Caribbean Public Health Agency

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Evidence Brief

Improving the Healthiness of Food Environments in the Caribbean

June 22, 2016

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Caribbean Public Health Agency

Legally established in July 2011 by an Inter-Governmental Agreement signed by Caribbean Community Member States, the main objectives of CARPHA are to promote the physical and mental health and wellness of people within the Caribbean; to provide strategic direction, in analyzing, defining and responding to public health priorities of the Caribbean Community; and to support solidarity in health, as one of the principal pillars of functional cooperation, in the Caribbean region.

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Funding

The evidence brief and the stakeholder dialogue it will inform were funded by the Caribbean Public Health Agency (CARPHA) and the Pan American Health Organization (PAHO).

Conflict of interest

The authors declare that they have no professional or commercial interests relevant to the evidence brief. The funders played no role in the identification, selection, assessment, synthesis or presentation of the research evidence profiled in the evidence brief.

Merit review

The evidence brief was reviewed by a small team of policymakers, stakeholders and researchers in order to ensure its scientific rigour and system relevance.

Acknowledgements

The authors are grateful to the McMaster Health Forum for providing the methodological approach used to develop the brief and the stakeholder dialogue it will inform. Gratitude is also extended to the Steering Committee members (Dr. Rosmond Adams, Dr. Kenneth George, Sir Trevor Hassell, Dr. Tomo Kanda and Ms. Yvonne Lewis) for overseeing the project; the merit reviewers (Dr. Simone Keizer-Beache, Dr. Kaelan Moat and Professor Dan Ramdath) for providing feedback on previous drafts of the brief; Ms. Shelly-Ann Hunte for reviewing and providing invaluable comments; and Mr. Aditya Nidumolu and Ms. Inna Berditchevskaia for assisting with referencing and proof-reading.

Citation

Yearwood AC, Samuels TA. Evidence Brief: Improving the Healthiness of Food Environments in the Caribbean. Port of Spain, Trinidad and Tobago: Caribbean Public Health Agency, 22 June 2016.

Product registration numbers

ISSN 2411-507X (Print)
ISSN 2415-5551 (Online)

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KEY MESSAGES

What is the problem?

- Caribbean countries have a number of issues in common regarding food security: these small open economies have limited agricultural resource bases; their food production is prone to disruption by natural disasters; there is a heavy reliance on imported commodities, as opposed to local food production; and trade liberalization has made relatively cheaper processed energy-dense foods, with high fat, sugar and sodium content, widely available on the domestic market. These factors combined, have resulted in unhealthy food choices and dietary practices among the population and a concomitant increase in the prevalence of obesity and diet-related non-communicable diseases.

- There is consensus among international agencies and the research community, that in order to promote healthier food environments, governments should launch a holistic response targeting seven areas: food composition; food labelling; food promotion; food provision; food retailing; food prices; and trade and foreign investments in food. The ability of Caribbean governments to implement these measures has, however, been constrained due to the challenges which they face in:
    1. coordinating decision-making across all State levels—achieving a whole-of government response;
    2. gaining broad participation from all sectors of society—the all-of-society approach; and
    3. developing and enacting required legislation.

- These constraints have stymied implementation of a comprehensive and effective response to diet-related non-communicable diseases.

What do we know (from systematic reviews) about viable options to address the problem?

- Option 1: Develop mechanisms to support sustainable implementation of a whole-of-government response to create healthier food environments.
    - Several systematic reviews of varying quality, which focused attention on collaborative working relationships between various players within the health system, identified possible factors that can facilitate collaborative working relationships. These included: joint planning; the use of common governance structures; leadership support or endorsement of the value of the collaboration; and use of standardized systems for data collection, measurement and reporting.

- Option 2: Strengthen civic engagement in policy and law-making processes.
    - A citizens' jury, which allows average citizens to hear evidence, deliberate on a particular issue and make recommendations to decision-makers, was identified in one medium-quality systematic review as a viable model for engaging the population in the decision-making process.

- One high-quality review also cited community-coalitions as an effective vehicle for achieving system-level changes in communities, such as creating green spaces, ensuring neighbourhood safety, and developing policies and procedures to improve access to healthcare and social services.

- Option 3: Strengthen the legislative process.
  - Many of the strategies for promoting healthy food environments are predicated upon the enactment of legislation. Countries would therefore need to have the capacity to develop and pass laws pertaining to food environments. We were unable to identify any systematic reviews that shed light on how to strengthen legislative capacity.

What implementation considerations need to be kept in mind?

- The political leadership in the Caribbean has demonstrated strong and consistent commitment to the prevention of diet-related non-communicable diseases and by extension, an openness to alter the environmental factors that contribute to unhealthy dietary practices in the population. There is good scientific evidence that points to a comprehensive suite of cost-effective policy measures that Caribbean governments may embark upon. In addition, examples of promising interventions from other countries are also available to support decision-making. Regional institutions, such as the Caribbean Agriculture Research and Development Institute and the University of the West Indies have been providing technical support, and international organizations, such as the International Development Law Organization, stand ready to assist in implementation efforts.

- Opposing the many facilitating factors, many challenges and constraints will be faced when attempting to accelerate the whole-of-government response, deepen citizen engagement, and build legislative capacity. Significant human and financial resources will have to be invested in several areas. For example, resources would be required to assist ministries and departments to re-engineer their processes to make them more attuned to integrated policy development. Resources would also be required for public education and engagement activities, especially with respect to bringing the processed-food industry on board, as well as for strengthening the capacity and functioning of civil society organizations and the institutions involved in undertaking legislative functions. Resource challenges would perhaps be the greatest barriers to moving forward with the proposed options.

REPORT

BACKGROUND AND POLICY CONTEXT

International context

Non-communicable diseases (NCDs) pose a serious health and development challenge to countries across the globe. Over 65 percent of mortality worldwide is attributable to NCDs (1) and it has been firmly established that unhealthy diets are one of the leading risk factors (2–5). Evidence from research also indicates that the environments in which people live influence their choices and behaviours (6,7). Where food intake is concerned, myriad physical, economic, policy and sociocultural conditions can influence food and beverage choices and determine dietary behaviours (8–10). The term 'food environment' refers to all of the factors that may influence an individual's food and beverage choices. These factors may occur in local settings such as in schools, workplaces or homes (referred to as the micro-environment) or at the broader sectoral level, for example in agriculture, manufacturing and trade (referred to as the macro-environment). Over the past decade and a half, the need to address these environmental conditions received heightened political attention, both internationally and in the Caribbean region.

The first Global Strategy for the Prevention and Control of NCDs, endorsed at the 53rd World Health Assembly, noted that prevention could be improved by altering trade, agriculture, fiscal and food program policies (11). Four years later, the Global Strategy on Diet, Physical Activity and Health, endorsed at the 57th World Health Assembly, recommended nutrition labelling, restrictions on advertising, sponsorship and promotion to children and pricing and taxation policies all in an attempt to change the relative

Box 1: Background to the evidence brief

This evidence brief mobilizes both global and local research evidence about a problem, three options for addressing the problem, and key implementation considerations. Whenever possible, the evidence brief summarizes research evidence drawn from systematic reviews of the research literature and occasionally from single research studies. A systematic review is a summary of studies addressing a clearly formulated question that uses systematic and explicit methods to identify, select and appraise research studies and to synthesize data from the included studies. The evidence brief does not contain recommendations, which would have required the authors of the brief to make judgments based on their personal values and preferences, and which could pre-empt important deliberations among stakeholders whose values and preferences matter in making such judgments.

The preparation of the evidence brief involved five steps:

1) convening a Steering Committee comprised of representatives from CARPHA and other key stakeholder groups;
2) developing and refining the terms of reference for the brief, particularly the framing of the problem and viable options for addressing it, in consultation with the Steering Committee and a number of key informants, and with the aid of several conceptual frameworks that organize thinking about ways to approach the issue;
3) identifying, selecting, appraising and synthesizing relevant research evidence about the problem, options and implementation considerations;
4) drafting the evidence brief in such a was as to present concisely and in plain language the global and local research evidence; and
5) finalizing the evidence brief based on the input of several merit reviewers.

The evidence brief was prepared to inform a stakeholder dialogue at which research evidence is one of many considerations. Participants' views and experiences and the tacit knowledge they bring to the issues at hand are also important inputs to the dialogue. One goal of the stakeholder dialogue is to spark insights–that can only come about when all of those who will be involved in or affected by decisions about an issue can work through it together. A second goal of the stakeholder dialogue is to stimulate those who participate in the dialogue and those who review the dialogue summary and the topic overview to take action to address the issue.

availability, affordability and acceptability of healthy and unhealthy foods (12).

In 2009, recognizing that many of the environmental drivers associated with unhealthy diets were global in nature, and lobbied by CARICOM governments for a global response, Commonwealth Heads of Government endorsed the call for a world summit on NCDs (13). The consequential 2011 United Nations High Level Meeting on NCDs concluded with a landmark political declaration that explicitly supported legislative, regulatory, fiscal and other measures to promote healthier diets. The declaration also called for implementation of the World Health Organization's (WHO) recommendations for the marketing of food and non-alcoholic beverages to children (14).

To support countries in realizing the commitments made under the UN declaration, the WHO produced a Global Action Plan (15) which again received endorsement at the World Health Assembly. The Action Plan was accompanied by a monitoring framework to track implementation. Five of the 25 indicators in the framework are related to healthy diets (16).

At the Second International Conference on Nutrition in 2014, Heads of States expressed concern that the global food system was increasingly constrained in its ability to provide adequate, safe and nutritious food due to resource scarcity, environmental degradation, climate change and unsustainable production and consumption patterns (17). The particular challenges faced by Small Island Developing States (SIDS), firstly as countries prone to natural disasters and secondly as net food-importing countries, was placed high on the agenda at the 2014 UN General Assembly. In the outcome document of the meeting, leaders committed to strengthening their agriculture, livestock and fisheries to improve food and nutrition security (18). More recently, the impact of climate change upon food availability was also echoed by the Parties to the Framework Convention on Climate Change in the Paris Agreement of 2015 (19).

Box 2a: A Decade and a Half of Calls for Action - Summary of the Main International Agreements and Policy Frameworks to Promote Healthier Food Environments

2016: WHO Report of the Commission on Ending Childhood Obesity
2015: Paris Climate Change Resolution
2015: WHO Global Strategy for Women's, Children's and Adolescent's Health 2016-2030
2014: SIDS Accelerated Modalities of Action (SAMOA) Pathway
2014: Second International Conference on Nutrition
2013: International Network for Food and Obesity / Non-communicable Diseases Research, Monitoring and Action Support (INFORMAS) Healthy Food Environment Policy Index (Food-EPI)
2013: World Cancer Research- NOURISHING Framework
2013: WHO Global Action Plan and Monitoring Framework for Prevention and Control of Non-Communicable Diseases 2013–2020
2011: UN General Assembly, Political Declaration of the High-level Meeting on the Prevention and Control of NCDs
2010: WHO Set of Recommendations on the Marketing of Foods and Non-Alcoholic Beverages to Children
2009: Commonwealth Heads of Government, Statement on Commonwealth Action to Combat NCDs
2009: Summit of the Americas supports the CARICOM call for a UN High Level Meeting on NCDs
2004: FAO Voluntary Guidelines to support the progressive realization of the right to adequate food in the context of national food security
2004: WHO Global Strategy on Diet, Physical Activity and Health
2000: WHO Global Strategy for the Prevention and Control of NCD

Box 2b: A Decade and a Half of Calls for Action – Summary of Political Declarations and Policy Frameworks to Promote Healthier Food Environments in the Caribbean Region

2016: The evaluation of the 2007 CARICOM Heads of Government Port of Spain NCD Summit Declaration
2016: Forty-First Meeting of the Council for Trade and Economic Development (COTED), Economic Sector-Related Aspects of Child Obesity Prevention
2015: CARICOM Strategic Plan for the Caribbean
2014: CARPHA, Plan of Action for Prevention and Control of Childhood Obesity
2011: Aruba Declaration on Obesity with Special Attention to Childhood Obesity
2011: CARICOM Regional Food and Nutrition Security Action Plan
2011: CARICOM/PAHO Strategic Plan of Action for the Prevention and Control of NCDs for Countries of CARICOM
2010: CARICOM Regional Food and Nutrition Security Policy
2009: Liliendaal Declaration on Agriculture and Food Security
2007: Declaration of St. Ann: Implementing Agriculture and Food Policies to Prevent Obesity and NCDs
2007: CARICOM Heads of Government, Declaration of Port of Spain: Uniting to Stop the Epidemic of Chronic NCDs
2005: Caribbean Commission on Health and Development

Regional context

Turning specifically to the Caribbean, since 2005 the Caribbean Commission on Health and Development drew attention to the role of environmental factors such as international trade in the population's consumption of energy-dense, nutrient-poor foods (20). This concern was later reflected in the 2007 Declaration of Port-of-Spain: Uniting to Stop the Epidemic of Chronic NCDs. In this declaration, Heads of Governments committed to 15 broad policy actions to address NCDs, 5 of which related directly to food environments and unhealthy diets (21). Very significantly also, the declaration called for the formation of multi-sectoral NCD Commissions. These Commissions or analogous bodies have since been established in 12 CARICOM Member States (22).

Building on the Declaration of Port of Spain, the Strategic Plan of Action for the Prevention and Control of NCDs 2011-2015 was completed jointly by CARICOM and the PAHO. Under the risk factor reduction and health promotion priority area, three objectives were identified for country action: the development of legislation to promote food security and healthy eating; regional nutrition standards and food-based dietary guidelines; and reduction of the salt content of processed foods (23).

The NCD challenge did not escape the attention of CARICOM Ministers of Agriculture who in 2007 released the Declaration of St Ann: Implementing Agriculture and Food Policies to prevent Obesity and NCDs, which committed to exploring and using agriculture and trade policies to ensure the availability and affordability of healthy foods (24). The Liliendaal Declaration on Agriculture and Food Security followed in 2009 (25) and the CARICOM Regional Food and Nutrition Security Policy and Action Plan (26,27) were then finalized.

More recently, in September 2014, the Council for Human and Social Development (COHSOD) endorsed the Caribbean Public Health Agency's (CARPHA) Plan of Action for Promoting Healthy Weights in the Caribbean (28). Although focused on prevention and control of childhood obesity, the plan recognized the importance of supportive environments and incentives to promote healthy eating. In November 2015, the economic dimension of the childhood obesity issue was brought into sharp focus at the 41st meeting of the Council for Trade and Economic Development (COTED), during which it was decided that further consultation should take place on the adoption of the following policy measures:

- Mandatory Food labelling;
- Nutrition standards and guidelines for schools and other institutions;
- Food marketing and portion sizes;
- Nutritional quality of food supply (levels of harmful ingredients);
- Trade and fiscal policies;
- Food chain incentives, particularly for fruits and vegetables (29).

In summary, altering the environmental influences on food intake, as a means of dealing with the current NCD epidemic is an established priority internationally and in the Caribbean and firm commitment to action has been expressed by the political leadership in the region. Table 1 outlines the various environmental influences on food intake, while Box 2a and Box 2b provide a snapshot of the main international and regional agreements that have been made in this regard.

The purpose of this evidence brief is to draw on the best available global and local evidence to help solve some of the pressing problems faced by Caribbean countries in bringing about the required changes. The process used to develop the brief is highlighted in Box 1. The brief aims to complement the many pieces of work that are currently being undertaken in relation to this issue. One such highly significant study is the evaluation of the 2007 Port of Spain NCD Summit and Declaration (30). The findings of this study will no doubt go a long way to accelerate policy and program responses in Caribbean countries.

Table 2 defines a list of key terms that will be used throughout the document, or that may be useful for informing deliberations about the problem, options and implementation considerations.

Table 1: Environmental influences on food intake

Type of environment	Physical environment	Economic environment	Sociocultural environment
Macro-environment	Food laws and regulation Food supply (agriculture and food manufacturing) Food technology Food marketing and promotion Food industry policies	Food taxes and subsidies Cost of food production, manufacturing, distribution and retailing. Cost of food technology Marketing costs Food prices	Society's attitudes, beliefs, and values related to food Traditional cuisine Modern cuisines Consumer demand Food status
Micro-environment	Food in home/household food security Choices available at school or work Food in local shops Proximity of fast food outlets Home grown foods	Family income Other household expenses Prices at local shops, schools and work canteens	Family eating patterns Peer attitudes Persuasion from advertising Festivities

Note: Adapted from: Egger and Swinburn, *An "Ecological" Approach to the Obesity Pandemic* (9) and Swinburn et al, *Dissecting Obesogenic Environments: The Development and Application of a Framework for Identifying and Prioritizing Environmental Interventions for Obesity* (8)

Table 2: Key terms relevant to the issues covered in this brief, or that may be useful for informing deliberations

Term	Definition
Civic engagement	The participation of private actors in the public sphere, conducted through direct and indirect civil society organizations and citizen interactions with government, business community and external agencies to influence decision making or pursue common goals (31)
Civil society organizations	The wide array of non-governmental and not-for-profit organizations that have a presence in public life, expressing the interests and values of their members or others, based on ethical, cultural, political, scientific, religious or philanthropic considerations. Civil society organizations refer to a wide array of non-governmental organizations and can include community and volunteer groups, labor unions, Indigenous groups, charitable organizations, faith-based organizations, professional associations, and foundations (32)
Food environment	The collective physical, economic, policy and sociocultural surroundings, opportunities and conditions that influence people's food and beverage choices, dietary intakes and nutritional status. It includes the overall food supply (what foods are available and at what cost), the food retail mix (the location of food retail outlets, the foods they sell, the prices they charge, the promotional strategies they use, and the nutrition-related activities they implement), and the food marketing and information environment designed to encourage consumers to adopt particular dietary behaviours (33,34).
Food security	Food security exists when all people at all times have access to sufficient, safe, nutritious food to maintain a healthy and active life. Commonly, the concept of food security is defined as including both physical and economic access to food that meets people's dietary needs as well as their food preferences (35).
Health-in-all-policies	An approach to public policies across sectors that systematically takes into account the health implications of decisions, seeks synergies, and avoids harmful health impacts, in order to improve population health and health equity (36)
Health sector and the health system	All of the activities whose primary purpose is to promote, restore and/or maintain health, and the people, institutions and resources, arranged together in accordance with established policies, to improve the health of the population they serve, while responding to people's legitimate expectations and protecting them against the cost of ill-health through a variety of activities whose primary intent is to improve health (37)
High-quality review	A systematic review of high methodological quality usually assessed using A MeaSurement Tool to Assess Reviews (AMSTAR), which rates overall quality on a scale of 0 to 11.
Inter-sectoral action	A recognised relationship between part or parts of the health sector with part or parts of another sector which has been formed to take action on an issue to achieve health outcomes (or intermediate health outcomes) in a way that is more effective, efficient or sustainable than could be achieved by the health sector acting alone(38)
Inter-sectoral governance	The set of political, legal and organizational structures that enables the coordination of multiple sectors and facilitate collaboration between different ministries, departments or sectors. Inter-sectoral structures are "tangible" or "visible" in terms of leaving a trace in the organogram or prescribing distinct entities or procedures inside government and administration (39)
Low-quality review	A systematic review of low methodological quality usually assessed using A MeaSurement Tool to Assess Reviews (AMSTAR), which rates overall quality on a scale of 0 to 11.

Term	Definition
Medium-quality review	A systematic review of moderate methodological quality usually assessed using A MeaSurement Tool to Assess Reviews (AMSTAR), which rates overall quality on a scale of 0 to 11.
Obesogenic environment	The sum of influences that the surroundings, opportunities, or conditions of life have on promoting obesity in individuals or populations' (8)
Policy coherence	A process through which governments make efforts to design policies that take account of the interests of other policy communities, minimize conflicts, maximize synergies and avoid unintended incoherence. A degree of incoherence may sometimes be inevitable, but trade-offs should be transparent and appropriate measures taken to mitigate negative impacts (40).
Regulation	The diverse set of instruments by which governments establish requirements for enterprises and citizens. Regulations include laws, formal and informal orders, subordinate rules issued by all levels of government, and rules issued by non-governmental or self-regulatory bodies to whom governments have delegated regulatory powers (41). It can include economic regulations where governments intervene directly in market decisions such as pricing, competition, market entry; social regulations to protect public interests such as health, safety, the environment, and social cohesion; and administrative regulations or administrative formalities. It therefore includes all forms of instruments including laws, subsidiary regulations, standards, national policies, fiscal measures and government-led self-regulatory initiatives.
Social determinants of health	The conditions in which people are born, grow, work, live, and age, and the wider set of forces and systems shaping the conditions of daily life. These forces and systems include economic policies and systems, development agendas, social norms, social policies and political systems (42)
Scoping review	Scoping reviews address broader topics where many different study designs might be applicable. They are less likely than systematic reviews to seek answers to specific research questions or to assess the quality of included studies (43).
Systematic review	A type of literature review, the purpose of which is to sum up the best available research on a specific question. This is done by using transparent procedures to find, evaluate and synthesize the results of several relevant research studies. Procedures are explicitly defined in advance, in order to ensure that the exercise is transparent and can be replicated. This practice is also designed to minimize bias (44).
Systematic realist review	Realist review is a strategy for synthesizing research which has an explanatory rather than judgemental focus. It seeks to describe the mechanism of how complex programmes work (or why they fail) in particular contexts and settings in rich detail (45)
Trade policy/liberalization	Trade policy comprises the rules and regulations governments put into place to govern transactions across national borders. Modern trade policy involves a huge array of different policy instruments designed to influence not just the physical movement of products across national borders, but the provision of services and economic exchange. It includes measures that influence trade across borders as well as "behind-the-border". The general thrust of modern trade policy is to reduce barriers to trade (46)
Whole-of-government	An umbrella term which is often used to describe the various approaches taken by governments to improve integration, coordination and capacity of its departments and agencies. It denotes public service agencies working across portfolio boundaries to achieve a shared goal and an integrated response to particular issues (47).
Whole-of-society	Refers to the need for public, private and civil society to act together to address multi-factoral determinants of risk and/or disease, and recognises the need for a coordinating mechanism for such actions.

THE PROBLEM

The interaction between environmental factors and dietary choices and their association with diet-related NCDs is complex and multifaceted. The problem can, however, be summarized as factors that either increase or decrease the availability, affordability, accessibility and acceptability of healthy food choices, or those that influence the demand and supply drivers of unhealthy food consumption. In the context of the Caribbean, attention must be brought to bear on some important dimensions of this issue:

- Food insecurity: Caribbean States are net food importing countries. This heavy reliance on imports as the main source of food has resulted in highly-processed unhealthy foods being widely available and affordable on the domestic market;
- Vulnerable groups: The surrounding environment faced by vulnerable groups, including children, urban populations and the poor, negatively impacts their food utilization choices;
- Disease Burden: Food environments can influence food choices and unhealthy food choices pose a major challenge to Caribbean countries because of the resulting heavy burden of diet-related NCDs;
- Implementation barriers: Although a range of cost-effective evidence-based policy interventions are available to address the various issues related to unhealthy food environments, Caribbean countries face a number of implementation challenges which constrain their ability to mount a comprehensive response.

Box 3: Mobilizing research evidence about the problem

The available research evidence about the problem was sought from a range of published and "grey" research literature sources.

Published literature that provided a comparative dimension to an understanding of the problem was sought using the following three health services research categories in MedLine- PubMed Special Queries:

- Appropriateness
- Processes assessment
- Outcomes assessment

These search categories increase the chances of identifying administrative database studies and community surveys. Published literature that provided insights into alternative ways of framing the problem was sought using a fourth category in MedLine, namely the one for qualitative research. Grey literature was sought by reviewing the MedCarib database in the EvIDeNCe portal, the websites of a number of regional and international organizations, such as PAHO, CARPHA, CARICOM, WHO and the World Bank.

Priority was given to research evidence that was published more recently, that was locally applicable (in the sense of having been conducted in the Caribbean), and that took equity considerations into account.

The above issues are discussed in more detail in the following section. All of them are important. **This evidence brief, however, focuses on the fourth dimension and presents three options that may be considered to tackle it.** We have chosen to focus on this area because solutions to these implementation challenges would provide the critical enablers needed to catalyze Caribbean governments' current response to diet-related NCDs.

Food insecurity

Small Island Developing States are a distinct group of developing countries with shared social, economic and environmental vulnerabilities: their populations, and markets are small; their resource base is narrow, fragile and prone to disruption by natural disasters; they have limited local capital for productive investment; and are price takers on the international market (48,49). Since 1992, the WHO recognized the small open economies of the Caribbean region as belonging to the group of SIDS.

Due to their relatively small land masses, the instability of domestic agricultural production and relatively high disposable income of the population, Caribbean countries are heavily reliant upon food imports to feed their populations. Almost all CARICOM countries import more than 60 percent of the food they consume. Half of them import more than 80 percent of their food consumption and only 3 countries—Belize, Guyana, and Haiti—produce more than 50 percent of their food (50). The relationship between these macro-environmental factors (the inadequacy and volatility of domestic agricultural production and the dependence on external food markets) and the consumption of nutritionally poor diets has increasingly been recognized, along with the major contribution of international trade.

There is evidence to suggest that international trade has affected dietary patterns through the price variable, with the relative cost of highly processed energy-dense diets being cheaper than diets consisting of whole grains, lean meats, fish, and fresh fruits and vegetables (51–53). Trade has been causally linked to increased food importation and increased consumption of a range of high-fat and high-sugar food and drinks, and escalating rates of obesity and NCDs(54). It has also been linked to the expansion of processed food markets in developing countries (55).

Removal of barriers to trade and foreign direct investment has facilitated market penetration by multinational food corporations, a phenomenon originally referred to as 'Coca-Colonisation' and 'McDonaldisation' in the 1980's and 1990's (51). Recent data has, however, continued to demonstrate the impact of removal or lowering of restrictions on foreign direct investment. For example, when Vietnam removed its restrictions on trade and investment, the increase in sales of sugar sweetened beverages climbed from 3.3% per capita per year to 12.1% per year, due to increased availability of sugar sweetened beverages from foreign companies (56).

Trade and investment agreements can also regulate the business environment. These type of 'deep integration' agreements have been found to impact availability, nutritional quality, price and promotion of foods in different locations. For example, following the signing of the North America Free Trade Agreement (NAFTA), imports of animal feed grains, soybeans, sugars derived from corn (including high-fructose corn syrup), processed 'ready-to-eat' snack foods, and dairy and meat products from the United States, as well as inward foreign direct investment in the food and beverage manufacturing sector by US-based companies, rose sharply in Mexico (57,58). These economic changes were also associated with a 12% rise in overweight and obesity rates.

In the Caribbean, the nutrition transition facilitated by international trade has also occurred. Although several countries in the region still produce significant amounts of food to sustain traditional diets consisting of domestic root crops, tubers, fruits, vegetables and pulses, these traditional food products

have largely been replaced in favour of low-nutrient energy-dense products high in fats, oils, sweeteners and sodium (50,28,59).

Vulnerable groups

Two important components of the micro food environment serve as potential risk factors in the diets of children and adolescents. Firstly, food advertising promotes largely energy-dense, nutrient poor foods and exposure has been found to influence children's food preferences, consumption, diet-related behaviours and health outcomes. A systematic review of the evidence on the extent, nature and effects of food promotion to children has confirmed that children, in both developed and developing countries, have extensive recall of advertised foods and that marketing and promotional activities influence their consumption patterns (60). This study showed that food promotion is dominated by television advertising, the majority of which promotes what is referred to as the Big Five: pre sugared breakfast cereals; soft-drinks; confectionary; savoury snacks; and offerings at fast-food outlets. Food advertisements were among the favourite type of advertising among children surveyed. The study also noted that parents, especially those from disadvantaged backgrounds, frequently yielded to children's requests to try advertised foods, with disadvantaged mothers being more likely to attribute importance to advertised food products than their more privileged peers. With respect to promotional materials, there is evidence that children's exposure to television commercials promoting fast food meal toys is associated with more frequent family visits to fast food restaurants (60,61).

Secondly, the local food environment around schools also has a significant influence on children's diets. Studies have found a positive association between children's BMI and the number of vendors around schools (62), as well as the number of vending machines available in schools (63). In the Caribbean region, the issue of food offerings and quality of meals consumed at schools was highlighted in Jamaica in a cross-sectional survey among high-school children in the inner city regions of Kingston (64). The findings suggested a correlation between the money provided to purchase lunch, and overweight/obesity. The percentage of children with obesity, who received $300 (US$2.50) for lunch, was more than twice as high when compared to those who received lunch money of $100 (US$0.80). The lunch choices of over 75% of the students surveyed consisted of fast food or snack items.

With respect to urban and disadvantaged populations, evidence is also emerging to suggest that poor and vulnerable populations living in 'urban food deserts' will eat foods available in their neighbourhoods, especially cheaper, calorie-dense, processed products. The retail food environment in deprived urban areas may therefore present a greater risk of poor nutrition for both adults and children due to the higher density of fast-food outlets and the limited availability of fresh fruit and vegetables (65–68). Living in close proximity to fast-food restaurants is associated with higher BMI and lower fruit and vegetable consumption, likely due to the nature of locally available foods (66).

Disease Burden

Unhealthy food environments pose a major challenge to Caribbean countries because of the associated heavy burden of diet-related NCDs. In the Caribbean, with the exception of Haiti, countries no longer have a heavy burden of communicable and nutritional deficiency diseases. Instead, they are now saddled with chronic non-communicable diseases, which are now their leading causes of death and ill-health—heart attack, stroke, high blood pressure and diabetes. This change in disease patterns is partially attributed to aging of the population, but largely to rapidly increasing risk attributed to unhealthy diets and physical inactivity.

Unhealthy food environments promote unhealthy diets, which put individuals at risk for obesity and its complications. Excessive salt, sugars, and fats are also risk factors for disease, independent of the effect of obesity. The Americas has the highest prevalence of overweight/obesity in the world, at 61.1%. Europe stands at 54.8%, the Eastern Mediterranean region at 46.0%, and Africa, the Western Pacific, and South-East Asia all stand below 30% (69). In the Caribbean, obesity rates in women range from 30% in Dominica to 52% in St. Kitts and Nevis, and among men, from 15% in Jamaica to 38% in St. Kitts and Nevis. Combining both overweight and obesity, rates range from around 50% - 80% (30). Both obesity and diabetes are significantly higher in women than in men, with, on average, women being twice as likely to be obese and 60% more likely to have diabetes (70). Childhood obesity, based on the WHO definition, exceeds 10% in 7 of 11 Caribbean countries with data, peaking at 18.2% among males and 23.6% among females in the Bahamas in 2013. In Barbados for example, 1 out of 3 children, 9-10-years old, are overweight or obese, an increase from 8.5% in 1981. Twelve percent (12%) had elevated blood pressure, which was associated with larger body size (71).

Obesity assessed by higher Body Mass Index (BMI) increases the risk for NCDs in adult women and men resulting in increases in coronary artery disease and ischemic stroke (69,72); type 2 diabetes mellitus (73); increased incidence and mortality from many cancers (74–76); chronic stress, depression and sleep disturbances (77); and poor asthma control (78). Overweight and obesity in women has negative effects on their reproductive health including their pregnancies, with increased risk of gestational diabetes, preeclampsia, operative delivery, fetal macrosomia, and neonatal morbidity (79,80).

Obesity in childhood and adolescence is associated with increased mortality in adulthood. There is a reported doubling of the mortality over 20 years, in adolescents over 18 year of age with BMI > 25 kg/m2 when compared to those with BMI <25kg/m2 (81). Obese children are likely to become obese adults with excess adult mortality due to well-known sequelae of cardiovascular disease, diabetes and cancer. Obesity in childhood is associated with both short and long-term impairments in health status. A high proportion of overweight or obese children will continue gaining weight, and are at increased risk for early onset of metabolic syndrome, cardiovascular disease, type 2 diabetes, musculoskeletal disorders and behavioral problems (82). Pulmonary and orthopedic problems are also directly related to the amount of excess weight as are metabolic and liver complications. Depression and stigma are important psychological burden affecting the quality of life of obese children (83).

The high burden of NCDs and their risk factors in the Caribbean causes deaths and ill-health among a young and middle-aged population, who are still in the work-force, in contrast, in North America, these deaths occur mainly among senior citizens. In the Caribbean, 4 out of 10 deaths among persons 30 – 69

years, are caused by preventable NCDs (84). Globally, in low and middle income countries, 20% of deaths due to NCDs occur among the working population, less than 60 years compared with 13.0% of deaths less than 60 years in high-income countries (1). The indirect cost implications due to these productivity loses may be quite significant.

Diabetes rates range from around 10% to 25% among adults in the region and hypertension from 20% to over 50% (85–87). Diabetes-related lower extremity amputations in Barbados are among the highest globally (88). Compared with North America, in Trinidad and Tobago diabetes mortality is 800% higher, cardiovascular disease mortality is 75% higher (84). NCDs also pose a significant financial burden for Caribbean countries. A 2003 study on diabetes and hypertension found direct health care costs to account for 17.6% to 175.3% of total public health expenditure in the Bahamas and Jamaica respectively (89). Another study examining the full economic burden of these two diseases estimated the costs to be unsustainable, ranging from 1.4% of GDP in the Bahamas to 8% of GDP in Trinidad and Tobago (90).

Thus, over the past several decades, the nutrition transition has taken place in the Caribbean. Food from the land has been largely replaced with highly processed, calorie-dense, nutrition-poor foods, that are imported and marketed aggressively to the population in the 18/20 countries in CARICOM that are high and upper middle income. Along with economic development has come increasingly sedentary jobs and living, resulting in an increasing burden of overweight and obesity. In several countries, adults in their twenties already are similar in weight to adults in their sixties and will likely continue to gain weight as they age. Obesity is a proven risk factor for a range of diet-related chronic non-communicable diseases: hypertension, heart attacks, stroke, diabetes. A new phenomenon of type 2 diabetes has now emerged in children due to the prevalence of obesity among them. The food environment is therefore directly linked to increased prevalence and mortality from chronic non-communicable diseases.

Implementation barriers

Researchers and international organizations have spent considerable time identifying cost-effective policy measures to improve food environments. The evidence suggests that in order to be effective, a comprehensive approach should be taken. This approach should consist of actions targeting each of the following areas:

- food composition
- food labelling
- food promotion
- food provision
- food prices
- food retailing
- food trade and investments (91,33,34)

Table 3a and 3b provide for each of these policy areas, an overview of the policy instruments or actions that have been found to be the most effective or promising. The core policy actions include: mandatory limits on artificial trans-fats; legislative and voluntary measures to reduce salt content; mandatory labelling of the front of packages with nutritional values; restrictions on the marketing and promotion of unhealthy foods to children; regulation of food nutritional quality and availability in schools, workplaces and at public institutions; taxes on carbonated soft drinks and other sugar-sweetened beverages; and subsidies on fruits and vegetables.

Caribbean governments, through their statements of accord with political declarations such as the Declaration of Port of Spain and the UN High-level Declaration, have signalled their commitment to take action in each of these policy areas. Studies assessing implementation progress in the Caribbean region have identified some advancements, but have also identified some critical weaknesses. In the area of food composition, for example, it was reported that the Barbados Salt Reduction Campaign resulted in significant reduction of salt content of various brands of bread, and pledges from other local food manufacturers to reduce salt levels (30). In the area of food provision, the school vending machine policy in Bermuda stipulates that vending machines in schools may only contain plain, unsweetened water and/or 100% juice (59). With respect to food prices, both the Government of Barbados and the Government of Dominica took action in 2015, introducing a 10% excise tax and a 10% tax increase on sugar-sweetened beverages respectively (30). No government in the region has, however, taken comprehensive action spanning all of the seven policy areas. Furthermore, policy implementation was found to be weakest in areas pertaining to regulation of the macro food environment (food labelling, product reformulation, trade and marketing), where legislation would most likely have to be passed to give effect to the policy measures (Box 4), (30,92).

The complexity involved in undertaking these public policy measures is well recognized and the necessity for governments to work across all state sectors while involving multiple stakeholders is well documented (93–95). Multi-sectoral action and multi-stakeholder partnerships have therefore been identified as necessary pre-conditions to achieving the comprehensive policy response (12,15,94).

With respect to the whole-of-government approach, the recently completed report on the evaluation of the Declaration of Port of Spain (30), identified the dire need for mechanisms within government to foster

a better working relationship between ministries. There are no formal mechanisms for health impact assessment of the policies of non-health ministries and agencies, therefore these policies can have negative impact on the social and behavioral risk factors. On the inclusion of multiple stakeholders and all-of-society in tackling the issue, a 2014 report concluded that the multi-sectoral response in the Caribbean is led by civil society organizations, however, this response is weak because these organizations are not fully engaged in the drafting and enactment of national policies and legislation (96). An assessment of the functioning of NCD Commissions, which also serve as vehicles for marshalling civil society and connecting it to the government, also uncovered critical challenges. Firstly, the Commissions were found to suffer significant human and financial constraints; and secondly, deficiencies of the State in working across portfolio boundaries produced an infertile ground for effective engagement (22).

Regarding the development of legislation to address food environments, a 2010 review of public health legislation pertaining to NCDs, found that no country or territory in the English-speaking Caribbean had enacted comprehensive legislation on the prevention and control of obesity, diabetes and cardiovascular disease (97). A more recent report on strengthening the regulatory capacity for NCD risk factors for the Americas noted that some Caribbean States face challenges in the formulation, implementation, review, and/or reform of health related-laws and regulations (98,99).

In summary, while the evidence-base for promoting healthy diets points to a suite of cost effective measures within seven policy spheres to shape food environments and there is growing consensus about the core policy actions that should be taken in each sphere (100,33,34,101), implementation of these measures in the Caribbean region has been constrained due to: i) the inherent difficulties faced in achieving an integrated whole-of-government response; ii) limitations in fully engaging all-of-society; and iii) weakness in the legislative development process in the region.

Box 4 Status of Implementation of the Port of Spain NCD Summit Declaration

Implementation of the Port of Spain NCD declaration in 20 CARICOM Member States is monitored annually using self-reported data from the countries about their compliance with 26 indicators. This information contained in the monitoring framework provides a good indication of the extent to which the political commitments have actually been translated into system changes or policy/ programs. The status of implementation, for 6 of the indicators that directly relate to food environments, in 18 countries with data for 2015 was as follows:

- Multi-sector NCD Commissions appointed: Nine countries reported full, current implementation of this measure. Seven reported that they were in the process;
- Multi-sector food and nutrition plan implemented: Nine countries reported full implementation, six reported in process;
- Trans-fat free food supply: No country reported that they had fully implemented this measure; three reported they were in the process;
- Policy and standards promoting healthy eating in schools: six countries reported that they had policies in place. A further ten reported that steps were being taken;
- Trade agreements utilized to meet national food security and health goals: One country reported that it had implemented this measure; three reported in process;
- Mandatory labeling of packaged foods for nutrition content: No country reported full implementation; seven reported in process/partial (92).

- Overall, the implementation rate (the percentage of countries reporting full or in process) was lowest for trans-fat free food supply (17%); trade agreements (22%) and mandatory labelling (39%).

Table 3a: Policy actions to address food environments that have been shown to be effective

Policy area	Policy action/ instrument	Available evidence	Type of study
Food composition	Removal of artificial trans-fats in all food products	Mandatory limits have virtually eliminated trans-fats in Denmark, Switzerland, Iceland, and Austria(102,103) and significantly reduced trans-fat consumption from restaurants in New York City (104)	Systematic review Single research studies
	Salt reduction	Widely identified as a cost-saving or highly cost-effective strategy. Both legislative and voluntary measures to reduce salt content of processed foods found to be cost–effective or cost-saving (105–107).	Systematic review Cost effectiveness studies
Food labelling	Mandatory, uniform Nutrition Facts Panels on all packaged retail grocery foods and beverages sold within region	One of the most cost-effective policy measures available to promote healthy diets; potentially cost-saving (106,108). Modest, positive impact on consumer purchasing, and on product innovation and reformulation (109).	Cost effectiveness study Systematic review Single research study
	Nutrition labels on packaged retail foods and beverages in conjunction with Nutrition Facts Panels	Simple, interpretative labels, with low density of information and incorporating text and colour, are the format most consistently preferred and understood by consumers, and improve purchasing and consumption behaviours (110–112). Stimulates reformulation of less healthy foods(109). A highly cost-effective public health measure (113)	Single research studies Systematic review Cost effectiveness study
Food promotion	Regulations to reduce children's overall exposure to unhealthy food advertising through all channels	Mandatory TV advertising restrictions highly cost-effective and are potentially cost-saving over long-term (106).	Cost effectiveness study
Food provision	Nutrition standards for all foods provided and sold in schools and early childhood services, based on generic regional guideline	Consistent evidence that whole-of-school approaches combining nutrition education, improvements in nutritional quality of foods available, including menu changes, support for teachers and other staff, and parent support and home activities, can be highly effective in changing children's eating behaviors (114).	Systematic review
Food prices	Adjustment of sales taxes to align with the nutritional value of foods	Fiscal measures are among the most cost-effective policy options available for promoting healthy diets (113,115). Taxes on carbonated soft drinks and subsidies on fruits and vegetables have potential for beneficial dietary and weight impact (116).	Systematic review Cost effectiveness studies

Note: This table is adapted from *Promoting healthy diets, food security and sustainable development in the Caribbean through joint policy action: CARICOM Technical Brief*(59) and *Monitoring and benchmarking government policies and actions to improve the healthiness of food environments: a proposed Government Healthy Food Environment Policy Index* (33).

Table 3b: Policy actions to address food environments that have been identified as promising

Policy area	Policy action/ instrument	Available evidence	Type of study
Food retailing	Incentives and rules to support availability of healthy foods and limit availability of unhealthy foods in communities	No clear evidence of effectiveness established. Zoning policies to attract food retailers to low-income neighbourhoods (e.g. farmers' markets and fresh fruit and vegetable outlets), and to limit availability of unhealthy food (e.g. zoning restrictions for fast-food outlets) around schools have been cited as possible best practices (117).	Single research study
Food trade and investments	Impact assessment of international trade agreements on national food policies, food environments, population diets, and the extent of protection of food sovereignty (35,73).	No clear evidence of effectiveness established. The Aid for Trade program has been cited as a positive example of global agencies collaborating to ensure that the health and trade sectors foster policy coherence across sectors (118).	Single research study

Note: This table is adapted from *Promoting healthy diets, food security and sustainable development in the Caribbean through joint policy action: CARICOM Technical Brief*(59) and *Monitoring and benchmarking government policies and actions to improve the healthiness of food environments: a proposed Government Healthy Food Environment Policy Index* (33).

THREE OPTIONS FOR ADDRESSING THE PROBLEM

Several approaches could be used to address the implementation barriers (achieving an integrated whole-of-government response; engaging all-of-society; and developing appropriate legislation) faced by Caribbean governments in attempting to alter food environments. One approach, which was selected by the Steering Committee and which was also supported by key informants (refer to Box 1), is to focus on the following three options:

- Option 1: Develop mechanisms to support sustainable implementation of a whole-of-government response to create healthier food environments;
- Option 2: Strengthen civic engagement in policy and law-making processes;
- Option 3: Strengthen the legislative process.

This evidence brief positions these three options as the requisites for successful implementation of the comprehensive set of cost-effective policy actions identified in Table 3a. These three options are not mutually exclusive, rather they are inter-dependent and should be collectively pursued.

The findings from systematic reviews about each option are discussed in the following sections. In instances where no systematic review was identified, findings from highly relevant single studies are reported. It is suggested that readers with limited time focus on the 'bottom line' messages contained in the summary paragraphs that appear at the end of each option, as well as the summary of findings tables, namely, tables 4, 5 and 6.

Box 5: Mobilizing research evidence about options for addressing the problem

The available research evidence about options for addressing the problem was sought from the following sources:

- CARPHA's EvIDeNCe Portal (www.carphaevidenceportal.bvsalud.org) which is a repository of research, syntheses and Caribbean policy-relevant documents. The Portal integrates resources from the Virtual Health Library, the MedCarib database and grey literature from CARPHA and from CARPHA Member States;
- Health Systems Evidence (www.healthsystemsevidence.org) which is a continuously updated database containing more than 4,400 systematic reviews and more than 2,200 economic evaluations of delivery, financial and governance arrangements within health systems.

Systematic reviews and economic evaluations were identified by searching both databases for reviews addressing each of the identified options and the approaches for addressing them. Quality ratings for all systematic reviews are AMSTAR scores, accessed from Health Systems Evidence, unless otherwise stated. Where a search for systematic reviews identified no relevant reviews, a search for single studies about the option was also undertaken. For all options, a search for single studies for the Caribbean region was also performed using the EvIDeNCe Portal.

The authors' conclusions were extracted from the systematic reviews. Some reviews concluded that there was substantial uncertainty about the option based on the identified studies. Being aware of what is not known can be as important as being aware of what is known. When faced with substantial uncertainty, or concerns about quality and local applicability, primary research could be commissioned, or an option could be pursued and a monitoring and evaluation plan designed as part of its implementation. When faced with a review that was published many years ago, an updating of the review could be commissioned if time allows.

Option 1 – Develop mechanisms to support sustainable implementation of a whole-of-government response to create healthier food environments

Whole-of-government is an umbrella term that is used to describe the various approaches taken by governments to improve the capacity for integration and coordination between its departments and agencies (119). It recognizes the inter-dependence between levels of government and seeks to foster greater collaboration across ministries and departments (horizontal collaboration) and/or greater collaboration at the national, regional and local levels (vertical collaboration). Various terms such as joined-up government, integrated government or horizontal government are often used synonymously to describe the same concept (47).

Strengthening the whole-of-government response is vital, not only because the State has principal responsibility to address diet-related NCDs and their environmental determinants, but also because fragmentation within the State's response can counteract the efforts of some branches, and negatively affect the ability and functioning of non-government partners. Poor coordination across government sectors can frustrate attempts to align government policies and impair wider multi-sectoral action. Three suggested approaches or elements for strengthening the whole-of-government response are implementation of:

- structures or arrangements to govern inter-sectoral action across public sectors
- processes to support integrated policy development
- mechanisms to evaluate policy coherence across public sectors

The focus of the first element is on governance arrangements, the second concerns processes for policy development, and the third emphasizes assessment of policy actions.

Searches for systematic reviews did not identify any publications that focused on whole-of government action or the suggested elements as the main research question. However, systematic reviews that indirectly addressed these issues were identified. The first category of review was concerned with the impact of inter-sectoral action on health and health-related outcomes, while the second examined integrated working between different parts of the health system. Given that the whole-of-government approach is based on the principle of inter-sectoral collaboration and requires integration and coordination between government departments, the findings from these reviews are of some relevance.

Two reviews, one of high-quality (120) and one of medium quality (121), both from the same project, examined the impact of policies, interventions and programs undertaken by the health sector in collaboration with other government sectors and non-government partners, on the social determinants of health and health equity (the outcome). Both studies concluded that the body of evidence is mixed, with inter-sectoral action having moderate to no effect on the social determinants of health. The first review (120), also identified the tools, mechanisms and strategies described in some of the included studies to support initiation and implementation of inter-sectoral activities. Some of the strategies and their characteristics explicitly described included: written agreements with clear roles and responsibilities for partners; resource commitment and stipulated outcomes; meetings with partners, community members and stakeholders; use of a champion; legislation and policy to direct the inter-sectoral activities;

multi-sectoral partnership committees; teams created specifically for implementation and coordination; and use of dedicated staff to carry out assigned roles.

It is important to note that the authors of this systematic review found limited or no evidence linking the use of these tools or strategies to changes in outcomes (the social determinants of health).

Another high-quality review examined integrated working relationships between primary health care professionals and staff in elderly care homes, and the impact this collaboration had on health and well-being of the elderly at these institutions (122). Integrated working was found to have mixed or no effect on the health and well-being of the elderly. The qualitative studies and process evaluations included in this review provided consistent evidence about the barriers and facilitators to integrated working. The barriers included: high staff turnover at care homes; limited availability of training; and failure to acknowledge the expertise of care home staff. The factors that enabled integrated working included manager's support for the intervention and dedicated time and the inclusion of all levels of staff in training.

Integrated governance was defined in one medium-quality systematic review as the collation of systems, processes and behaviours by which healthcare organizations lead, direct and control their functions in order to achieve organizational objectives (123). In this review, findings from process evaluations of integrated primary/secondary healthcare governance and service delivery structures were synthesized and ten key elements required for integrated governance in this context were identified (123). These were:

- joint planning, including the setting of goals and strategies and the use of formal agreements between organizations;
- use of integrated information communication technology;
- having an effective change management strategy and linking change to an improvement agenda;
- shared clinical priority areas;
- aligning incentives to support the integration strategy;
- population focused care;
- using data for quality improvement and redesign;
- professional development to support joint working;
- community/patient engagement; and
- innovation—supporting innovative approaches and making resources available for innovation.

All of the successful models of primary/secondary care integration included some combination of these ten elements. This review was also able to analyse the barriers and facilitators to integration identified across the 21 included studies. The key enablers included leadership, a vision that remained centre stage and commitment to the partnership. The most significant barrier identified was conflicting aspirations across different parts of the system.

The final review addressed collaborations between public health and primary healthcare and the structures and processes required to build successful collaborations (124). This review was of low methodological quality. Several facilitators for collaboration were cited. At the system level these included: i) government endorsement of value; ii) technical and financial support to teams for promoting the integration; and iii) sustained government funding. At the organizational level, the major facilitators

or tools used to support collaboration were identified as: i) community-based committees or boards with diverse membership; ii) joint planning; iii) organizational structures and processes that supported team communication; iv) contractual agreements; v) common governance structures; vi) parallel reporting; vii) job descriptions that explicitly required collaboration; viii) use of standardized systems for data collection and dissemination; and ix) shared protocols.

The search for single studies specific to the Caribbean region identified an old study that examined the integration of the health sector with other sectors in Jamaica (125). Based on her analysis, the author recommended: i) setting of clear goals; ii) sharing a common understanding of expectations across sectors; and iii) incorporation of potential beneficiaries into program planning and design as measures to improve inter-sectoral coordination.

- Summary

- Search for systematic reviews did not identify any reviews that directly answered the question about mechanisms that have been proven to work to bring about or to support whole-of-government action in general or in the context of NCDs and food environments.

- Available systematic reviews examined the impact of collaborative action—between health and other sectors, and between different parts of the health system—on health outcomes. The available evidence from these reviews is mixed. Inter-sectoral collaboration has moderate to no effect on the social determinants of health (120,121) and integrated working between primary care professionals and staff in elderly homes has mixed effects on health and well-being of the elderly (122).

- Several systematic reviews also provided evidence about the barriers and enablers to collaboration or integration in various circumstances, namely, collaboration between primary care professionals and elderly care home staff (122); integrated primary and secondary care governance (123); and collaborative arrangements between public health and primary care (124). A summary of the key findings from the systematic reviews of the research literature is provided in Table 4.

- The findings from a single study conducted in the Caribbean were closely aligned to the global evidence in that collaborative planning and goal setting were also identified as pre-conditions to improve inter-sectoral coordination with health and other sectors.

- To learn more about each systematic review and the specific citations for them please refer to Appendix 1.

Table 4: Summary of key findings from systematic reviews relevant to Option 1 – Develop mechanisms to support sustainable implementation of a whole-of-government response to create healthier food environment

Category of finding	Summary of key findings
Benefits	▶ **The whole-of-government response to improve food environments requires collaboration across all sectors of government and integrated working between various government departments.** ▶ One high-quality review was able to identify, from qualitative studies and process evaluations, the following facilitators to integrated working between primary healthcare services and elderly care homes: ▪ manager's support for the intervention ▪ dedicated time and the inclusion of all levels of staff in training (122) ▶ One medium-quality review, which included process evaluations of integrated governance and delivery structures, identified the following elements as common to successful models of integrated primary/secondary care governance: ▪ joint planning; ▪ integrated information communication technology; ▪ change management; ▪ shared clinical priority areas; ▪ aligned incentives; ▪ population focused care; ▪ measurement—using data for quality improvement and redesign; ▪ professional development; ▪ community/patient engagement; and ▪ supporting innovative approaches and making resources available for innovation (123). ▶ One qualitative scoping review suggested the following structures and processes facilitate successful collaboration between public health and primary care: ▪ government endorsement of value; ▪ technical and financial support to teams for promoting the integration; ▪ sustained government funding; ▪ community-based committees or boards with diverse membership; ▪ joint planning; ▪ organizational structures and processes to supported team communication; ▪ contractual agreements; ▪ use of common governance structures; ▪ parallel reporting; ▪ job descriptions that explicitly required collaboration; ▪ use of standardized systems for data collection and dissemination; and ▪ shared protocols (124)
Potential harms	▶ No systematic reviews identified potential harms associated with this option
Costs and/or cost-effectiveness in relation to the status quo	▶ No economic evaluations or costing studies were identified that could provide information about costs and cost-effectiveness of this option in relation to the status quo.

Category of finding	Summary of key findings
Uncertainty regarding benefits and potential harms (so monitoring and evaluation could be warranted if the option were pursued)	▶ Uncertainty because none of the systematic reviews directly addressed whole-of-government action. ▶ Uncertainty because no systematic reviews were identified related to the following sub-element: ▪ Mechanisms to evaluate policy coherence across public sectors.
Key elements of the policy option if it was tried elsewhere	▶ Not applicable
Stakeholders' views and experience	▶ Not applicable

Option 2 – Strengthen civic engagement in policy and law-making processes

To achieve a truly all-of-society response to food environments, actions that extend beyond all government sectors to include active participation of non-government players and the general public are required. It is suggested that one way to deepen civic engagement could be through the use of formal mechanisms to support such participation. The following was identified as a method to achieve this option:

- Develop formal mechanisms to support the participation of civil society and the food industry in development of policies and standards.

Civil society includes a wide array of non-governmental not-for-profit organizations, but also includes less formalized community and volunteer groups that play an important role working between average citizens, the private sector and the State to influence matters of public concern. Civil society organizations undertake functions such as representation (aggregate the citizen voice), advocacy, capacity building, service delivery, and may also provide technical information and advice (126). The food industry, especially processed-food manufacturers will be significantly affected by policy changes and are critical stakeholders in moving forward. As such, special attention should be given to them within this approach.

Two categories of systematic reviews related to this option were identified. One category consisted of just one review, which examined citizen participation in decision-making, while the other category consisted of over 20 systematic reviews that addressed community engagement in the design, development and implementation of health interventions. Given the volume of literature in this latter area, we only include findings from reviews that are of high or medium methodological quality. There were no reviews that specifically shed light on approaches to engage processed-food manufacturers in the policy-making and law-making processes, however, the findings from the available reviews can also be applied to these private sector organizations.

The first review, which focused on citizen participation, examined citizens' juries as a model for engaging the population in health policy decision-making (127). A citizens' jury brings together a group of citizens to deliberate on a particular issue, or policy options. Over several days, the citizens or jurors are exposed to information about the issue, hear a wide range of views from witnesses and after deliberating amongst themselves produce a decision or provide recommendations in the form of a citizens' report, which the policy-making body should act upon. In this way, a small group of average citizens have the opportunity to make important decisions in the public interest (128). Based on evaluation of the process, recruitment, presentation of evidence, documentation and outputs of 66 citizens' juries, the authors of this medium-quality review concluded that these juries can create a positive environment for deliberation on a range of complex public issues and deliver useable outcomes to inform policy and practice. To ensure that the juries provide an unbiased and inclusive deliberative process, attention should, however, be paid to four areas. Firstly, the recruitment strategy should ensure representation from a wide variety of experience and backgrounds. Secondly, there should be independent oversight of the process by a steering committee. Thirdly, an independent facilitator should be used to moderate the process and promote fair interaction and fourthly, the duration of the jury should provide sufficient time to explore issues. Almost

66 percent of the juries in the included studies were held over 1 - 2 days, however, the review offered no conclusive evidence about the ideal duration.

The second set of identified systematic reviews produced considerable evidence of the benefits of engaging communities in the development and implementation of health interventions (129–135). One high-quality review found community coalitions to be effective in bringing about changes in the health and behaviour of ethnic and racial minority populations (131). These coalitions provided a structured arrangement for collaboration with a broad base of participants representing diverse interest groups, agencies, organizations, and institutions. In particular, coalitions that focused their efforts on system level issues such as green spaces, neighbourhood safety, and regulatory policies and processes had a positive, albeit small and inconsistent, effect on the health and lifestyle issues of the ethnic and racial minority groups they served. Coalition-led interventions that sought to bring about changes in the healthcare and social care systems, such as changes in the behaviour of staff or policies and procedures to improve access to care, also consistently had a positive impact on health.

The community coalitions included in the 58 studies in this review were of three types: “grass roots” partnerships of predominantly community-based organizations; academic institution partnerships with communities; or public health agency partnerships with communities. These coalitions also differed in terms of their organizational and leadership structures, functioning, processes and strategies. Given these variances, the authors of this review were unable to make definitive statements about the characteristics of effective coalitions or the processes through which successful coalitions were able to achieved their results (131).

Two additional medium-quality systematic reviews from the same research project examined community engagement for disadvantaged groups. The results of these reviews showed that public health interventions that engaged disadvantaged communities had positive benefits by bringing about improvements in health behaviours, health consequences, self-efficacy and social support. Three models of engagement were examined in these reviews: the patient/consumer involvement model (the need for the intervention is identified by people outside the community, but community members are involved, either through consultation or collaboration, in developing the program); the community empowerment model (the health issue is identified by the community and they mobilize themselves into action); and peer/lay delivered interventions (individuals within the communities are themselves involved in delivery of the intervention). Variations in effectiveness among the three approaches were identified, however, both studies concluded that there was insufficient evidence to determine whether one model was more effective than another (129,130). The authors therefore suggested that the approach to community engagement should be ‘fit for purpose’ rather than ‘one size fits all’ (130).

Following on this theme, another high-quality study that reviewed various community engagement methods and approaches used in health promotion similarly concluded that the effectiveness of community arrangements in bringing about behaviour change depended upon the type of behaviour that was being targeted. For example, community coalitions were found to contribute to effective bicycle helmet use and to promote physical activity, however, community committees used in planning and designing an intervention were found to be effective in improving diet and in reducing drunk-driving (133).

A fifth, medium-quality systematic review of interventions for motor vehicle crashes among indigenous communities was able to identified the following features of successful community programs: i) focus groups; ii) community needs assessment; iii) technical training to community members; iv) educational activities; and v) incentive programs (135). This study also suggested that failure to incorporate cultural and contextual factors was a possible barrier to implementation of these programs.

The final systematic review, which interestingly looked at engaging communities in disease surveillance, included 57 research papers, the majority of which reported on the process involved in engaging communities in surveillance of zoonotic diseases (134). The authors found several contextual factors and behavioural mechanisms influenced community engagement in this context. The key factors that promoted high levels of community engagement were identified as: i) the use of multiple methods of communication and education; ii) repetition of education and awareness activities; iii) use of existing community groups to promote and deliver interventions; and iv) engagement of community members at all stages, including planning, delivery and evaluation.

Since we were unable to find systematic reviews directly related to private-sector engagement, and given the pivotal role to be played by the private food industry, a search for single studies was conducted. The literature in this area focus to a large extent on voluntary partnerships between government and the food industry towards product reformulation. Several examples of global, transnational and national initiatives with the industry, to promote healthier food environments are available (136,137). Although some research studies have identified benefits, others have questioned the achievements, in particular, the extent to which these partnerships have diluted broader public health goals and objectives (138,139). All in all, these initiatives have not been systematically evaluated and as such, no clear statement of the effectiveness of one approach versus another can be made. Notwithstanding this, consistent recommendations for strengthening their performance have emerged across the studies. Firstly, it is recommended that an independent, accountable body should be entrusted with administration of the program, for example a committee with equal representation from government, industry, and public health organizations, with no one party having disproportionate power or voting authority. Secondly, predefined standards, benchmarks and targets should be determined through the collection and analysis of data by a combination of scientists (not paid by industry), representatives of leading non-governmental organizations and parties involved in global health governance. Thirdly, there should be independent, transparent and comprehensive monitoring of the program, using baseline data and time-bound indicators. Monitoring should include mandatory public reporting of progress toward full compliance and the attainment of key benchmarks. Fourthly, incentives for compliance (such as positive publicity or subsidies) and dis-incentives for non-compliance (including “naming and shaming”, fines, expulsion from the program and threats of legislation) should be enforced; and finally objective external evaluation of the program should be conducted to determine the initiative’s overall success (136,140,141).

Finally, search for single studies specific to the Caribbean region identified a case study of public sector and non-profit organizations partnerships in Haiti during a disaster situation (142). This paper identified five inputs required for partnerships between public sector and non-profit organizations: communication; coordination; mutuality (supportive of each others missions and goals); common norms and trust (which substitute for formalized contractual arrangements); and experience working together. The findings from the case study concluded that communication, trust and experience working together were the most important inputs for a successful partnership of this type.

Another study conducted for Barbados, highlighted the important role played by policy entrepreneurs, in contributing to NCD policy development in that country, using the following approach: i) defining the problem through research; ii) preparing written seminal guidance for policy formulation; and iii) maintaining personal contact with politicians and other societal sectors to bring policy ideas to fruition (143).

- Summary

- One systematic review of medium quality indicates that citizens' juries constitute a promising model that allows citizens to interact with evidence and to deliberate and deliver recommendations to inform policy and practice on a range of health issues (128).

- There is solid evidence that community engagement has a positive impact on the outcome of health programs. Community coalitions were found to have a positive effect on the health of ethnic and racial minorities (131) and on the health of disadvantaged groups (129,130). It was less clear, which specific types of engagement strategies worked better in bringing about the expected program result and in actually achieving active engagement of community members.

- Findings from a study in the Caribbean identified communication, trust and experience working together as the three most important ingredients for successful partnerships between civil society organizations and the public sector (142) and another study identified policy entrepreneurs as playing an instrumental role in NCD policy development (143).

- A summary of the key findings from the systematic reviews of the research literature is provided in Table 5. To learn more about each review and the specific citations for them please refer to Appendix 2.

Table 5: Summary of key findings from systematic reviews relevant to Option 2 – Strengthen civic engagement in policy and law-making processes

Category of finding	Summary of key findings
Benefits	▶ **Develop formal mechanisms to support the participation of civil society and the food industry in development of policies and standards.** ▪ One medium-quality review found that citizens' juries create fertile environments for citizens to engage with evidence, deliberate and deliver recommendations that could be used in policy and decision-making on a range of demanding public health issues (127). ▪ Two reviews based on the same project (one medium-quality and one high-quality) found solid evidence that interventions that engaged the community using any of the following models had a positive impact on health outcomes: i) patient/consumer involvement in development; ii) peer-lay delivered interventions; or iii) empowerment of community approach (129,130) ▪ One high-quality review found that interventions led by community coalitions to bring about system changes in the community and changes in the healthcare and social care systems had positive effects by connecting health and human service providers with ethnic and racial minorities. Interventions that used lay community outreach workers also had a positive effect (131).
Potential harms	▶ The qualitative evidence from studies included in one systematic review suggested that a collaborative community engagement process may have unintended negative consequences which could include furthering alienation and disenfranchisement, and inhibition of innovative change (131)
Costs and/or cost-effectiveness in relation to the status quo	▶ No economic evaluations or costing studies were identified that provided information about costs and/or cost-effectiveness of this option in relation to the status quo
Uncertainty regarding benefits and potential harms (so monitoring and evaluation could be warranted if the option were pursued)	▶ Uncertainty because no studies were identified, despite an exhaustive search, specifically related to strategies for engagement of the food industry ▶ Uncertainty because although the evidence suggests that the citizen's jury model provides an opportunity for individuals to deliver recommendations useable in policy and practice, it was found that few juries actually succeeded in having their rulings considered by the decision-making body (127).
Key elements of the policy option if it was tried elsewhere	▶ One medium-quality review (127) found that recruitment strategies for citizens' juries that rely upon stratification, use of marketing researchers and honoraria tended to be more successful in enlisting diverse voices. ▶ One high-quality review indicated that the following factors promoted high-levels of community engagement in the context of community-based communicable disease surveillance: i) the use of multiple methods of communication and education; ii) repetition of education and awareness activities; iii) use of existing community groups to promote and deliver community interventions; and iv) engagement of community members at all stages including planning, delivery and evaluation (134). ▶ Another medium-quality review identified features of successful intervention strategies for motor vehicle crashes: i) focus groups particularly in the development stage; ii) community needs assessment; iii) technical training for community members; iv) educational activities; and v) incentive programs (135).
Stakeholders' views and experience	▶ No reviews provided information about stakeholders' views and experiences with this option.

Option 3 – Strengthen the legislative process

This option recognizes that many of the cost-effective policy actions identified in Table 3a require mandatory action to be taken and as such, the need for Caribbean governments to pass related legislation would become necessary.

Development of effective legislation should follow a systematic process that should include scoping, rule-making, implementation, enforcement and monitoring and evaluation. The process should also include technical consultations, avenues for social participation, clear paths for the defense of rights, and adequate support for communication (98).

Despite an exhaustive search, we were unable to identify any systematic reviews that evaluated the legislative process and could therefore provide insights about promising approaches for strengthening a country's capacity to develop laws to improve the food environments. However, we did find one low-quality systematic review that addressed the opposite side of this issue, namely, the factors that are likely to threaten the legislative process and undermine the likelihood of success of public health legislation (144). This review included a study of 99 research papers and identified four main threats: i) problem misidentification; lack of public support; lobby group opposition; and enforcement (low enforcement and insufficient resources for enforcement). The findings from this systematic realist review suggest that consideration of these factors by decision-makers are important steps in the legislative process.

Search for single studies for the Caribbean region did not identify any studies relevant to this option.

- Summary
  - Our search for systematic reviews did not identify any studies evaluating approaches for strengthening the legislative process.

Table 6: Summary of key findings from systematic reviews relevant to Option 3 – Strengthen the legislative process

Category of finding	Summary of key findings
Benefits	▶ Despite an exhaustive search, no systematic reviews were identified on strengthening the legislative process. ▶ One low-quality review suggested that decision-makers should consider the feasibility of or likelihood of success of public health legislation by examining the following questions: ▪ Is the severity of the problem sufficient to justify a law? ▪ Is there likely to be public support for such a law? ▪ Is there likely to be effective pressure group opposition? ▪ Is the law enforceable? (144)
Potential harms	▶ Not applicable.
Costs and/or cost-effectiveness in relation to the status quo	▶ No economic evaluations or costing studies were identified that provided information about costs and/or cost-effectiveness of this option in relation to the status quo
Uncertainty regarding benefits and potential harms (so monitoring and evaluation could be warranted if the option were pursued)	▶ Uncertainty because no systematic reviews were identified
Key elements of the policy option if it was tried elsewhere	▶ Not applicable.
Stakeholders' views and experience	▶ No reviews provided information about stakeholders' views and experiences

IMPLEMENTATION CONSIDERATIONS

The available evidence pertaining to each of the options proposed in this brief, to improve food environments, was outlined in the previous section. Successful implementation of new initiatives is, however, heavily dependent upon the interaction between the evidence (knowledge and experience), the context (the environment or setting in which the proposed change is to be implemented), and facilitation (the type of support needed to help change attitudes, skills, ways of thinking and working) (145).

When attempting to implement any of the options presented in this document, either individually, or in combination with each other, a number of challenges will be faced. These challenges will generally arise at three levels: at the level of citizens; at the level of organizations; and within the broader system (the food environment). These factors need to be carefully considered when making decisions about whether and how to move forward with any of the proposed approaches. Table 7 presents some of the potential barriers that were identified by the key informants.

Table 7: Potential barriers to implementing the options

General - Cross-cutting barriers relevant to all options
▶ **Financial** ▪ Significant resources will be required to: ○ support investments in standardized organizational processes and integrated information and communication technology; ○ create and maintain multi-sectoral partnerships; and ○ fully engage civil society and citizens. ▪ The food industry is investing heavily in marketing to promote increased sales of unhealthy foods, which is in opposition to public health goals and objectives. ▶ **Human resource** ▪ Development of new skills in the public service and other sectors may be required. These relate in particular to leadership, networking and coordination skills.
Option 1 - Develop mechanisms to support sustainable implementation of a whole-of-government response to create healthier food environments
▶ **Citizens** ▪ Citizens may resist inter-sectoral initiatives because they may not perceive new areas of functioning to be a legitimate part of the remit of existing ministries and government departments. ▶ **Organizations** ▪ Individual ministries and departments may resist attempts to re-align their work processes to make them compatible with the inter-sectoral whole-of-government approach ▪ The whole-of-government approach may create ambiguity about accountability frameworks and reporting structures. ▶ **Systems** ▪ Changes in political administration may thwart the vision for inter-sectoral action and erode the functioning of inter-sectoral governance structures. ▪ The traditional planning and budgeting process in the public sector is incompatible with the whole-of-government approach. The current process is not designed for individual departments or agencies to span-boundary lines.

▪ Assessment of the impact of policies is not a traditional part of the function of public sector organizations and will require significant changes in corporate culture. ▪ Competing demands faced by the health system (e.g. Chikungunya and Zika) are likely to draw political and management attention away from the issue of diet-related NCDs.
Option 2 – Strengthen civic engagement in policy and law-making processes
▶ **Citizens** ▪ Citizens are unlikely to participate if they are unable to obtain, process, and understand health information and the issues related to healthy food environments. ▪ Citizens would also be unwilling to participate if they do not have the assurance that their inputs would actually be used to influence policy decisions.
▶ **Organizations** ▪ Some civil society organizations currently operate with limited human and financial capacity and it may be difficult for them to expanding their functioning with their current resources.
▶ **Systems** ▪ The policy development and planning processes used in public agencies present limited avenues to directly incorporate the views of stakeholders.
Option 3 - Strengthen the legislative process
▶ **Citizens** ▪ Citizens may not support legislative action if they are not sufficiently educated about the issues.
▶ **Organizations** ▪ The processed-food industry is likely to oppose legislative measures if they are not sufficiently engaged. ▪ Processed-food manufacturers are likely to oppose fiscal measures (changes in taxation and prices) if it will affect their bottom line.
▶ **Systems** ▪ The current economic downturn faced by many Caribbean countries may intensify the State's reliance on financial support from the food industry and Governments may be unwilling to pursue legislative measures that may be in conflict with the interest of the industry. ▪ Although Caribbean States import much of their food, they comprise a small share of the international market. The extent to which domestic legislation regarding food composition and labelling could be effectively enforced for imported commodities is therefore questionable.

Despite these potential barriers, there are also several windows of opportunity that could be capitalized in pursuit of the options outlined in this brief (Table 8). These windows of opportunity should also be considered when deciding whether and how to pursue any of the options.

Table 8: Potential windows of opportunity for implementing the options

General - Windows of opportunity
▶ Political commitment to address unhealthy diets and their environmental determinants has been demonstrated regionally at the highest levels and consistently over time. ▶ Considerable evidence is available pertaining to a comprehensive package of policy actions, in each of the key policy areas, to effectively promote healthier eating. ▶ Several global monitoring frameworks and databases containing examples of implemented policies from around the world (e.g. NOURISHING and INFORMAS), are available to support government in implementing and monitoring policy actions in each of the key areas.
Option 1 – Develop mechanisms to support sustainable implementation of a whole-of-government response to create healthier food environments ▪
▶ Whole-of-government action is viewed internationally as a necessary step to address NCDs and the environmental determinants of unhealthy diets. ▶ Health-in-all policies is a recognized approach globally to promote health and protect health equity. ▶ The current economic downturn faced by many Caribbean countries may force Governments to seek out more efficient ways for the functioning of government departments and agencies and the public sector in general. ▶ The small sizes of Caribbean States make it relatively easy to work across sectors. In some countries, the critical agencies required for multi-sectoral action to address food environments fall under the same Minister or Ministry.
Option 2 – Strengthen civic engagement in policy and law-making processes
▶ There are many civil society organizations operating in the region and involved in NCD prevention. ▶ The Healthy Caribbean Coalition has been a vibrant civil society organization and can be used as a best practice model. ▶ Several regional institutions with the mandate to address food and nutrition security (e.g. Caribbean Agriculture Research and Development Institute-CARDI, Caribbean Farmers Network-CaFAN and Caribbean Industrial Research Institute-CARRI) operate in the region. ▶ At the level of CARICOM, the Intra ACP Agriculture Policy Program (APP) provides active support to sustainable development and integration of smallholder agriculture into national, regional and, where appropriate, global markets. ▶ The economic space and the free movement of labour created by the CARICOM Single Market and Economy (CSME) can facilitate easy sharing of expertise across the region.
Option 3 - Strengthen the legislative process
▶ The Memorandum of Understanding (MoU) between CARPHA and the International Development Law Organization (IDLO) signed in July 2014 and valid until December 31 2019, creates the opportunity for technical support to strengthen the legal environment for the prevention of disease and the protection and promotion of health in the Caribbean region.

The MoU envisages that IDLO and CARPHA will undertake a joint plan of work that support research, training and capacity building activities, relevant technical assistance, promote professional networks, and host joint conferences and seminars on relevant legal issues. The joint initiative aims to achieve the following objectives:

- Increased national and regional technical capacity in law and NCDs, with a focus on obesity, diabetes, healthy diets and physical activity;
- Enhanced empirical knowledge base through research conducted and published in support of policy and law reform; and
- Increased relevant information shared through national and regional networking.

In order to ensure that the program is integrated into existing regional structures and initiatives the Health Law Advisory Committee of the Caribbean (HLACC) was established to provide oversight to this initiative. The HLACC is comprised of individuals with diverse expertise, including public health, law, policy and advocacy, and experience in functional cooperation in health in the region.

- The PAHO REGULA initiative is focused on technical cooperation to strengthening the regulatory capacity for NCD Risk Factors in the region of the Americas.

- Regional institutions such as the Caribbean Law Institute Centre and the University of the West Indies are able to provide technical support for capacity building within the legal profession.

- Formal evaluations of regulatory initiatives to improve food environments are being carried out. The University of the West Indies Chronic Disease Research Centre (UWI/CDRC) is currently evaluating the impact of the introduction of the tax on sugar sweetened beverages in Barbados. The model is being developed to inform application in other Caribbean countries.

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Appendices were sent as a separate electronic document.
A hard copy of the appendices will be available upon request the day of the event