	Yes ^e
Iceland	330 000	90	1 000	8	Yes ^e
Norway	5 200 000	87	35 000	10	Yes ^e
Sweden	9 764 000	89	80 000	9	Yes ^e
Others					
Belgium	11 288 000	86	94 000	12	No
Estonia	1 315 000	93	13 000	17	No
Ireland	4 700 000	90	27 000	10	No
Israel	8 065 000	86	36 000	9	No
Malta	428 000	90	3 000	10	No
MKD	2 079 000	95	19 000	22	No
Turkey	78 271 000	88	392 000	17	No

^a Based on all-cause mortality rates for 2015.

^b Estimated by applying the NCD death rates to the estimated resident population.

^c Only countries for which the MD has been inscribed on the United Nations Educational, Scientific and Cultural Organization's Representative List of the Intangible Cultural Heritage of Humanity are included under this heading.

^d Spanish dietary guidelines (82).

^e Nordic nutrition recommendations 2012 (58).

MKD: The former Yugoslav Republic of Macedonia
(International Organization for Standardization abbreviation)

Source: Adapted from WHO (2017) (8).



3. DISCUSSION

3.1. Strengths and limitations of this review

No previous review has systematically collected MD and ND policies and programmes or studied the impact of these policies on NCD outcomes in the WHO European Region. This report is based on an extensive review of academic and grey literature as well as policy documents that are publicly available online.

A strength of the review is the lack of restrictions on publication language and date, which ensured a comprehensive search of government websites of all 53 Member States. The search identified 15 demographically and politically diverse countries that include MD or ND recommendations in their national FBDG. A limitation is that the search terms used may have missed policies that promote the MD and ND under names, programmes and interventions that promote healthy subsets of the MD and ND, for example fruit and vegetable interventions. The addition of less specific search terms such as “local” and “traditional” was intended to address this limitation. However, it was difficult for reviewers to accurately determine whether all diets identified using these terms align with the MD or ND. Another limitation is that the review team comprised English and Russian speakers only, which may have restricted the grey literature search, data extraction and interpretation of retrieved documents, which utilized Google Translate, and may also have limited the analysis of findings (e.g. country-specific activities not published in English or Russian). It is also important to note that this review did not search for evidence of intervention implementation or investigate the use of evaluation results. Therefore, it is not clear whether or how the interventions were implemented and whether effectiveness research was utilized to improve existing interventions.

The primary limitation of the review of studies on intervention effectiveness was the limited number of studies retrieved. Only four studies in three countries were identified: Norway, Spain and Sweden. This limitation restricts the generalizability of findings across the highly diverse WHO European Region. Therefore, the impact of MD and ND policies outside the countries of origin or where NCD burden is highest could not be ascertained.

3.2. Diet policy and evidence translation

Over the years, dietary guidelines have shifted from focusing on undernutrition and nutrition adequacy (59) to providing more comprehensive dietary, and in

some cases lifestyle, advice to reduce common NCD risk factors. The MD and ND can both be considered comprehensive approaches to diet that are not based on nutrition alone. Multiple opportunities exist to translate and adapt MD and ND patterns and policies across and within countries. Of the 15 countries with policies, programmes and interventions, 13 countries had dietary guidelines based on the MD or ND; these provide a framework for adoption by countries that either do not have dietary guidelines or wish to update their existing guides. A more comprehensive example is the Maltese framework, which includes separate guidelines for consumers and professionals, visual representations of a healthy MD and public awareness campaigns to increase adoption of guideline recommendations (Case study 4). Other countries have based national guidelines on evidence derived from populations with similar demographic and disease profiles. For example, dietary guidelines in Estonia, Finland, Norway and Sweden are adapted from the same NNR, and Norway has demonstrated that national healthy eating policies can be recommended to healthy and non-healthy populations alike, appropriate for both the prevention and treatment of NCDs. By developing national dietary guidelines and recommendations, governments can disseminate consistent, evidence-informed information among the general population, as well as to individuals and organizations involved in nutrition education and related activities. Changing eating habits is difficult, and efforts to improve nutrition have a better chance if they take into account the cultural contexts of health and existing culinary traditions. An evidence-informed discourse is essential but not sufficient to change culturally based eating practices.

Case study 4. Dietary guidelines for Maltese adults (aged 19–65 years)

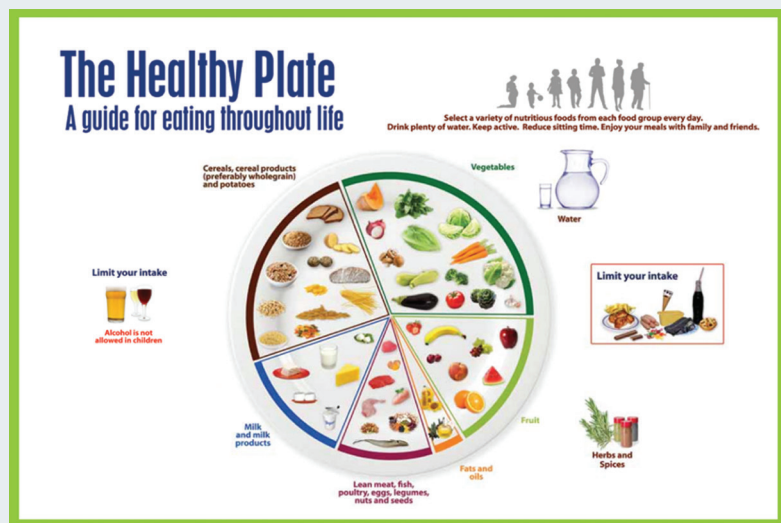
The current Maltese dietary guidelines were published in 2016 in accordance with the Food and Nutrition Policy and Action Plan for Malta (2015–2020) (98). The guidelines are based on the MD and lifestyle and are presented in two formats: an information document for professionals involved in nutrition education (Dietary guidelines for Maltese adults (80)); and a guideline booklet for consumers (Healthy eating the Mediterranean way! (99)). The guidelines for consumers are brief, clear, colourful and provide practical tips, whereas information for professionals is provided in a comprehensive document. In addition to these resources, The healthy plate: a guide for eating throughout life graphic provides a visual representation of the guidelines (see figure below).

On European Obesity Day 2016, the Maltese Health Promotion and Disease Prevention Directorate launched A healthy weight for life: the Mediterranean

Case study 4. (contd)

diet, a month-long campaign (television, radio, social and digital media) to increase awareness about the prevention and management of obesity (79,100). Together, these resources and activities are used to promote the MD in Malta. The May 2016 campaign also shows how dietary guidelines can inform the development of health promotion activities and how a combination of strategies can be adopted to promote the use of dietary guidelines.

The healthy plate: dietary guidelines for Maltese adults



Source: Maltese Parliamentary Secretariat for Health (2016) (80).

3.3. Monitoring and evaluation

SMART targets and mechanisms are needed to measure and understand the impact of policies and associated nutrition interventions to guide future activities (101). To date, most countries have not developed a validated system or tool to assess the diet quality of their national dietary guidelines (61), or the impact of guideline adherence on NCD outcome. This may explain the limited number of studies on the impact of policy, specifically MD and ND policy, available in the scientific

literature. Despite variations, all dietary guidelines identified in the Region promote aspects of both the MD and ND, notably a varied diet including healthy fats and lots of fruit and vegetables. It is possible that context-specific recommendations not explicitly based on the MD or ND have similar health benefits to those reported for MD and ND policies, but owing to lack of evidence the impact of these policies on NCD outcomes could not be ascertained.

3.4. Frameworks to support MD- and ND-based policies, programmes and interventions

Three frameworks highlight key areas where policy-makers can increase and expand MD and ND activities: the European Food and Nutrition Action Plan 2015–2020 (10); the NOURISHING framework (102); and INFORMAS (International Network for Food and Obesity/noncommunicable diseases Research, Monitoring and Action Support) (103). Of these, the European Action Plan is the most relevant to this review.

This review found that MD- and ND-based guidelines and policies can help to achieve the objectives of the Action Plan (shown in Fig. 1). Nutrition policies and interventions consistent with MD and ND FBDG can promote healthy eating in multiple settings across all ages, including in schools, kindergartens, nurseries, hospitals, care facilities for the elderly, public institutions and workplaces. The legislated school meal programmes of Finland and Sweden demonstrate the practical application of national dietary guidelines and the NNR to promote better nutrition among children. By incorporating the underlying social and cultural principles of the ND (including communal eating), these programmes show that improved eating environments can support good nutrition. In the absence of mandatory policy, setting-specific awareness campaigns, such as Israel's MD advice to school parents (see Table 1) (100), can be implemented.

Malta's Health Promotion and Disease Prevention Directorate have a Facebook page (facebook.com/HPDPMalta) that promotes healthy lifestyles through activities including the 2016 MD campaign, A healthy weight for life (Case study 4) (79,100). Through their extensive reach, social media (1.28 billion daily active Facebook users (104)) and mobile applications (149.3 billion mobile applications downloaded worldwide in 2016 (105)) can support consumers to make food purchase and consumption decisions in line with healthy diets. These platforms are often free to use but are currently underutilized in this area. The George Institute's FoodSwitch application, which has been launched in Australia, China, India, New Zealand,



South Africa and United Kingdom, empowers consumers in making better food choices by switching to healthier options (106). With additional features such as filter selection to accommodate different health needs (e.g. FatSwitch, GlutenSwitch, SaltSwitch, SugarSwitch), there is the potential to expand work to investigate whether this application can provide a model for effectively promoting MD and ND through the use of technology.

Nutrition labels, such as the Keyhole (89), also increase consumer ability to purchase and consume healthier foods, as well as encouraging producers to reformulate healthier products. In countries with similar dietary patterns, the MD and ND offer a renewed point of focus for strengthening cross-government and cross-country cooperation and coherent nutrition policy. Both the MD and ND have been deemed healthy and, to an extent, sustainable, as highlighted in the New Nordic Cuisine Manifesto. This dual benefit presents a win–win for policy-makers wanting to achieve better health and sustainability outcomes –essential in achieving the SDGs.

Finally, the Action Plan encourages the effective use of available data, including through knowledge translation, to inform policy-making. Nordic countries have demonstrated knowledge translation via sharing experiences, best practice and resources on online platforms (e.g. nordicnutrition.org). This reinforces the notion that countries with MD and ND dietary guidelines and policies should ensure that they are utilized and promoted. Through the dissemination of good practice, many countries in the WHO European Region can adopt or adapt health-promoting strategies. To achieve this goal, a common platform to collect, store, and share these activities and their respective evaluations is also needed. The FAO Food-based dietary guidelines website provides an applicable model (73).

3.5. Policy implications and options

Since 1992, FAO and WHO have promoted the concept of FBDG to “promote appropriate diets and healthy lifestyles” (107). Today, identifying and investing in an optimal diet for disease prevention and developing a nutrition message that is evidence-informed, appropriate and practical remains a significant challenge for policy-makers.

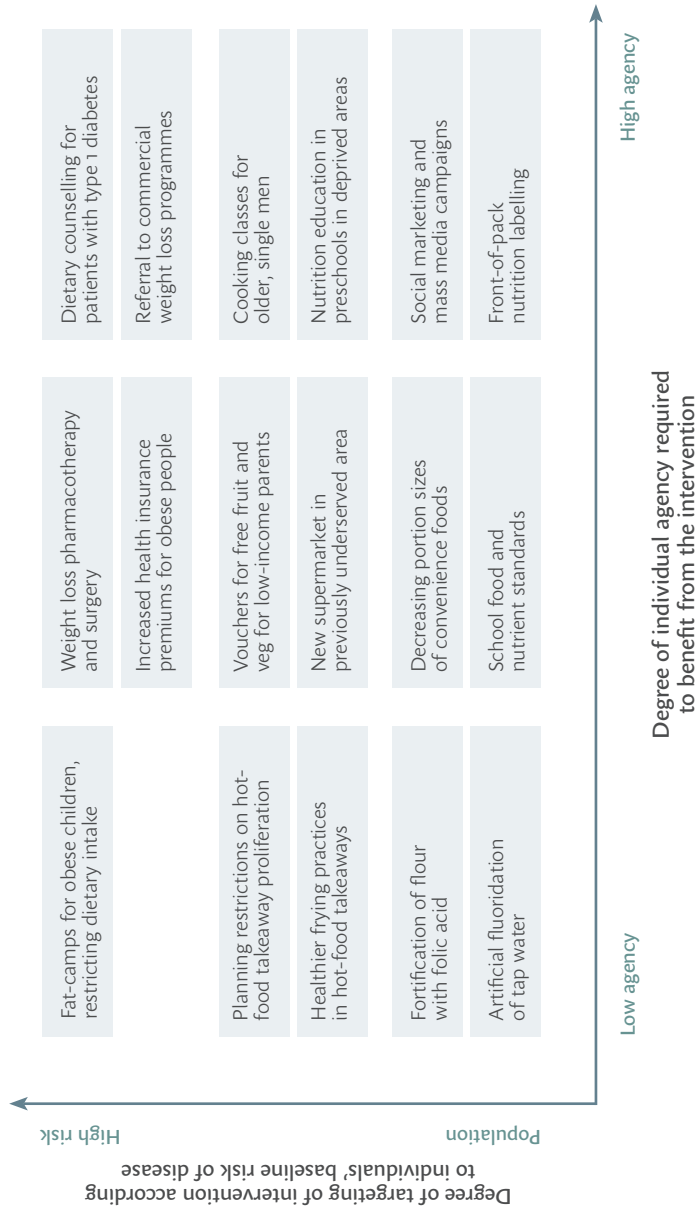
The health benefits of the MD and ND are well documented and could be translated into diet and nutrition guidelines and policy, with their impact on NCDs monitored and evaluated according to structured guidance from WHO (108) and individual countries (e.g. Spain; see section 2.2.1). Ideally, a monitoring and evaluation framework

and plans for SMART policy initiatives would be developed concurrently with guidelines. For countries that have already modelled their FBDG on the MD or ND, it is important to ensure that these guidelines are acted upon. Increased activity to promote awareness and uptake of the MD and ND can ensure message continuity. Combined with this, it is necessary to explicitly outline how current nutrition activities complement or promote MD- and ND-based FBDG. FBDG uptake can be increased in target populations by building on cultural and culinary traditions in innovative and healthy ways. As countries expand the range of policies in place to promote healthy diets, and consider food environment policies such as school food standards, marketing restrictions or front-of-pack nutrition labelling, a formal exercise to explore, model and validate the proposed criteria against the FBDG for consistency with the MD or ND might become necessary. This could help both politically and culturally to demonstrate that the proposed measures and criteria being adopted are consistent with both scientific evidence and traditional diets. For example, the recent introduction by the Israeli Government of warning labels for foods high in saturated fatty acids, sodium and sugar (109,110) is consistent with MD recommendations to limit the intake of such foods. Regional and global frameworks to guide and support these activities are available and can be adopted.

To further increase investment and attention for MD and ND policies, collaborative policy-making and goal-setting across countries with similar dietary patterns and health profiles may increase both the number and the effectiveness of MD and ND policies, as already demonstrated in the Nordic region. Additionally, sharing evaluation results through a common platform could enable countries with similar population and disease profiles to adopt and contextualize effective health-promoting policies to tackle unhealthy diets, a primary, modifiable risk factor for disease.

MD and ND policies and programmes could also be evaluated for the required level of individual agency and for cultural appropriateness. Low agency interventions should form the backbone of public health strategies (111), and in the context of diet, these interventions should also consider culture and traditions. This will help policy-makers to align nutrition policy with local cultural contexts as much as possible and help to avoid the promotion of exogenous patterns that will not be adopted by the populations concerned. To ensure national dietary recommendations are appropriate and effective for different subgroups within the general population, it is also useful to understand risk of disease in the context of agency. Fig. 3 provides an example of diet and obesity intervention targeting and agency (111).

Fig. 3. Diet and obesity interventions by individual risk and agency



Source: Adams et al. (2016) (111).

The main policy options for consideration are to:

- consider the existing MD and ND based dietary guidelines for either adoption or enhancement of the existing nutrition policies;
- access and make use of adaptable evaluation tools and methods as well as evaluation results through a shared, publicly accessible platform;
- monitor and evaluate the effectiveness of MD and ND policies and interventions on NCD outcomes and promote implementation research to improve and scale up interventions;
- explore cross-country collaborative approaches to MD and ND promotion with countries with similar cultural, social and disease profiles as a renewed point of focus for strengthening cross-government and cross-country cooperation and coherent nutrition policy; and
- take into account the cultural contexts of health and existing culinary traditions in formulating and implementing MD or ND policies.

Annex 2 lists tools and resources that may provide assistance in the implementation of report recommendations, most notably MD and ND guideline development, utilization, monitoring and evaluation, and Annex 3 has a glossary of terms.




4. CONCLUSIONS


Despite the limited available evidence on the health benefits of national and subnational MD and ND policies, this review provides important lessons for future research, policy and practice. Diet is a key risk factor for NCDs that incur a huge health and economic costs in the WHO European Region. As a result, many countries have developed and implemented national and local diet programmes and policies, some of which are based on the health-promoting MD and ND, most notably in the form of dietary guidelines. However, these guidelines are not always translated into national programmes and interventions based on the MD and ND, and evaluations have rarely been undertaken to determine their effectiveness on NCD outcomes. Suggested actions are threefold: (i) translate MD and ND scientific evidence into diet policy; (ii) monitor and evaluate diet and nutrition policies with a specific focus on population health outcomes; and (iii) share evaluation results within and across countries. Most notably, countries with similar dietary patterns and cultural heritage have an opportunity to work together to achieve these three actions. The Nordic countries (Denmark, Iceland, Finland, Norway and Sweden) have adopted a collaborative regional approach within the wider Region to improve the diet, reduce production and consumption impacts on the environment, increase intervention sustainability and facilitate the achievement of the SDGs. Mediterranean basin countries could follow suit, by engaging in shared goal-setting, implementation and evaluation to improve population diets through a reinvestment and reconnection with traditional diets and practices. Investment in MD guidelines at the regional level (akin to the NNR) that can be adapted and adopted at country level may facilitate such collaboration. Despite more available scientific evidence on the benefits of the MD on health outcomes, this review found more programmes/interventions/policies based on the ND in the Region. Investigating the cause(s) of this phenomenon is beyond the scope of this review, but they may include an additional investment in the cultural contexts of health.

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ANNEX 1. SEARCH STRATEGY

Website search

The website search was used to answer part 1 of the synthesis question: current interventions, policies and programmes based on the MD and ND. Government and ministry of health websites (where available) of the 53 Member States of the WHO European Region were searched for recommended or implemented national policies, interventions and programmes that include the terms “Mediterranean” or “Nordic”/“Baltic”/“Scandinavian”. Search terms were intentionally kept broad to encompass various types of MD and ND activities in all Member States. The terms “Mediterranean”, “Nordic”, “Baltic” and “Scandinavian” were translated for non-English websites using Google Translate. The term “diet” was added to key search terms (e.g. “Nordic diet”) to ensure accurate translation. For countries or regions identified as Mediterranean (Croatia, Cyprus, Greece, Italy, Morocco, Portugal and Spain) and Nordic (Åland Islands, Denmark, Faroe Islands, Finland, Greenland, Iceland, Norway and Sweden), the search terms “indigenous diet”, “local diet”, “national diet”, “native diet” and “traditional diet” were included to ensure that key documents that did not explicitly mention “Mediterranean diet” or “Nordic diet” were not overlooked. These searches were supplemented by search for MD- and ND-based policies, programmes and interventions in Google and the WHO databases. Consultations were held with technical officers at the Division of NCDs and Promoting Health through the Life-Course, WHO Regional Office for Europe, to uncover key documents and activities not found through the systematic online search.

The website search identified documents from 15 countries that met the inclusion and exclusion criteria:

- **inclusion:** explicit mention of the terms “Mediterranean diet” or “Nordic diet” in publicly available government documents or FBDG based on the MD or ND; and
- **exclusion:** documents that included key search terms only in the reference list or that mentioned the MD or ND as a contrast with their subject matter (e.g. “unlike the Mediterranean diet...”); and documents that mentioned only a minor aspect of these diets (e.g. the practice of alcohol consumption during meals being associated with a “Mediterranean tradition”).



For each document, the country, document title, diet type (MD or ND), intervention type, target population, setting and document description were extracted and collated.

Database search

The database search was used to answer part 2 of the synthesis question: evidence of effectiveness.

Four databases (MEDLINE, EMBASE, Global Health and Web of Science) were searched in November 2016 for academic peer-reviewed literature on the effectiveness of MD- and ND-based policies on NCD outcomes. No language or date restrictions were placed on the search. Eligible records and studies had to address a national or subnational intervention, policy or programme based on the MD or ND that is recommended or implemented in the WHO European Region and examines the effectiveness of such MD and ND policies, interventions or programmes on NCD outcomes.

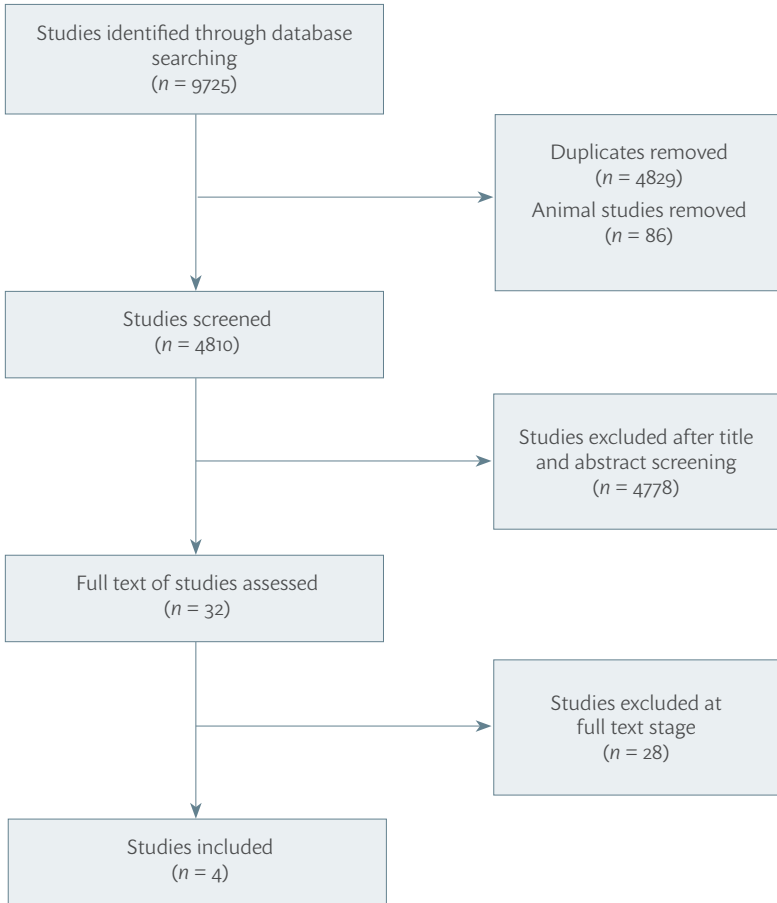
Two independent reviewers screened the titles and abstracts and selected titles that met the inclusion and exclusion criteria:

- **inclusion:** interventions that measured NCD outcomes based on diets prescribed in accordance with national FBDG that explicitly mentioned the MD or ND; and interventions based directly on the MD and ND; and
- **exclusion:** small-scale and pilot interventions; studies that only addressed or evaluated a specific component (e.g. olive oil) of these diets; and interventions that did not assess impact on NCD outcomes.

Records were divided evenly for screening, with each reviewer also conducting a 10% double screening of the other's records. A third reviewer conducted a 10% double screening of all records. All three reviewers met to discuss and resolve disagreements. One reviewer completed data extraction and quality assessments.

Of the 4011 journal articles, 789 conference papers and 10 books and theses during the first screening, four journal articles were included in the review on intervention effectiveness based on a full text reading. Studies were selected as shown in Fig. A1 (1).

Fig. A1. PRISMA flow diagram for the literature review.



Quality assessment

A modified Newcastle–Ottawa scale (2), as recommended by the Cochrane Collaboration (3), was utilized to assess study quality and risk of bias (Tables A1.1–A1.3). Three studies were considered to have low risk of bias and one to have moderate risk of bias; thus, the studies collectively demonstrated a low–moderate risk of bias.

Table A1.1. Quality assessment^a for peer-reviewed articles: case–control studies

Assessment category	Score ^b	
	Overby et al. (2007) (64)	Marckmann et al. (1994) (63)
Is the case definition adequate?	1	1
Representativeness of the cases	1	0
Selection of controls	1	0
Definition of controls	1	1
Comparability of cases and controls on the basis of the design/analysis	1	1
Ascertainment of exposure	1	1
Non-response rate	1	1
Total score	7	5
Category ^c	Low	Moderate

^a Using a modified Newcastle–Ottawa scale (2).

^b Score: 0, not achieved; 1, achieved.

^c Category: high, score of 0–2; moderate, score of 3–5; low, score of 6–8.

Table A1.2. Quality assessment^a for peer-reviewed articles: cohort study^b

Assessment category	Score ^c
Representativeness of the exposed cohort	1
Selection of the non-exposed cohort	1
Ascertainment of exposure	1
Demonstration that outcome of interest was not present at the start of study	1
Comparability of cohorts on the basis of the design or analysis	1
Assessment of outcome	1
Was follow-up long enough for outcomes to occur	1
Adequacy of follow-up of cohorts	1
Total score	8
Category ^d	Low

^a Using a modified Newcastle–Ottawa scale (2).

^b Hlebowicz et al. (2013) (4).

^c Score: 0, not achieved; 1, achieved.

^d Category: high, score of 0–2; moderate, score of 3–5; low, score of 6–8.

Table A1.3. Quality assessment^a for peer-reviewed articles: cross-sectional study^b

Assessment category	Score ^c
Representativeness of the sample	1
Sample size	1
Non-respondents	1
Ascertainment of the exposure	1
Comparability of subjects in different outcome groups (control for confounding)	1
Assessment of outcome	1
Statistical test is appropriate	1
Total score	7
Category ^d	Low

^a Using a modified Newcastle–Ottawa scale (2).

^b Molina-Montes et al. (2014) (5).

^c Score: 0, not achieved; 1, achieved.

^d Category: high, score of 0–2; moderate, score of 3–5; low, score of 6–8.

Search terms


The following search terms were used for the databases.

Medline

((exp *Neoplasms/) OR (Cardiovascular diseases/pc) OR (heart diseases/ or exp myocardial ischemia/) OR (stroke/) OR (exp Lung Diseases, Obstructive/) OR (Diabetes Mellitus, Type 2/ OR Diabetes Mellitus/) OR (Chronic Disease/) OR (exp Obesity/) OR (Hypertension/) OR (exp Hyperlipidemias/) OR ((cancer* or diabet* or asthma* or copd or chronic bronchitis or emphysema* or cvd or stroke).ti,ab.) OR (((chronic obstructive lung or chronic obstructive pulmonary or chronic lung or chronic pulmonary or cardiac or myocardi* or heart or coronary or isch?emi* or cardiovascular or cardio-vascular or cvd) adj2 disease*).ti,ab.) OR (((chronic or noncommunicable or non-communicable) adj2 disease).ti,ab.) OR ((overweight or obes* or hypertens* or hypercholesterol* or high cholesterol* or hyperlipid*).ti,ab.)) AND ((Diet, Mediterranean/) OR ((mediterranean adj2 diet?).ti,ab.) OR (((nordic or scandinavian or baltic) adj2 diet?).ti,ab.))

Embase

((cardiovascular diseases/ or heart disease/ or vascular disease/ or cerebrovascular disease/) OR (exp ischemic heart disease/ or exp myocardial disease/) OR (Heart Failure/) OR (cerebrovascular accident/) OR (non insulin dependent diabetes



mellitus/) OR (chronic obstructive lung disease/) OR (exp *Neoplasm/) OR ((cancer* or diabet* or asthma* or copd or chronic bronchitis or emphysema* or cvd or stroke).ti,ab.) OR (((chronic obstructive lung or chronic obstructive pulmonary or chronic lung or chronic pulmonary or cardiac or myocardi* or heart or coronary or isch?emi* or cardiovascular or cardio-vascular or cvd) adj2 disease*).ti,ab.) OR (((chronic or noncommunicable or non-communicable) adj disease).ti,ab.) OR ((overweight or obes* or hypertens* or hypercholesterol* or high cholesterol* or hyperlipid*).ti,ab.)) AND ((Mediterranean diet/) OR ((mediterranean adj2 diet?).ti,ab.) OR (((nordic or scandinavian or baltic) adj2 diet?).ti,ab.))

Global Health

((cardiovascular diseases/ or heart diseases/ or vascular diseases/ or cerebrovascular disorders/) OR (exp cardiomyopathy/) OR (stroke/) OR (type 2 diabetes/) OR (chronic obstructive pulmonary disease.sh.) OR (exp Cancer/) OR ((cancer* or diabet* or asthma* or copd or chronic bronchitis or emphysema* or cvd or stroke).ti,ab.) OR (((chronic obstructive lung or chronic obstructive pulmonary or chronic lung or chronic pulmonary or cardiac or myocardi* or heart or coronary or isch?emi* or cardiovascular or cardio-vascular or cvd) adj2 disease*).ti,ab.) OR (((chronic or noncommunicable or non-communicable) adj disease).ti,ab.) OR ((overweight or obes* or hypertens* or hypercholesterol* or high cholesterol* or hyperlipid*).ti,ab.)) AND (((mediterranean adj2 diet?).ti,ab.) OR (((nordic or scandinavian or baltic) adj2 diet?).ti,ab.))

Web of Science

((TI=(((cardiovascular or cardio-vascular) NEAR/3 disease*)) OR TI=(((coronary or heart or myocard*) NEAR/3 disease*)) OR TI=(((ischaemic or ischemic or ischaemia or ischemia) NEAR/3 disease*)) OR TI=("myocardial infarct*") OR TI=(((cerebrovascular or vascular) NEAR/3 disease*)) OR TI=(stroke) OR TI=("heart failure")) OR (TI=(diabet*) OR TI=((niddm or t2dm or tiidm))) OR (TI=((chronic NEAR/2 (lung or pulmonary))) OR TI=(copd)) OR (TI=((neoplasm* or cancer*))) AND ((TS=(mediterranean NEAR/2 diet*) OR (TS=((nordic or scandinavian or baltic) NEAR/2 diet*))))

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ANNEX 2. RESOURCES TO GUIDE THE IMPLEMENTATION OF REPORT RECOMMENDATIONS

WHO diet policy implementation, monitoring and evaluation tools

A school policy framework focusing on diet and physical activity (<http://www.who.int/dietphysicalactivity/SPF-en-2008.pdf>)

Implementation research in health: a practical guide (<http://www.who.int/alliance-hpsr/resources/implementationresearchguide/en/>)

Preventing chronic diseases: a vital investment. WHO global report (http://www.who.int/chp/chronic_disease_report/full_report.pdf)

Promoting a healthy diet for the WHO Eastern Mediterranean Region: user-friendly guide (http://www.who.int/nutrition/publications/nutrientrequirements/healthydietguide2012_emro/en/)

Report of joint WHO/World Economic Forum event on prevention of noncommunicable diseases in the workplace (http://www.who.int/dietphysicalactivity/WHOWEF_report_JAN2008_FINAL.pdf)

Reports of WHO technical meetings on reducing salt intake in populations and on marketing of foods and non-alcoholic beverages to children (http://www.who.int/dietphysicalactivity/Salt_Report_VC_april07.pdf, <http://www.who.int/dietphysicalactivity/publications/Oslo%20meeting%20layout%202027%20NOVEMBER.pdf>)

Technical report on diet, nutrition and the prevention of chronic diseases (http://apps.who.int/iris/bitstream/10665/42665/1/WHO_TRS_916.pdf)

Technical report on obesity: preventing and managing the global epidemic (http://www.who.int/nutrition/publications/obesity/WHO_TRS_894/en/)

Technical report on preparation and use of food-based dietary guidelines (http://www.who.int/nutrition/publications/nutrientrequirements/WHO_TRS_880/en/)

The WHO global infobase (http://www.who.int/ncd_surveillance/infobase/en/)

The WHO/FAO framework for promoting fruit and vegetables at national level (<http://www.who.int/dietphysicalactivity/fruit/en/>)

The WHO STEPwise approach to surveillance of noncommunicable diseases (STEPS) and the Global School-based Student Health Survey (GSHS) surveillance and monitoring tools (http://www.who.int/ncd_surveillance/en/steps_framework_deco3.pdf, <http://www.who.int/ncds/surveillance/global-school-student-survey/en/>)

WHO European food and nutrition action plan 2015–2020 (http://www.euro.who.int/__data/assets/pdf_file/0008/253727/64wd14e_FoodNutAP_140426.pdf)

WHO framework to monitor and evaluate implementation of policies and programmes related to diet and physical activity at the national level (<http://www.who.int/dietphysicalactivity/M&E-ENG-09.pdf?ua=1>, <http://www.who.int/dietphysicalactivity/DPASindicators/en/>)

Country- and guideline-specific tools

2004 revised version of the Spanish food pyramid score (1)

Diet quality index (known as DQI-SNR) based on the 2005 SNR and the Swedish dietary guidelines (2)

Nordic nutrition recommendations 2012 (3)

Programme National Nutrition Santé Guideline Score: components and scoring criteria (4)

Additional useful resources

Food based dietary guidelines in the WHO European Region (http://www.euro.who.int/__data/assets/pdf_file/0017/150083/E79832.pdf)

Mediterranean diet pyramid. Available in Arabic, Catalan, English, Euskera, French, Galician, Greek, Italian, Portuguese and Spanish (<http://dietamediterranea.com/en/nutrition/>)

The FAO food-based dietary guidelines website (<http://www.fao.org/nutrition/education/food-dietary-guidelines/regions/europe/en/>)



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ANNEX 3. GLOSSARY

EPIC study. A prospective study with a cohort of over 521 000 participants enrolled from 23 centres in 10 western European countries (1).

Food-based dietary guidelines (FBDG). Advice for the general public on foods, food groups and dietary patterns to provide the required nutrients to promote overall health and prevent chronic diseases; they are intended to establish a basis for public food and nutrition, health and agricultural policies, and nutrition education programmes to foster healthy eating habits and lifestyles (2).

Healthy eating index. A measure of diet quality that assesses compliance with dietary guidelines (3).

PREDIMED study. A multicentre, single-blind, randomized clinical trial conducted by 16 research groups in seven communities in Spain between 2003 and 2011 to assess efficacy of the MD in the primary prevention of CVD and mortality (4).

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