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## EDITED BY

Uma Tiwari,  
Technological University Dublin, Ireland

## REVIEWED BY

Afiya John,  
The University of the West Indies St. Augustine,  
Trinidad and Tobago  
M. Leonor Faleiro,  
University of Algarve, Portugal

## \*CORRESPONDENCE

Cassandra Halliday  
✉ cassandras.halliday@outlook.com

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# Trends in food supply, diet, and the risk of non-communicable diseases in three Small Island Developing States: implications for policy and research

Cassandra Halliday<sup>1\*</sup>, Karyn Morrissey<sup>2</sup>, Arlette Saint Ville<sup>3</sup>, Cornelia Guell<sup>1</sup>, Eden Augustus<sup>4</sup>, Leonor Guariguata<sup>5</sup>, Viliamu Iese<sup>6,7</sup>, Gordon Hickey<sup>5</sup>, Madhuvanti M. Murphy<sup>8</sup>, Emily Haynes<sup>1</sup>, Roberts Pierre Tesca<sup>9</sup>, Predner Duvivier<sup>9</sup> and Nigel Unwin<sup>1,10</sup>

<sup>1</sup>European Centre for Environment and Human Health, University of Exeter, Truro, United Kingdom, <sup>2</sup>Department of Technology, Management and Economics, Technical University of Denmark, Kongens Lyngby, Denmark, <sup>3</sup>Department of Geography, University of the West Indies St. Augustine, St. Augustine, Trinidad and Tobago, <sup>4</sup>The Faculty of Medical Sciences, University of the West Indies, Cave Hill, Bridgetown, Barbados, <sup>5</sup>Department of Natural Resource Sciences, McGill University, Montreal, QC, Canada, <sup>6</sup>Pacific Centre for Environment and Sustainable Development, University of the South Pacific, Suva, Fiji, <sup>7</sup>School of Agriculture, Food and Ecosystem Sciences, Faculty of Science, The University of Melbourne, Dookie Campus, Melbourne, VIC, Australia, <sup>8</sup>George Alleyne Chronic Disease Research Centre, University of the West Indies, Cave Hill, Bridgetown, Barbados, <sup>9</sup>Faculty of Agriculture and Veterinary Medicine, State University of Haiti, Port-au-Prince, Haiti, <sup>10</sup>MRC Epidemiology Unit, University of Cambridge, Cambridge, United Kingdom

**Introduction:** Small island developing states (SIDS) are a diverse group of coastal and tropical island countries primarily located in the Caribbean and Pacific. SIDS share unique social, economic, and environmental vulnerabilities, high dependency on food imports, and susceptibility to inadequate, unhealthy diets, with high burdens of two or more types of malnutrition. Our objective was to examine trends in food availability, imports, local production, and risks of non-communicable diseases (NCDs) in three SIDS: Haiti, Saint Vincent and the Grenadines (SVG) and Fiji.

**Methods:** Data on food availability, imports, exports, and production was extracted from the Food and Agriculture Organization Database (FAOSTAT), and on overweight, obesity and diabetes prevalence from the NCD Risk Factor Collaboration database (NCD-RisC) from 1980 to 2018. Data were collated, graphed, and used to calculate import dependency ratios (IDRs) using Excel and R software.

**Results:** Between 1980 and 2018, the availability of calories per capita per day has risen in Fiji and SVG by over 500, to around 3000. In Haiti, the increase is around 200, to a level of 2,200 in 2018, and in all three settings, > 10% of calories in 2018 came from sugar. In Fiji and Haiti, the availability of fruit and vegetables is < 400 g per person per day (the minimum intake recommended by WHO). Between 1980 and 2010, both Fiji and SVG experienced high IDRs: around 80% (Fiji) and 65% (SVG). In Haiti, IDR has more than doubled since 1980, to around 30%. The prevalence of obesity (BMI > 30 Kg/m<sup>2</sup>) has increased since 1980 (by 126% to 800%) and is substantially higher in women. In the most recent data for Fiji, an estimated 35% of women are obese (24% men); in SVG, 30% women (15% men); and in Haiti, 26% women (15% men).

**Conclusion:** The increase in per capita availability of calories, which has taken place since 1980, is concurrent with an increase in IDR, a loss of local food, and increases in obesity prevalence. These findings highlight the importance of further research to understand the drivers of food supply transformations, and to

influence improving nutrition, through production, availability, and consumption of nutritious local foods.

#### KEYWORDS

small island developing states (SIDS), import dependency, food availability, obesity, local food production

## Introduction

Small island developing states (SIDS) are a geographically widely dispersed group of 58 countries and territories with a total population of 61 million. Thirty-eight are independent countries and full members of the United Nations, the majority of which are located in the Caribbean and Pacific (United Nations, 2015). Over two-thirds of independent SIDS are low- or middle-income countries, with over a quarter (10 countries) falling into the category of “least developed”. SIDS share common environmental, social, and economic vulnerabilities. They also share vulnerabilities related to food insecurity and nutrition-related diseases<sup>1</sup>.

Over the past few decades, and in common with other parts of the world, SIDS have undergone dietary and nutrition transition, with increased availability and consumption of animal protein and foods high in sugar, salt, fat, and low in fiber (FAO, 2017). These changes are associated with underlying trends in the globalization of economies, including food systems and in urbanization (Popkin and Gordon-Larsen, 2004; Popkin, 2015). Lower levels of physical activity alongside these dietary changes have contributed to global increases in overweight and obesity and related non-communicable diseases (NCDs), such as diabetes, hypertension, atherosclerotic cardiovascular disease, and certain common cancers (World Health Organization, 2018a).

Readily available data, such as through the Global Nutrition Report<sup>1</sup>, suggests that all the SIDS in the Caribbean and Pacific have at least a double burden of malnutrition, typically with a high prevalence of adult overweight/obesity and of anemia in women of reproductive age. Several SIDS, including Haiti in the Caribbean and the Solomon Islands in the Pacific, also have a high prevalence of childhood stunting<sup>1</sup>. These levels of malnutrition are associated with high rates of non-communicable disease (NCD) in adults. For example, the prevalence of diabetes ranges from 1 in 12 adults in SIDS at the lower end of the range to over 1 in 4 adults in higher prevalence countries (Saeedi et al., 2019). The probability of premature death (before 70 years) from an NCD is 20% in most SIDS and over 30% in several (World Health Organization, 2018b). A key factor associated with these high burdens of malnutrition and related disease is an increasing reliance by most SIDS in the Caribbean and Pacific on food imports, which tend to be relatively cheap, energy-dense, highly or ultra-processed and of low nutritional quality (FAO, 2017).

In recognition of their high levels of food insecurity and nutrition-related diseases, the governments of SIDS in 2014 adopted the goal of ending malnutrition in all its forms by 2030 (Loke and Leung, 2013; UN, 2014). A programme for achieving this

goal was agreed upon in 2017: the Global Action Programme on Food Security and Nutrition in Small Island Development States<sup>1</sup>. This provides a framework around three broad areas: building enabling environments, developing sustainable and resilient food systems and empowering people and communities for food security and nutrition<sup>1</sup>. The system-wide approach promoted by the Global Action Programme includes interventions to increase local food production that are socially, economically, and environmentally sustainable.

It is within this context that the study ICoFaN (Intervention Co-creation for Food and Nutrition in Small Island Developing States) was established, a collaborative project with researchers and non-governmental organizations (NGOs) in the Caribbean, Pacific, Canada, and Europe. Work is taking place in three SIDS across two regions: Haiti and SVG in the Caribbean, and Fiji in the Pacific. The specific aim of the study presented here is investigate how food supply, and the risk of diet related health conditions have changed since 1980 in the three project countries, and to use the findings to inform priorities for policy relevant research aimed at improving food security and nutrition.

## Methods

This study uses routinely available data to describe trends over time in the food supply, diet, and diet related NCD prevalence in two SIDS in the Caribbean and one in the South Pacific.

## Data sources

### FAOSTAT and NCD Risk

National-level data on food availability, imports, exports, and local production for Haiti, Fiji and SVG were downloaded from FAOSTAT (<http://faostat.fao.org>). FAOSTAT is an open-access database created by the Food and Agriculture Organization of the United Nations (FAO) to provide data on food supply and security, trade, and import and export values on a national level. Food Balance Sheets provide a broad overview of food supply (imports, exports, and local production) to describe the supply (availability for consumers) and per capita supply (availability per person) of around 16 major commodity groups. It does not provide estimates on what percentage of the available food has been consumed. The data available is presented in grams per capita per day or in calories per capita per day, calculated by dividing the availability by national population estimates. Although there are some limitations to FAOSTAT data discussed below, it is generally accepted that as the only large-scale standardized source of country-level food availability data, FAO Food Balance Sheets are a good indicator of

<sup>1</sup> The Global Nutrition Report (2020). Available online at: <https://globalnutritionreport.org/reports/2020-global-nutrition-report/>.

food supply trends over time so is the primary data source used for this paper.

FAO data on availability is separated into food sourced from local production and food imported. Estimates on the extent of each country's self-sufficiency and dependency on imports over time were recorded from this data. Two measures commonly used are the import dependency ratio (IDR) and the self-sufficiency ratio (SSR) (Loke and Leung, 2013). The SSR and IDR can be used for both individual food groups and aggregated groups. The equations used to calculate SSR, and IDR are as follows:

$$SSR = \frac{P}{P + M - X} 100\%$$

$$IDR = \frac{M}{P + M - X} 100\%$$

where P = local production of food; M = food imports; and X = food exports.

After these initial calculations, IDRs for some years exceeded 100%. IDRs over 100% occur in countries where many imported food items are exported instead of consumed (re-exports) or when part of an exported product must be imported. Therefore, these measurements need to be modified to account for re-exports to accurately assess import dependency and self-sufficiency. The modified IDR (MIDR) and modified SSR, or localization ratio (LR), are calculated as follows:

$$MIDR = \frac{M - X_m}{P + M - X_m - X_p} 100\%$$

$$LR = \frac{P - X_p}{P + M - X_m - X_p} 100\%$$

Where  $X_m$  = imports which are re-exported and  $X_p$  = exports from local production.

FAOSTAT does not provide data on re-exports, but it is possible to identify them for specific food groups under certain conditions. For example, re-exports could be determined from the absence of either local production, imports, or export data, which varied for each country, and the MIDR and LR were calculated using weight.

Data on overweight and obesity for the three project countries were taken from the NCD Risk Factor Collaboration (Risk Factor Collaboration, 2022). This collaboration has collated data from over 2,000 population-based studies from 193 countries and used Bayesian hierarchical modeling to estimate trends in mean BMI and the prevalence of overweight (BMI 25 kg/m<sup>2</sup> to < 30 kg/m<sup>2</sup>) and obesity (BMI 30 kg/m<sup>2</sup> and above) in men and women aged 20 years and above in 200 countries. Details of their methods have been published (Di Cesare et al., 2016; Bentham et al., 2017). We took the NCD-RisC data on the age-standardized prevalence of overweight and obesity in adults aged 20 years and above for each of the three project countries.

## Food groups of interest

Given the limited range of food items on which it was possible to calculate re-exports for MIDR and LR, the decision was made to focus on those food items that are known to be related to the risk of NCDs. Therefore, we used fruit and vegetable availability as a general indicator of access to healthy diets and decreased NCD risk

(Lock et al., 2005; Pem and Jeewon, 2015), and sugar and red meat availability as indicators of access to unhealthy diets and increased NCD risk (WHO, 2015; Johnston et al., 2019). Because of their numerous nutritional benefits and potential to minimize the risk of NCDs, fruits and vegetables are crucial components of healthy diets. The EAT-Lancet Commission emphasizes the overall need for nations to limit their consumption of red meat and animal-sourced goods and adopt a diet rich in plant-based foods beneficial to human and planetary health (Willett et al., 2019). The World Health Organization recommends a minimum intake of 400 g/day of fruits and vegetables to reduce the risk of NCDs (Lock et al., 2005). In addition, the World Health Organization recommended that sugar intake be limited to 10% of total energy intake for adults (about 50 g per day), and red meat is recommended to be limited to 70 g per day (Bouvard et al., 2015).

## Data management and analysis

Data from FAOSTAT and NCD-Risc was downloaded as XLW files and compiled. Based on considerations of varying data availability across the two databases it was decided to focus on trends from 1980 onwards. IDR and SSR calculations were done in excel. All food categories were de-aggregated, and for those categories in which it was possible, MIDR and LR were calculated in excel. All files were converted to txt and uploaded to R Studio. In R, files were converted to time series data and plotted. No formal statistical analysis was undertaken in R, as the aim was to produce visual representations of changes over time to inform hypotheses to guide further work. Several alternate units of measure could have been used for this study, such as nutritional value or monetary value. We use calories from all food sources combined and from sugar, thus enabling proportion of all available calories from sugar to be determined. For all other measures we use weight as the unit of measure.

## Results

### Availability of calories

The per capita availability of calories from all food sources imported and locally produced has increased in all three settings since 1980 (Figure 1). The per capita availability of calories from sugar, including mono- and di-saccharides (sucrose, lactose, galactose, etc.), syrups, maltodextrins, honey, and others (polyols, polyfructoses), but not including sugar from fruits or sugar-sweetened beverages increased in Fiji but stayed about the same in Haiti and SVG since 1980 (Figure 2). This means that the proportion of calories available from sugar has stayed the same over time in Fiji and decreased in Haiti and SVG.

### Fruits and vegetables

This category includes leafy and non-leafy greens, tubers (potatoes, yams, cassava, sweet potatoes, and taro), tropical fruits grown locally (bananas, plantains, citrus fruits, and pineapples) and imported fruits and vegetables. The availability

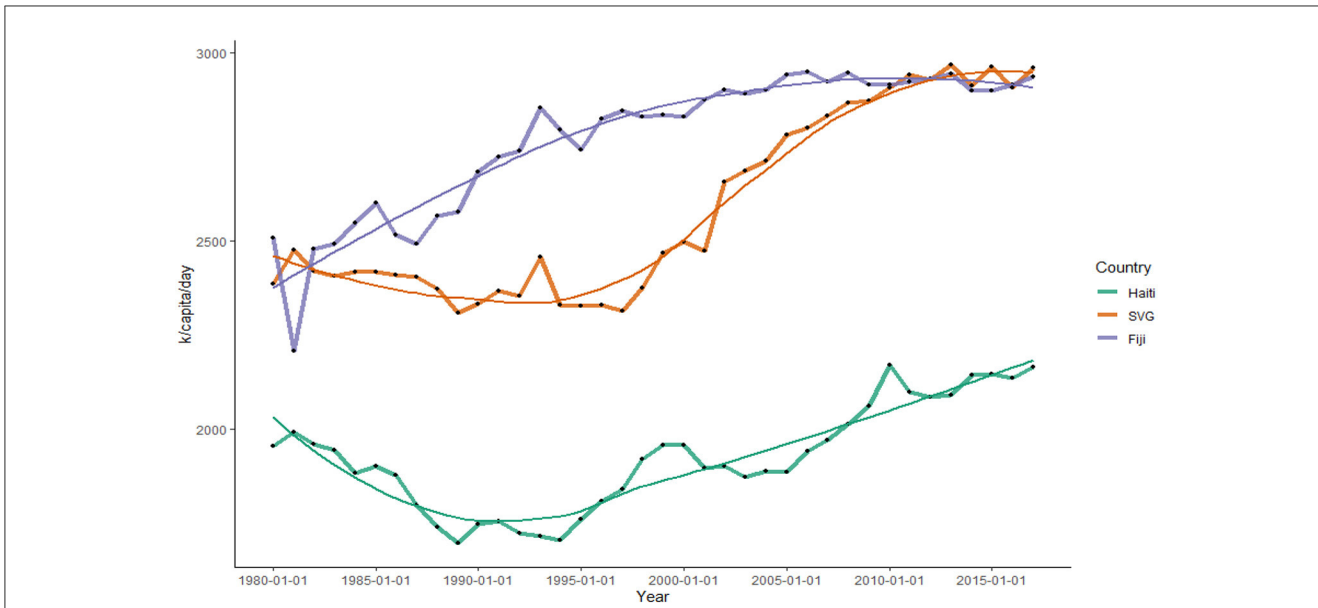


FIGURE 1 Total availability of calories from Haiti, SVG and Fiji since 1980.

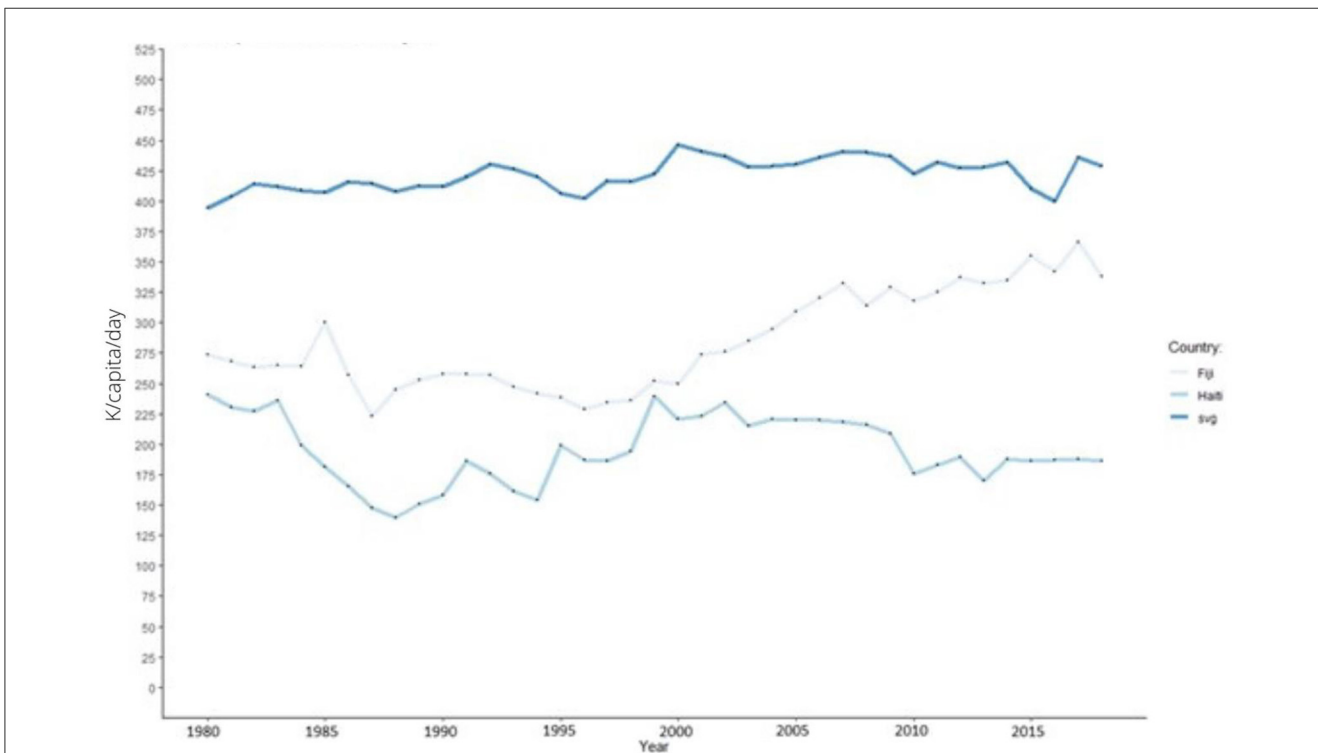


FIGURE 2 Availability of calories from sugar (does not include sugar sweetened beverages).

of fruits and vegetables has increased in both SVG and Fiji since 1980 (Figures 3A, B). However, only SVG has above the recommended intake of fruits and vegetables (400 g/day) available per person.

### Red meat

Red meat includes mixed or unspecified: fresh and processed beef, mutton, goat, and pig meat. Availability in grams per capita

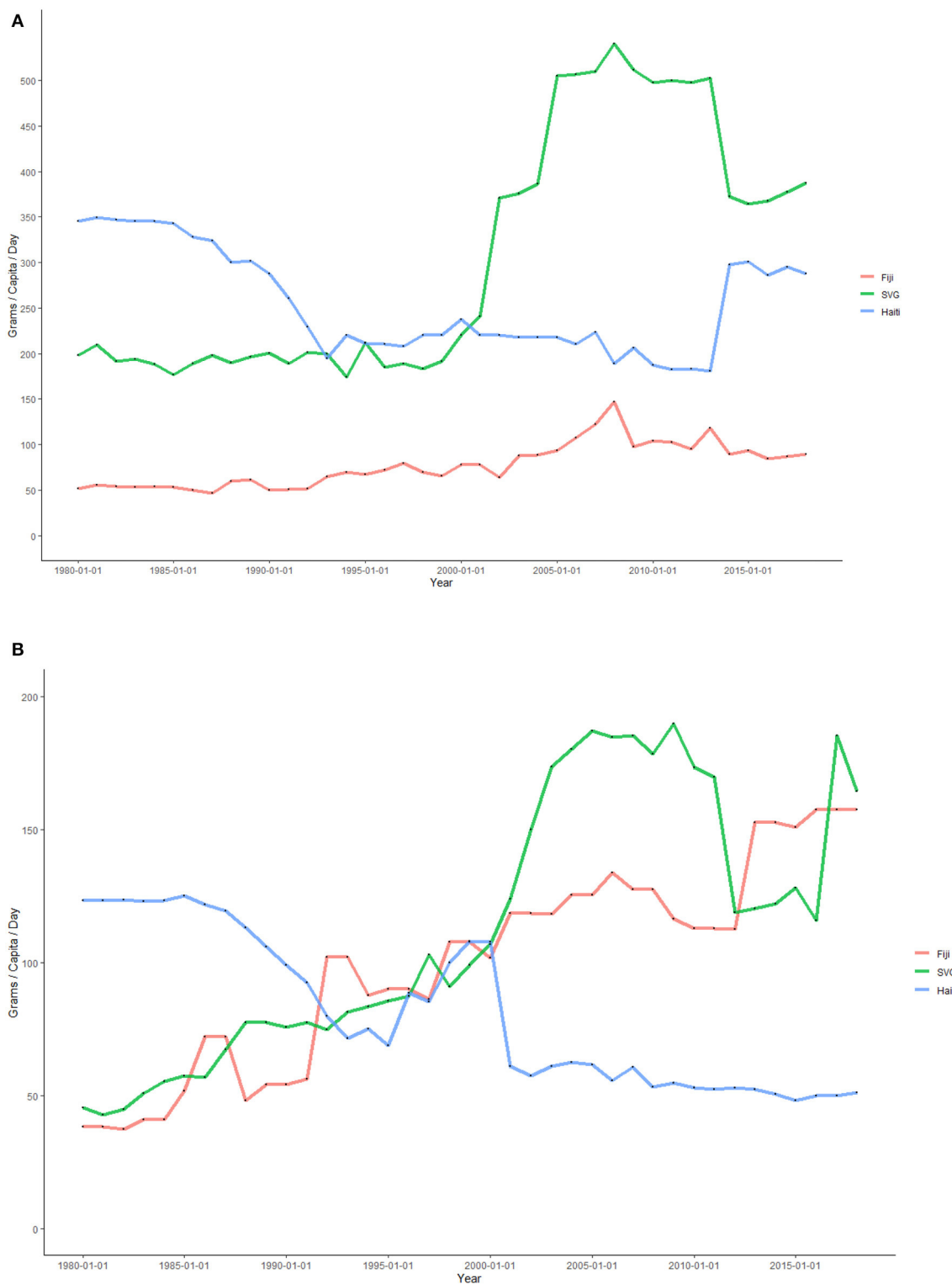


FIGURE 3  
(A) Per capita availability of fruit in grams. (B) Per capita availability of vegetables in grams.

per day is highest in Fiji, and has increased from 60 grams in 1980, to 91 grams in 2000, and decreasing recently. Red meat availability in Haiti has also decreased, by 48.2% from 23 grams in 1980, while availability in SVG has increased by 83.8% from 27 grams in 1980.

### Import dependency, modified import dependency, and localization ratio

The initial analysis of import dependency indicated that all three settings were over 100% dependent on imports for

specific recent years. While the IDR exceeding 100% may look contradictory, it implies that there is food that is re-exported, perhaps because it is processed or stored before its final market destination. As described in the methods section, re-exports are not specifically identified in FAOSTAT data, but it is possible for certain food categories to calculate modified import dependency ratios (MIDR) and localization ratios (LR). MIDRs fluctuated between 10 and 65% in SVG, 35 and 80% in Fiji, and 5 to 30% in Haiti. Local production of fruit since 1980 has increased in all three SIDS between 41 and 119%, while local production of sugar increased in Fiji and SVG by 48 and 100%. Local production of vegetables has increased by 875% in Fiji and by 150% in SVG, but decreased by 46% in Haiti, and local production of root vegetables has increased in Haiti and Fiji, by 144 and 451%, and decreased in SVG by 37%. LRs for those foods it was possible to derive them on (see [Table 1](#)) are shown in [Figure 4](#).

## Overweight and obesity

According to data from NCD-RisC, the prevalence of overweight (BMI  $\geq 25$  to  $\geq 30$  Kg/m<sup>2</sup>) and obesity (BMI  $> 30$  Kg/m<sup>2</sup>) has increased markedly since 1980 (by 126 to 800%) in all three countries ([Figure 5](#) shows data from 1990 to 2015). In all three countries obesity is substantially higher in women than men. In the most recent data for Fiji, an estimated 35% of women are obese (24% men); in SVG, 30% women (15% men); and in Haiti, 26% women (15% men).

## Discussion

This study set out to investigate how food supply and the risk of diet-related health conditions have changed since 1980 in three SIDS and to identify priorities for policy-relevant research aimed at improving food sovereignty, nutrition and reducing the burden of diet-related NCDs. The data suggest that in all three countries the per capita supply of calories has increased substantially, by around twenty five percent in Fiji and SVG, and ten percent in Haiti. Over ten percent of calories in all settings are from sugar, and in Fiji and Haiti the supply of fruit and vegetables is insufficient to meet to minimum dietary intake recommendations. Concurrent with these changes have been marked increases, particularly in women, in the prevalence of overweight and obesity, and data from NCD-RisC, not presented here, indicate a marked increase in the prevalence of diabetes ([Zhou et al., 2016](#)).

## Data limitations

Before considering these findings and their implications in detail it is important to acknowledge some of this study's limitations. The estimates of food supply are from FAOSTAT data, specifically from the Food Balance Sheets (FBS). FBS data are created on a national level by collating various sources, including household surveys on food consumption habits, estimates from trading partners, reports on local production, and government data on imports and exports. As a result, coverage can vary, and FAO

data sources may not show the complete picture of a country's food supply. For example, local production is measured at the end of the main harvest period. However, there may be secondary harvests of crops for export and consumption unaccounted for in the FAOSTAT database. In addition, in small holder farming systems where farmers are dispersed, disaggregated and market systems are informal (e.g., farmer's markets, fruit stands, pop up vending, at the farm gate) means that meaningful data collection may be neither practical or possible. Furthermore, subsistence farming either for personal consumption, consumption by relatives, or on-farm use is a common and an essential source, although it is rarely recorded in FAO statistics. In this study we were also interested in changes since 1980 in the proportions of the food supply that are imported rather than locally produced. It is not possible to estimate this properly for all food groups, for two reasons. Firstly, data are not available on re-exports of imported foods. This means that where a food group is produced locally, imported, and exported it is not possible to calculate what proportion of the local supply is imported. Secondly, data on imports, exports, and local production often had missing years or were missing for specific food categories. For these reasons we were unable to calculate modified import dependency ratios and localization ratios for all food groups.

The data on overweight and obesity are from the NCD risk factor collaboration. These data are modeled estimates, based where available on local survey data. In the absence of local survey data, the estimates are modeled on data from comparable settings.

## Concurrent trends in food supply and obesity

There are marked differences in the trends in food supply between the three settings, most clearly between Haiti and the other two. The calories per capita per day in Haiti in 1980 were around 2000, falling in the mid-1980s and only returning to 1980 levels by the year 2000. This reduction in food supply was associated with a period of major political change and instability, moving from the longstanding Duvalier dictatorship to a democratically elected president in December 1990, followed a few months later by a military coup in 1991. An international embargo followed the coup, and in this time childhood malnutrition and mortality increased ([Reid et al., 2007](#)). During the period of the embargo citrus crops start to be affected by greening disease ([FAO, 2013](#)), and this is part of the explanation for the marked fall in per capita fruit supply seen during this time, which persisted for the next 20 years.

Although it has increased since 1980, per daily per capita calorie supply in Haiti remains around 800 kcal lower in Haiti than in SVG or Fiji. Today Haiti's supply of calories remains 2,250 per person per day. The facts that intake will be less than supply, and that there is inequitable access to food supply, mean that almost half of Haiti's population is faced with acute food insecurity, one of the highest rates globally ([World Food Programme., 2022](#)). A consequence of this is the persistence of high levels of childhood stunting, at around 20% of children under

TABLE 1 Food Groups included for MIDR and LR calculations.

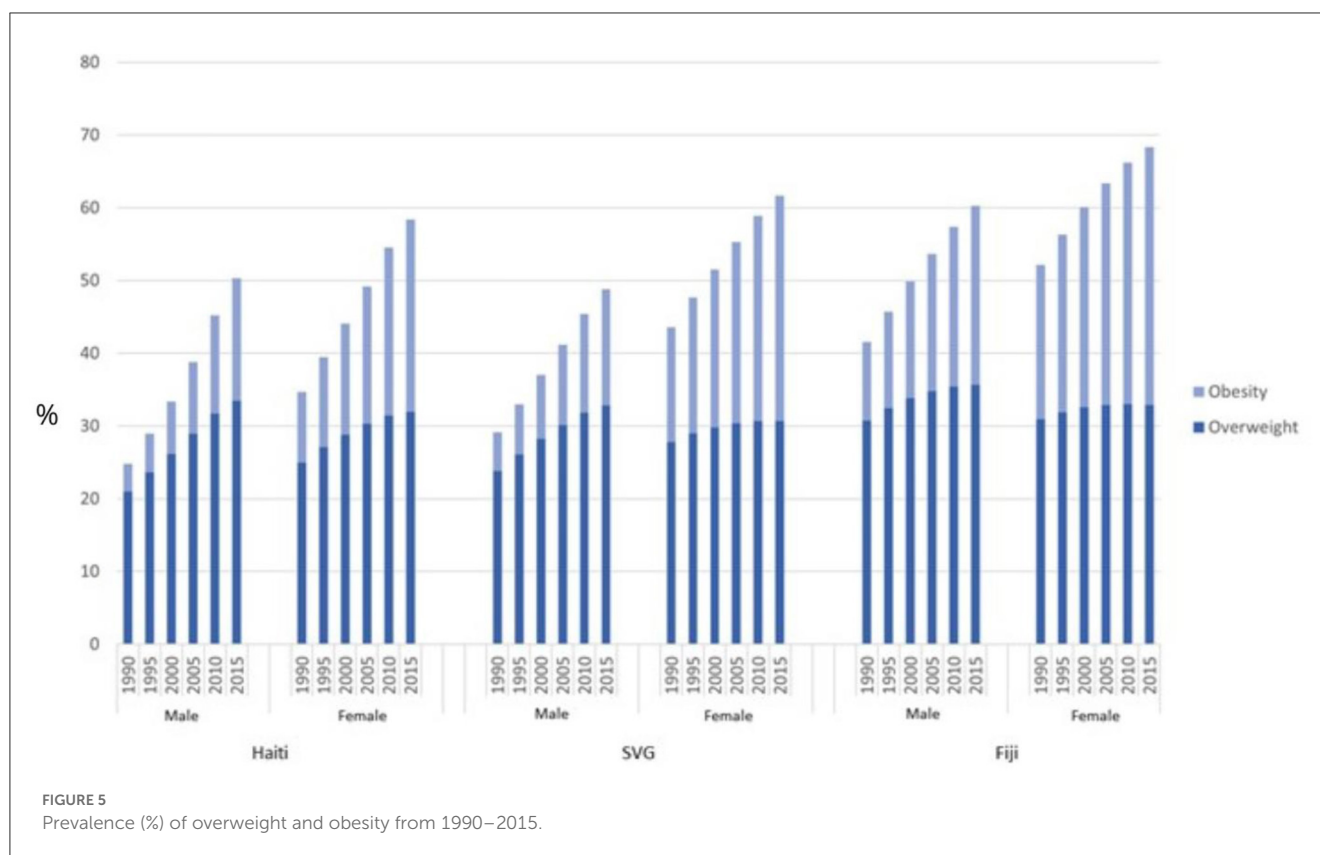
Country	Able to determine exports from local production or imports	Unable to determine	No data for food group
Fiji	Wheat, Barley, Maize, Oats, Sorghum, Other cereals, Sweet potatoes, Yams, Other roots, Honey, Other sweeteners, Pulses, Tomatoes, Onions, Bananas, Apples and products, Pineapples and products, Grapes and products (excluding wine)	Rice Cassava Potatoes Raw sugar Other vegetables Mandarins Other fruits	Rye Millet Lemons Limes Plantains Grapefruit Other citrus fruit Dates
SVG	Wheat, Rice, Barley, Maize, Rye, Other cereals, Cassava, Potatoes, Sweet potatoes, Yams, Other roots, Raw sugar, Other sweeteners, Pulses, Onions, Lemons and Limes, Bananas, Plantains, Apples and products	Other vegetables Mandarins Other fruits	Oats Millet Sorghum Honey Tomatoes Grapefruit Other citrus Pineapple Dates Grapes and products (Excluding wine)
Haiti	Wheat, Rice, Barley, Maize, Rye, Oats, Sorghum, Other cereals, Cassava, Potatoes, Sweet potatoes, Yams, Other roots, Honey, Other sweeteners, Pulses, Tomatoes, Onions, Other vegetables, Mandarins, Lemons, Limes, Grapefruit, Other citrus fruit, Bananas, Plantains, Apples and products, Pineapples and products, Grapes and products (excluding wine)	Other fruits Raw sugar	Millet Dates

NCD-RisC, NCD Risk Factor Collaboration.



5 years<sup>1</sup>. At the same time there are increasing rates of adult overweight, obesity and diabetes, and Haiti has high premature mortality from NCDs. Dietary fruit and vegetables are known

to help protect against NCDs. However, throughout the study period, the per capita supply of fruit and vegetables has been below the recommended dietary intake of 400 g per day (World



Health Organization, 2018a). Indeed, the situation is worse now than it was in 1980, with the per capita supply of fruit being close to returning to the level in 1980, but the supply of vegetables remaining well below.

In contrast to Haiti, in Fiji and SVG the per capita availability of calories is around 3,000, having risen from roughly 2,400 per day in 1980. In Fiji, the data show a steady rise since 1980, followed by plateauing between 2005 and 2010. In SVG there was no increase in per capita availability of calories until the late 1990s, since when there was steep climb, reaching the same level as Fiji by 2010. In both Fiji and SVG levels of overweight and obesity have risen alongside the increased availability of calories. The higher prevalence of obesity in Fiji may be in part due to the greater length of exposure to increased per capita calorie availability.

In Fiji there has been an increase in per capita availability of fruit and vegetables since 1980, rising from a combined total of roughly 100 g per day (little more than one portion), to 225 g per day, still well below recommended levels. SVG has higher levels of fruit and vegetable availability than Fiji, with marked increases in both, especially fruit, beginning around the year 2000. This might partly reflect an increase in local production for regional (Caribbean) and international [particularly to the European Union (EU)] fruit exports. The latest data for the availability of fruit and vegetables suggest that there is more than enough to meet recommended intake levels, although data from dietary surveys suggest that despite enough supply the vast majority of adults (>90%) consume <5 portions (400 g) per day (WHO, 2013).

## Dependency on food imports

While noting the limitations of the data described above, it appears that in both Fiji and SVG there has been over most of the time period of this study a marked dependency on food imports, accounting for over 60% of available food from 1980 up to at least 2005 in SVG and 2010 in Fiji. Liberalization of trade in agricultural produce in the 1990s (McKeon, 2015), reducing the price of imports relative to local produce, will tend to have reinforced this trend. However, in more recent years there is evidence that import dependency has decreased in both Fiji and SVG, with the proportion of food produced locally increasing. This is in keeping with policy commitments in the Pacific and Caribbean to strengthen local food production as a means to improve food security and population nutrition (FAO, 2017). However, whether these recent trends in reduced import dependency for food are maintained, and what underlies them, requires further investigation.

The situation with regard to food imports is different in Haiti. Here the data suggest that import dependency continues to steadily increase, doubling since 1980 to the current level of 25%, with a concomitant decrease in locally produced food. The government of Haiti is seeking to reverse these trends, aiming to boost the agricultural sector as a means of reducing food insecurity and improving population nutrition (World Food Programme, 2021).

With a high reliance on food imports, the SIDS of the Caribbean and Pacific are part of an increasingly globalized food system that is a complex web of activities involving the production, processing, transport, and consumption of food. Globally, over the



past several decades there has been a shift away from traditional, locally defined diets, toward more standardized diets dominated by a small number of staple foods (Clapp, 2016) and the consumption of increasing amounts of animal protein and highly/ultra-processed foods (high in sugar, salt, and fat) (Harris et al., 2020; Popkin et al., 2020). The results presented here are not unique to these Caribbean and Pacific countries but reflect current changes in diet, nutrition, and health outcomes within an increasingly globalized food system. One measure of the reliance of a country on food imports is their cost relative to earnings from the export of all merchandise (Hickey and Unwin, 2020). Globally, countries on average spend 5% of earnings from such exports on food imports. In the Caribbean and Pacific, it is higher, around 20% on average, but much higher in many countries. In Haiti, SVG and Fiji the percentages for 2015–2017 were 107, 152, and 30% respectively<sup>2</sup>. International tourism is a key source of the foreign currency needed to pay for food imports in many SIDS. The drop in earnings from tourism during the COVID-19 pandemic further emphasized SIDS vulnerability to the need to pay for food imports. In all three of the countries in our study, receipts from the visits of international travelers were estimated before the pandemic to account for between 34% (Haiti) and 78% (SVG) of total exports<sup>2</sup>.

## Addressing complex drivers

As noted in the introduction, SIDS in the Caribbean and Pacific region are particularly susceptible to diet-related non-communicable diseases (Afshin et al., 2019). This susceptibility is underpinned by the regions' colonial pasts (Wilson and McLennan, 2019; Guell et al., 2021), but perpetuated by their continued dependence on external food sources, exposure to extreme weather/environmental events, climate change (Mohammadi et al., 2022), and in the case of Haiti, severe political, economic and social instability. The large variation in the level of dependence on basic food imports year on year highlights the vulnerability of each of the three countries to internal and external shocks. The recent challenges to food security in SIDS from the COVID-19 pandemic have provided further argument for increasing local food production as one important approach to improving food security (WHO, 2013; Popkin et al., 2020). This adds weight to policy commitments that were made by SIDS governments as part of the Global Action Programme on Food Security and Nutrition (FAO, 2017) and the Caribbean Community's (CARICOM) goal of reducing the regional food import bill by 25% by 2025 (CARDI, 2019).

However, there are considerable challenges to overcome if local agriculture and fisheries are to provide nutritious foods as an increasing proportion of what is consumed in SIDS. For example, food system mapping in three Caribbean countries identified difficulties faced by local producers that included weak local supply and value chains, limited and insecure access to good land, lack of infrastructure to maintain the quality of produce between

farm and point of sale, lack of reliable markets, competition with cheap food imports and unpredictable extreme weather events (Guariguata et al., 2020). In addition to the supply side, further challenges arise on the demand side. In-depth interviews and focus groups with stakeholders from across the food system in SVG and Fiji found that while there is an appreciation of the cultural and potential nutritional value of traditional local foods, there is also a strong taste, particularly in younger adults, for ultra-processed, highly marketed, and branded foods (Guell et al., 2021). A further challenge in the promotion of local food production, is the lack of new entrants to farming and fishing due to their low social status and the perceived difficulty in making a decent living (Guell et al., 2022). Women food producers face particular difficulties, including in access to land and lack of gender sensitive policies, reflecting in part persistent colonial-plantation relations and patriarchal social norms (Barry and Gahman, 2021).

Much relatively recent national and regional policy, in the Caribbean at least, has focused on exploiting potential opportunities in global food value chains (Guell et al., 2021), with the export of bananas, accounting for almost 50% of agricultural exports from SVG, being one example. However, despite strong regional and national policies to move toward a global food value chain approach, the region's agro-processing industry remains underdeveloped and the expansion toward a value-added system has been limited (World Bank, 2017). At the same time, these policies while ineffective in developing a value chain approach to agriculture, have been identified as undermining efforts to develop local food production (Wilson, 2016; Guell et al., 2021). Ineffective in stimulating the region's agriculture sectors, the focus on engaging with global food value chains has been identified as undermining the social practices that propagate healthy food consumption in the region (Wilson, 2016; Guell et al., 2021). It remains to be seen whether the recent commitments by governments in the Caribbean and Pacific to decreasing reliance on food imports and increasing local food production and consumption will reverse these trends.

## Conclusions and recommendations

The data presented in this article reveal that the Global Action Programme's targets for enhancing food security and nutrition in SIDS remain a long way off. Fruit and vegetable supplies are insufficient in Fiji and Haiti to satisfy minimum dietary intake recommendations, inconsistent with current targets to ensure access to sufficient, safe, affordable, diversified, and nutritious food. The per capita supply of calories has increased substantially, over ten percent of which in all settings are from sugar, which would be even greater with the inclusion of sugar sweetened beverages; concurrent with these changes have been marked increases, particularly in women, in the prevalence of overweight and obesity. An increased supply of healthy produce (fruits and vegetables) is necessary but insufficient to improve diet, as evidenced in SVG, the only country with more than the recommended daily minimum intake available per capita yet where over 90% of the population consumes less than this. Import dependency is high in Haiti, SVG, and Fiji. However, policy commitments in the Pacific and

<sup>2</sup> UNdata. (2021). Available online at: <http://data.un.org/> (accessed February 21, 2021).

Caribbean to strengthen local food production to improve food security appear to have brought dependency down over the last two decades, with the proportion of food produced locally increasing. Finally, the clearly outlined limits of the food supply and intake data have made it challenging to understand import dependency and the relationship between food supply and diet. Trends should be monitored and evaluated with higher quality data on re-exports and NCD surveillance alongside dietary surveys.

## Data availability statement

Publicly available datasets were analyzed in this study. This data can be found here: <https://www.fao.org/faostat/en/>.

## Author contributions

NU, KM, and EH developed the research questions and objectives. CH gathered data and produced figures. KM, NU, AS, CG, EA, LG, VI, GH, MM, EH, RT, and PD contributed to the review of the final draft. KM, NU, and CH contributed to the writing of the final draft. All authors contributed to the article and approved the submitted version.

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## Conflict of interest

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